



arahne



ArahPaint®

User's manual



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1 INTRODUCTION

Welcome to ArahPaint—a drawing tool which helps textile designers in editing pictures in repeat. These pictures are mainly used for jacquard woven fabrics. ArahPaint is the first step in the preparation of a design for weaving. The program supports both drawing operations as sophisticated textile functions. Drawing operations have unlimited undo capability; allowing you to quickly correct undesired modifications to the picture.

The topics of this manual are arranged in a similar way to the sequence in the design preparation procedure. The reader should be familiar with graphical user interfaces since its basics (selection with a mouse, double-click, buttons, file selection boxes, text entry and editing, etc.) will not be explained here.

ArahPaint is aimed at designers who have some knowledge of the weaving process. Namely, the manual does not contain complete instructions to develop a design into a fabric. ArahPaint contains many tools to assist a textile designer, but they cannot replace the skills and knowledge of a professional textile designer.

We hope you find ArahPaint a powerful designing tool, which will help you in everyday work. We are always open to comments and suggestions, so please send them to our address, and we will do our best to improve the program.

2 PROGRAM'S APPEARANCE

After starting the program by clicking on the *Arahpaint's* icon (Figure 1), the main window is displayed on the screen. Except the **File**, **Edit** and **Help** menu, all menus are inactive until you create a new image or load an old one or paste an image from the clipboard.

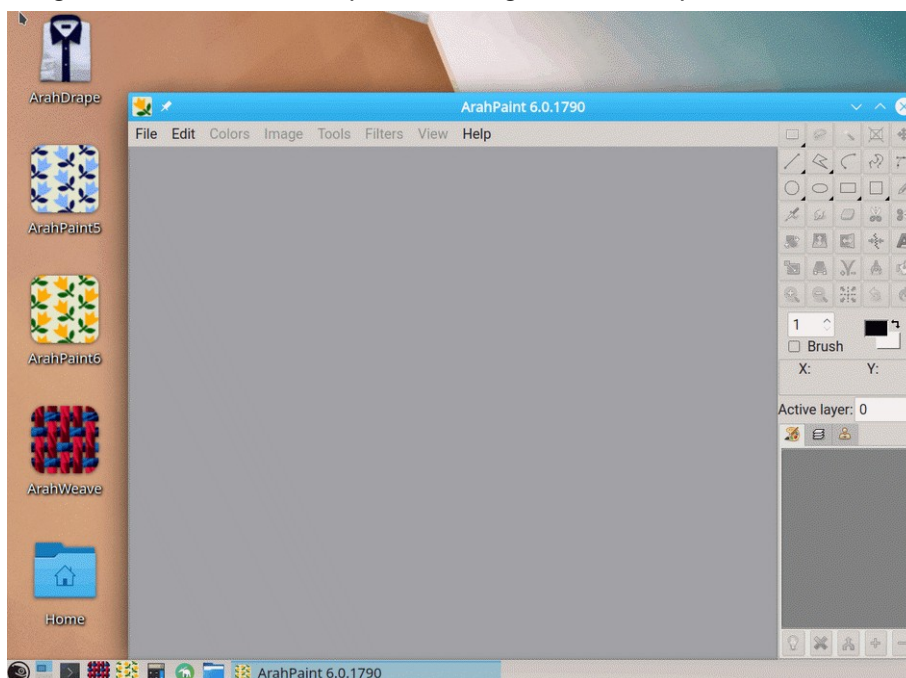


Figure 1: ArahPaint on KDE Desktop

Figure 2 explains the components of Arahpaint's main window:

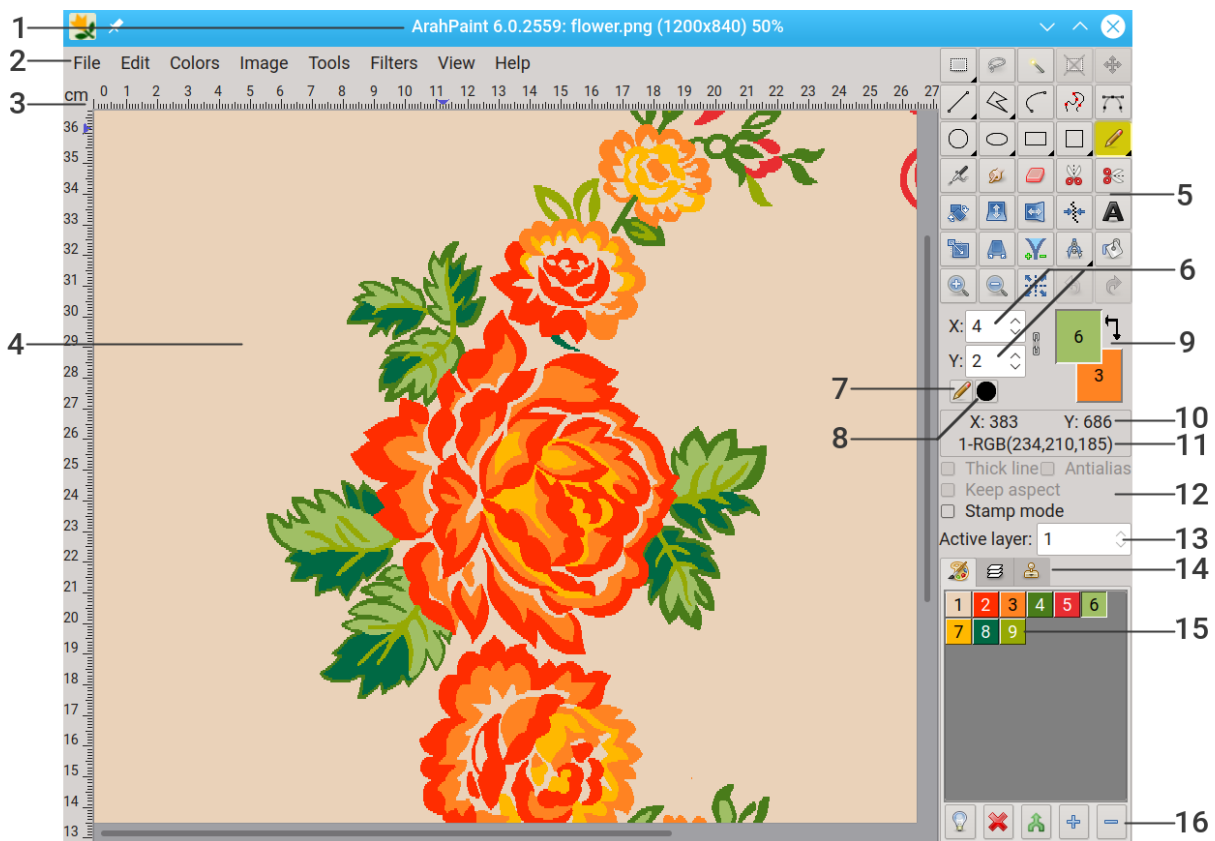



Figure 2: Main window of ArahPaint

1. The title bar displays the program name, version and current design filename, size in pixels and zoom level.
2. Menu bar.
3. Ruler (optional).
4. The main window is the area which displays the currently edited picture. Note that the first row of design is at the bottom of the picture, as this is usual in weaving.
5. The toolbox contains tools for creating and editing images.
6. Line width—this setting sets the width of lines, rectangles/squares, ellipses/circles, arcs, polygons, brushes. If you break the chain's link by clicking on the chain icon , you can set the width in the x and y direction independently.
7. The drawing mode. The default is a standard drawing, indicated by a pencil.
8. If you set the width of a line to be more than 1 pixel, then you can choose the shape of the pen, which influences the look of the starting and ending points of the line and the shape of a single-click drawn object.
9. Color indicator shows which color is the foreground and which is the background. By double-clicking the color indicator, the color dialog box will pop up.
10. Pointer coordinates
11. Color RGB values of the pixel under the cursor.
12. Options of the currently selected tool.
13. Active layer number.
14. Panels (colors, layers, brushes).
15. Color palette (sometimes referred as color table or colormap).
16. Palette's toolbar.

2.1 SETTING THE LANGUAGE

To change the user interface language of *ArahPaint*, choose **Help > Language** and select the language from the list. You must restart *ArahPaint* for the change to take effect.

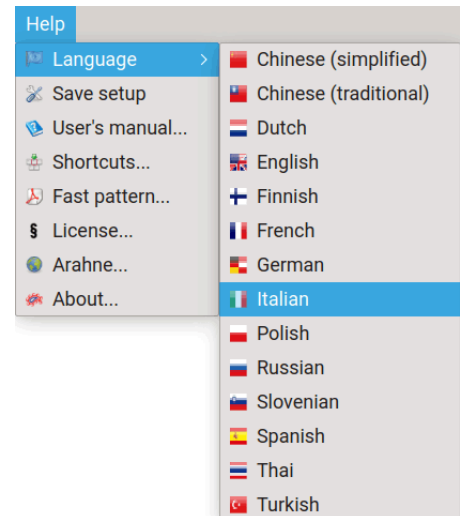


Figure 3: Setting the language

2.2 MEASUREMENT SYSTEM (METRIC OR IMPERIAL)

If you disable the **Metric** units option in the **View** menu, the measurement system is switched to imperial, or vice versa.

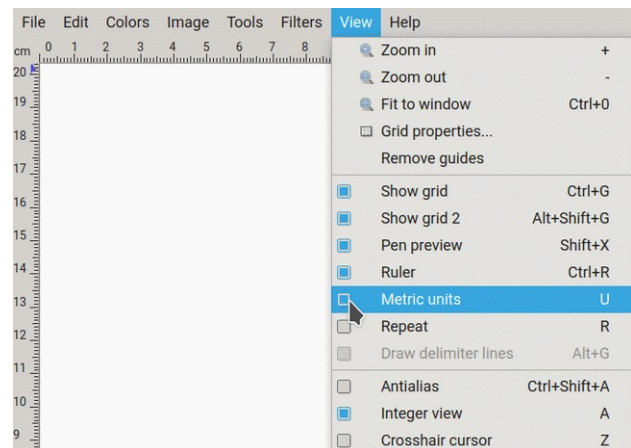


Figure 4: Changing the unit of measurement.

2.3 SAVING OTHER USER-DEFINED SETTINGS

Normally *ArahPaint* runs alongside *ArahWeave*, which enables you to modify and save *ArahPaint*'s preferences too. But if you want to use *ArahPaint* to save its current settings, you can do so by clicking the Save setup menu entry (**Help > Save setup**). The current state of user interface variables—they are listed and described in more detail in the subsections below—is saved in the configuration file. Next time when you open *ArahPaint* these settings will be used.

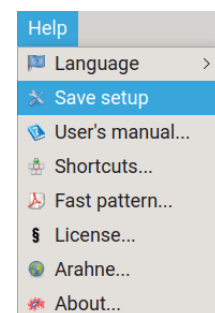


Figure 5: Saving the setup

2.3.1 CHANGING THE DEFAULT LOAD AND SAVE LOCATION

If you want to change a default save location, navigate in the image browser to the desired folder, and click the **Help > Save setup** menu.

2.3.2 THE IMAGE BROWSER PREFERENCES

The current state of the image browser's variables is saved when you click the **Help > Save setup** menu.



Figure 6: The view options in the image browser

2.3.3 SAVING THE DEFAULT WINDOW'S SIZE

If you want change the size of the *ArahPaint*'s window, scale it to desired size and click the **Help > Save setup** menu.

2.3.4 OTHER SETTINGS

Beside a location, window sizes and image browser settings, the options under the view menu and Save as window are saved, when you click the **Help > Save setup** menu:

- Grid on/off
- Grid properties
- Integer view on/off
- Ruler on/off
- Measurement system (metric or imperial)
- Pen preview on/off
- Default image file format for saving

3 SUGGESTED SEQUENCE OF STEPS

The process of converting a design idea into a fabric can be divided into the following steps:

1. Preparation of the design with *ArahPaint*.
2. Preparing the necessary weaves in *ArahWeave*.
3. Combining the design and weaves into a jacquard control data with the color simulation on screen and paper.
4. Selecting the appropriate loom layout and saving the design in the desired jacquard format.

ArahPaint only covers the first stage – the preparation of the design – which can be subdivided into the following steps:

1. Drawing a design on paper.
2. Scanning the design into the computer.
3. Loading the design into *ArahPaint* program.

4. Cutting out the color border.
5. Scaling the image to the desired dimensions.
6. Setting the number of colors (weaves).
7. Cleaning the scanned picture.
8. Editing the picture.
9. Saving the final picture.

3.1 DRAWING A DESIGN ON PAPER

Drawing a design on paper is usually simpler and easier for a designer than drawing it directly into the computer. Therefore, a design can be drawn by hand on paper using traditional drawing techniques. The drawing can be black and white or colored. It is easier to color regions using Arahpaint's bucket fill tool instead of doing it by hand.

The design does not need to be drawn in 1:1 scale because the computer can resize the image to any size. A design on paper does not need to exceed the size of A4 format. In this way, an A4 scanner will be enough to import the picture into *ArahPaint*.

3.2 SCANNING THE DRAWING

Regardless of the scanner type, you should take care of that:

1. The image is aligned with the scanning area, which reduces the need to rotate the drawing later on.
2. The unnecessary white space should be cut out from the scanned picture. By using the preview mode, you can see the size of the drawing in correspondence to the scanning area. Use the bounding rectangle to limit the scanning area to the area actually covered by the drawing.
3. Choose a proper scanning accuracy. This is measured in dpi (dots per inch) and it ranges from 50 to 2400 dpi. The bigger the dpi, the better the accuracy. But a better way to calculate the accuracy is to set the proper dimensions of a scanned drawing. The user usually knows in what quality the design will be woven. A particular design will be woven on jacquard looms with 1344 hooks. This means, the scanning width in pixels shall not exceed 150% of the hooks used. This means $1344 * 1.50 = 2016$ pixels of scanning width. Dividing the drawing width on paper in inches by scanning width in pixels will give us the dpi. Again, for our example, let's suppose the drawing is 15 cm wide. Thus $2016 / (15 / 2.54) = 341,3$ dpi. By using this simple formula, the user can calculate the accuracy and/or scanning width, whichever can be set in the scanning software.
4. Set the proper saving format. For importing an image in ArahPaint, you can use PNG, GIF, JPEG, WebP, TIFF, PCX, BMP graphic file format. In total, 72 file formats are supported, including many weaving related ones (dobby and jacquard card machine formats). Vector formats like PDF, PS or SVG can also be imported. If you encounter an unsupported image format, you can use the program Gimp to convert the image into one of the supported formats.
5. Save the drawing into the desired directory.

4 BASIC OPERATIONS

For effective use of the program, you should be familiar with some basic functions, like loading and saving files, selecting a region, setting colors... In this chapter we will not explain them in full detail, just enough to enable you to work with the program. You should understand the basic operations before continuing with the other chapters.

4.1 CREATING NEW IMAGES

The **New picture...** command from the **File** menu (**Ctrl+N**) lets you create a blank image.

In the pop-up window you can set the following parameters:

- **Size:** **Width** (this will usually be equal to the number of pattern hooks on your jacquard head) and **Height** (this will usually be equal to the number of wefts/picks in your design).
- **Color depth** (for jacquard, you will mostly use indexed-color images (color palette images), which enable you to work with up to 256 colors).
- The **fill type** of the new image.

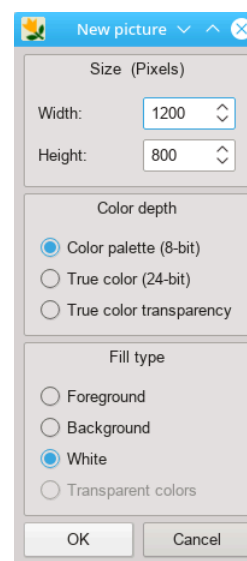


Figure 7: New picture dialog

4.2 LOADING IMAGES INTO ARAHPAINT

To open a file, choose **File > Load picture...** (keyboard shortcut **Ctrl+O**). In the **Load picture** dialog box, select the name of the file you want to open. The appearance of the File selection dialog depends on the operating system you are using.

The program can load pictures in PNG, GIF, PCX, BMP, TIFF, WebP and JPEG graphics file formats. Also, it supports most of the jacquard specific machine formats (TIS, Grosse, Stäubli, Bonas, Schleicher) and some competitors (Sophis, EAT) as well. Additionally, ArahPaint imports some vector formats – SVG, PDF and SVGZ.

*If you enable the **Hide load menu, use browse** option ArahWeave, then the **Load file** command opens the **Browse images** dialog, and not the **Load picture** dialog.*

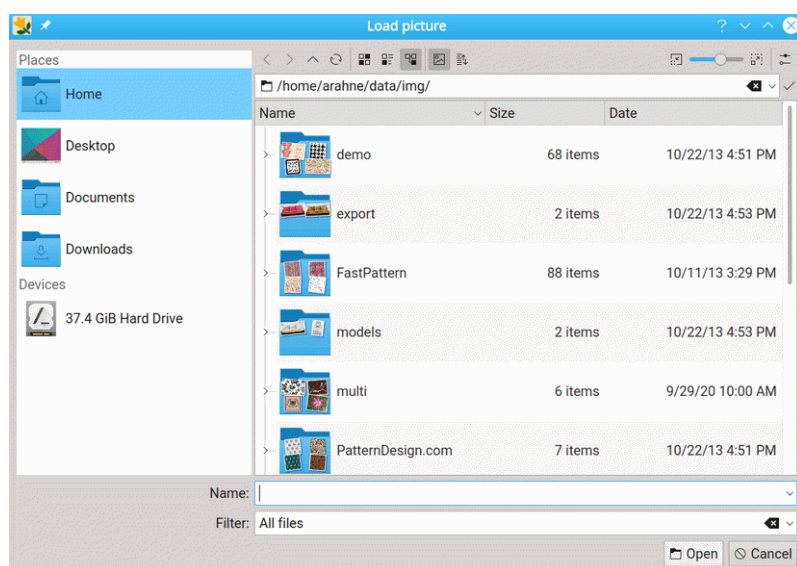


Figure 8: File selection dialog on Linux

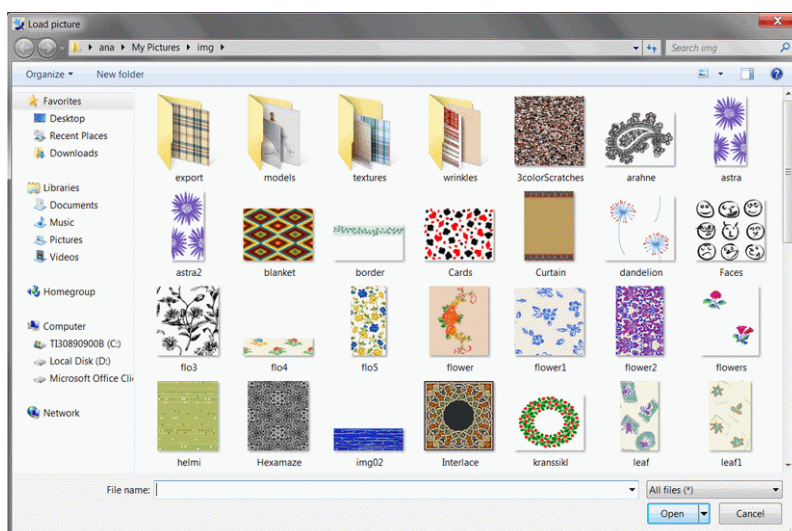


Figure 9: File selection dialog on Windows 7

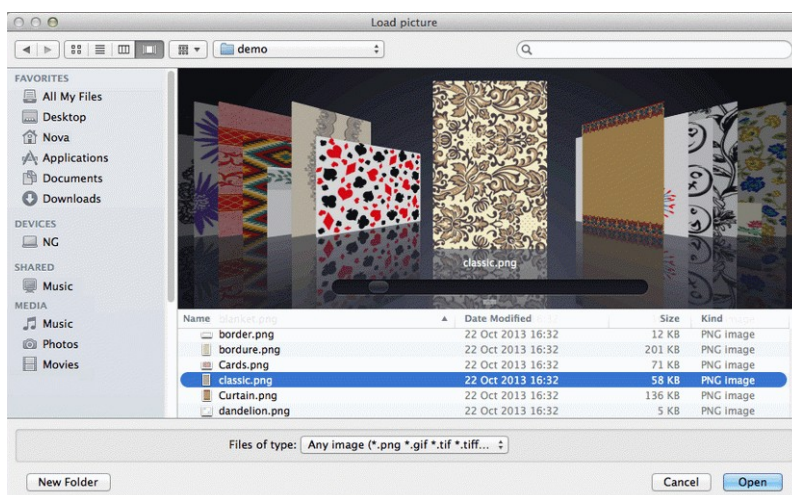


Figure 10: File selection dialog on Mac OS X

4.3 LOADING FILES FROM IMAGE BROWSER

To load a file using the Image Browser, choose **File > Browse...** (keyboard shortcut: **Ctrl+Shift+O**). The image browser displays thumbnails of image files to identify each image.

The text labels below the image icons have different background colors. Currently selected image has a text label in yellow, so you can quickly find it. Bi-level (black and white) images have a light gray background of the filename area, indexed-color (8-bit) images have it in white, true-color images have a background in light pink, and images with alpha channel (transparency) have light-blue labels (Figure 11). So you can quickly distinguish jacquard cards or weaves (black and white), scanned images (true color) and cleaned up palette images.

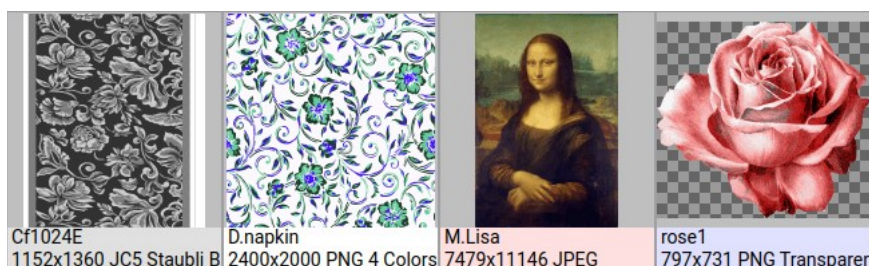


Figure 11: Four different color tags help distinguish between file types.

When hovering over the image icon, a *tooltip* appears, showing a filename, image size in pixels, number of colors, density (dpi) and physical size, file size and date of modification.











Figure 12: Image browser

Do one of the following to open the image in *ArahPaint*:

- Double-click an image file.
- Select an image file and then click **OK**, or press Enter.

The meaning of icons in the toolbar is described in the following table.

	One directory up		Rename image
	Reload		Delete image
	Back to default directory		Open image in a new ArahPaint window
	Details view mode		PNG and JPG optimizer (a keyboard shortcut is . (period))

The options icon menu and filter options are positioned at the bottom of the window.

- The **Filter** option allows you to search for particular images by size X, size Y, date of creation, file name, file format, and color depth. The program will interactively change the display to show you only pictures which match the search filter. In this way you will find the image you are looking for very quickly.

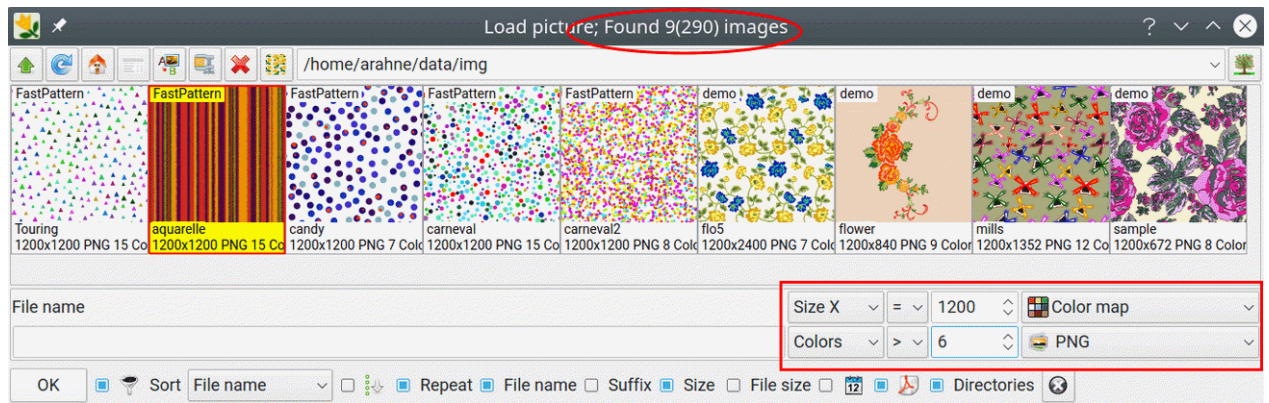


Figure 13: The filter finds 9 images out of 290 that meet the set criteria.

- The sort drop-down option button allows you to choose a criterion, by which you want to sort the fabric files. The default criterion is the name, followed by file type, file size, date, image size in the horizontal direction, image size in the vertical direction, image size in both directions, number of used colors, dpi X, dpi Y, Width (cm), Height (cm), and Bad repeat.

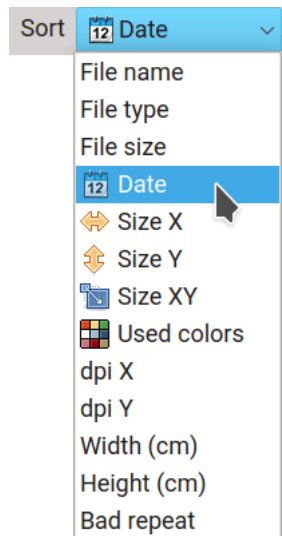



Figure 14: Menu of sorting criteria

- The **Repeat** option is enabled by default. It means that the image icon is displayed in continuous repeat; if disabled, the icon shows the image as it is.



Figure 15: Same image displayed in repetition, with a repeat option enabled (left), and disabled.

- Then there are some options to change what is shown in the information below fabric icons: Filename, Suffix, Size in pixels, File size, and Date.
- The vector preview enabled  will calculate the preview icon also on PDF, Postscript or SVG files. Since this is quite a time consuming operation (large multi-page PDF files must be read entirely), it is turned off by default. You can enable it if preview of vector files is important to you, and if the number of vector files in a directory is not too big.

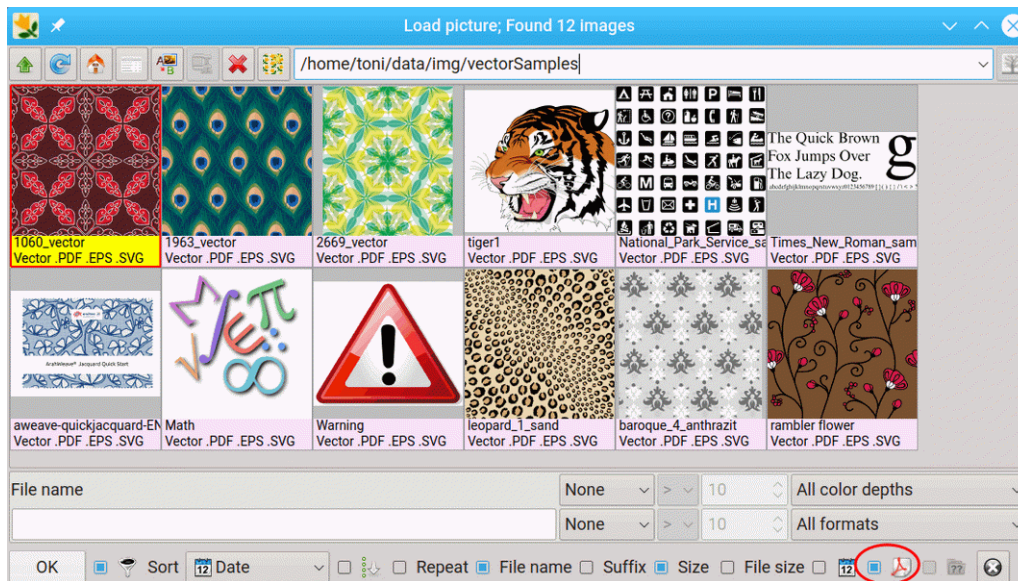


Figure 16: Preview of vector files in the image browser.



- To check the number of files and sub-directories in the directories displayed in the Browse window, do enable the Show number of files option  . The number of files in the directory is displayed below the directory icon, the number of sub-directories is displayed next to the directory icon.



Figure 17: The number of files in directory and the number of sub-directories

Another useful function of the image browser: pressing the first letter of directory or file name positions selection on a directory or file whose name starts with that letter.

4.3.1 IMAGE PREVIEW

To preview an image, position the pointer over a thumbnail and click with the right mouse button. The Preview window in a full screen mode will appear. The arrow keys (\leftarrow \uparrow \rightarrow \downarrow) move the image in the window in the desired direction. Default view size is set to 100%, the repeat view is on. Press F on the keyboard to fit the image in the window. Use + and - or Ctrl+mouse wheel to zoom in or zoom out (or 1,2,3,... for zoom 100%, 200%, 300%...). R toggles between the single image view and the repeating image view. The Page Down key loads the next image, the Page Up key loads the previous one. The Home key loads the first image in the directory, the End key loads the last one.

To close the Preview window press the Esc key, or click with the right mouse button in the preview window.

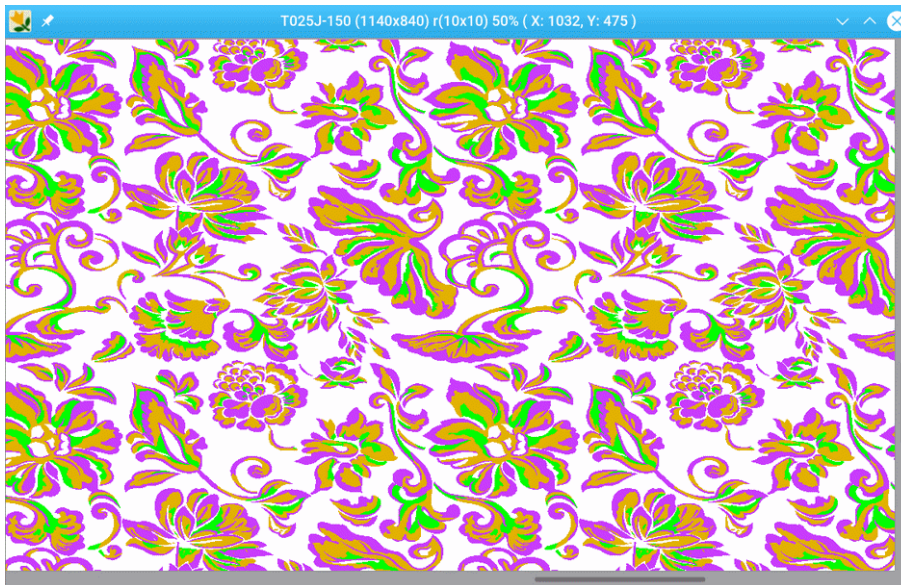




Figure 18: The image preview window

4.3.2 THE DETAILS VIEW

The image browser also supports the details view, which displays each file in a separate line, as a file name followed by information about the image: Date, File type, Size x, Size y, Colors, dpi X, dpi Y, Width(cm), Height(cm), File size. You can sort images by any of these criteria. To change the sort key, click in the title of the list. A column of this property is highlighted in yellow. To switch from icon view to details view click the details view icon , to go back click the icon view icon .

Load picture; Found 80 Images

/home/toni/data/img/DEMO



File name	Date	File type	Size X	Size Y	Colors	dpi X	dpi Y	Width (cm)	Height (cm)	File size
sadje5e.png	15.Jun.2022 10:45	PNG	1800	1400	4	81	66	22.1	21.2	91,778
CT07070.jpg	31.Jul.2009 11:26	JPEG	1841	1841	Millions	300	300	6.1	6.1	251,876
2.DES.FLUIDITY_t.p...	15.Jun.2022 10:47	PNG	2400	1360	2	121	96	19.7	14.1	65,638
ara1.png	05.Jun.2009 12:34	PNG	2400	2259	3	254	254	9.4	8.9	194,821
sample7.png	15.Jun.2022 10:44	PNG	2400	1200	4	162	81	14.8	14.8	57,094
spots.png	15.Jun.2022 10:42	PNG	2400	1320	42	162	95	14.8	13.8	2,217,106
tutorial11-01.png	02.Feb.2015 13:14	PNG	2400	1400	5	162	101	14.8	13.8	71,112
tutorial11.color.png	02.Feb.2015 13:14	PNG	2400	1400	4	162	101	14.8	13.8	72,996
tutorial11.png	02.Feb.2015 13:14	PNG	2400	1400	2	162	101	14.8	13.8	69,310
3-KUPON-5537-030...	22.Mar.2017 16:40	PNG	2648	2566	7	508	508	5.2	5.1	559,163
h4307.png	14.Jul.2020 11:19	PNG	3000	1029	5	162	111	18.5	9.2	362,224
B570B.png	23.Jun.2011 13:58	PNG	3500	3200	3	19	19	177.8	162.6	338,172
varianta.png	02.Feb.2015 13:14	PNG	3518	6459	6	599	599	5.9	10.8	217,771
artRose.png	30.May.2022 17:13	PNG	4167	4167	Millions	150	150	27.8	27.8	13,901,478

File name: None > 10 All color depths > All formats

OK Sort Date Repeat File name Suffix Size File size


Figure 19: The image browser in the details view mode.

4.3.3 BROWSING SUBDIRECTORIES


ArahPaint's browser is capable of showing files in subdirectories. It is very useful when you search for a file, but you don't know where you have saved it. If there are directories in your parent directory, then the Image browser displays the "leafless tree" icon  at the top right corner of the window (in the same line as a directory path). To display all files from subdirectories, click the tree icon. It changes to the "tree with leaves and fruits" icon , which means that the Image browser shows all files from

the parent directory and its subdirectories. If an image was found in a subdirectory, then the name of the subdirectory appears in the image icon.


4.3.4 RENAMING FILES

You can also rename image files from the **Browse** window: left-click the name below the image's icon, or  icon in the toolbar. A small window appears and you just type the new name and press Enter.

4.3.5 DELETING FILES FROM ARAHPAINT

If you want to delete a file, or image file, choose **File > Browse...**, select a file you want to delete, and press Delete button on your keyboard, or click  icon in the toolbar. You will be warned before the file is actually deleted, but once you do it, there is no way back.

4.3.6 OPTIMIZING PNG AND JPG FILES

ArahPaint's image browser enables you to reduce the file size of older png and jpg images or images that you get from other sources. To use this function, select the image icon, and click the Optimize PNG and JPEG images icon  or select the keyboard shortcut *Period* (.). After it finishes—few seconds for large files—the pop-up dialog shows the information about size reduction or tells that the file is already optimized.

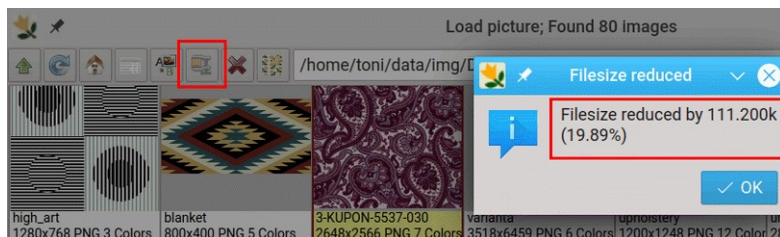


Figure 20: Information about file-size reduction after using the PNG optimizer.

4.4 OPENING IMAGE FROM DESKTOP OR FILE MANAGER

You can open an image file from desktop or file manager by dropping the image icon over the ArahPaint shortcut icon.



Figure 21: Opening an image from Desktop (or File manager)

After dropping an image icon into ArahPaint's icon, the program starts with that image loaded.

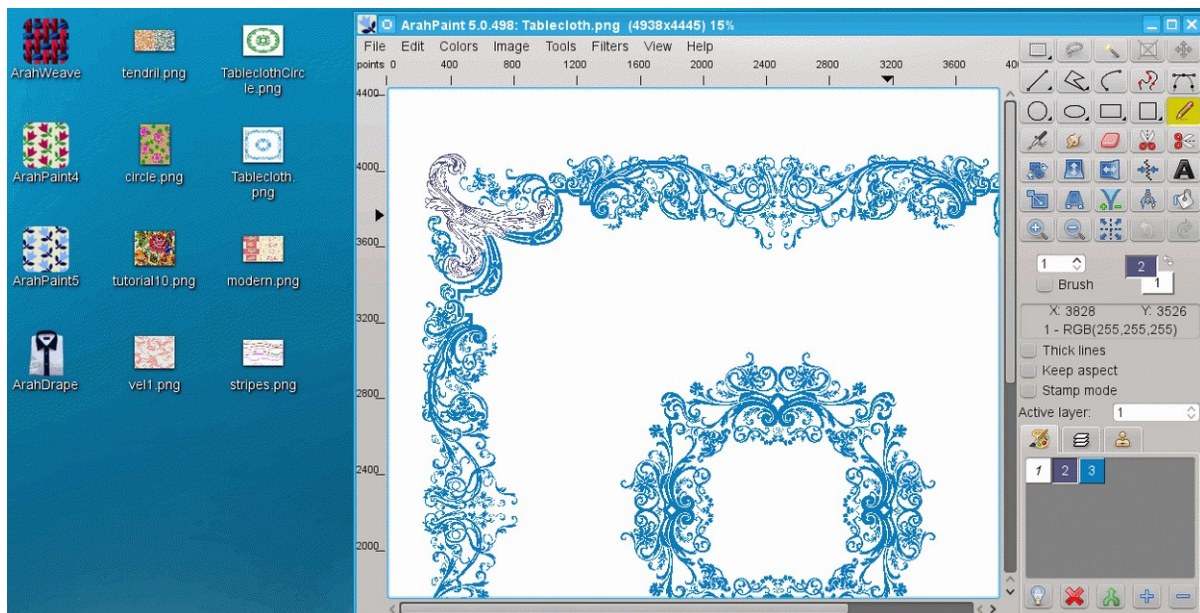


Figure 22: After you have dropped a file icon over ArahPaint program shortcut, a file icon moves back to its previous position and program opens with image loaded

If you drag-and-drop an image icon into an already running ArahPaint, it will load it as a layer onto the currently loaded background image.

4.5 LOADING RECENTLY USED FILES

ArahPaint remembers recently used files and directories. To open one of recently used files, choose **File > Load recent...** The menu of the recently used files consists of two sections, one displays recently saved files, the other displays recently viewed files.

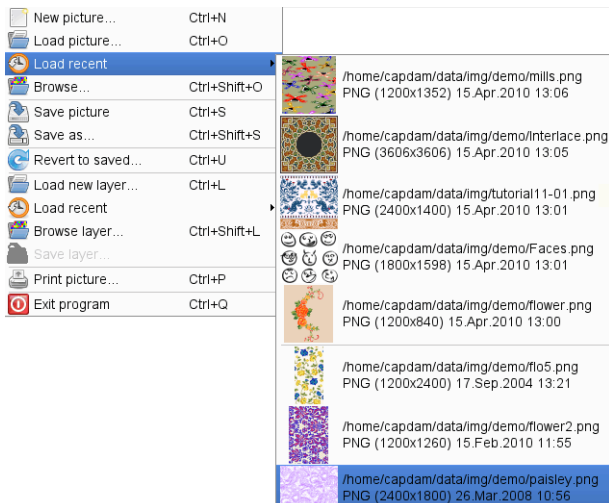


Figure 23: The load recent menu with file icons

You can set the number of recently used files in the **Number of recent files** field in **Save setup > Appearance** in ArahWeave.

To open a list of the directories that you most recently accessed through the **Load picture**, **Save as**, or **Browse** dialog boxes, click the arrow at the right side of the Location bar. These directories are sorted by access time with the most recent at the top, least recent going down on the list.

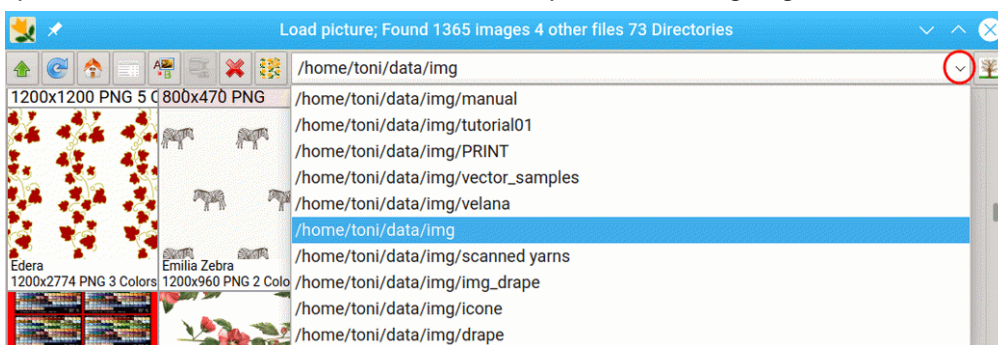


Figure 24: Most recently used directories list

4.6 SAVING A DESIGN


You can save the image under an existing name by selecting the command **Save** from the **File** menu (keyboard shortcut **Ctrl+S**).

In case you want to change the name of the design, invoke the command **Save as** from the **File** menu (keyboard shortcut **Ctrl+Shift+S**). This action will bring up the file selection box, where you can choose the desired directory and enter the new file name. If the file with the same name already exists, ArahPaint warns you before saving. The program gives you the option of either overwrite the existing file or change the file name.

The default file format for image saving is PNG. You can save an image in five other formats: TIFF, GIF, JPEG, WebP, and BMP. To specify the file format, you have to write the proper file extension to the file name.

4.7 IMPORTING VECTOR IMAGES (SVG, PDF) INTO ARAHPAINT

ArahPaint supports importing of Scalable Vector Graphics images (**svg** and **svgz** extension) and images (documents) in Portable Document Format (**pdf** extension).

To import a vector image into ArahPaint, choose **File > Import vector image...** (instead you can use **File > Browse...** and import a vector file from regular image browser). In the **Load picture** dialog, the correct filter (**Files of type**) is already set to svg, pdf, and svgz file types, so the dialog displays only files in these three formats. Then choose a file which you want to import, and click Open. The program pops-up the **Import vector image** dialog, showing the preview of the image next to the Width and Height field. Enter the width and height in pixels. If you break the chain by clicking on it () , you can change the **Width** and **Height** separately.

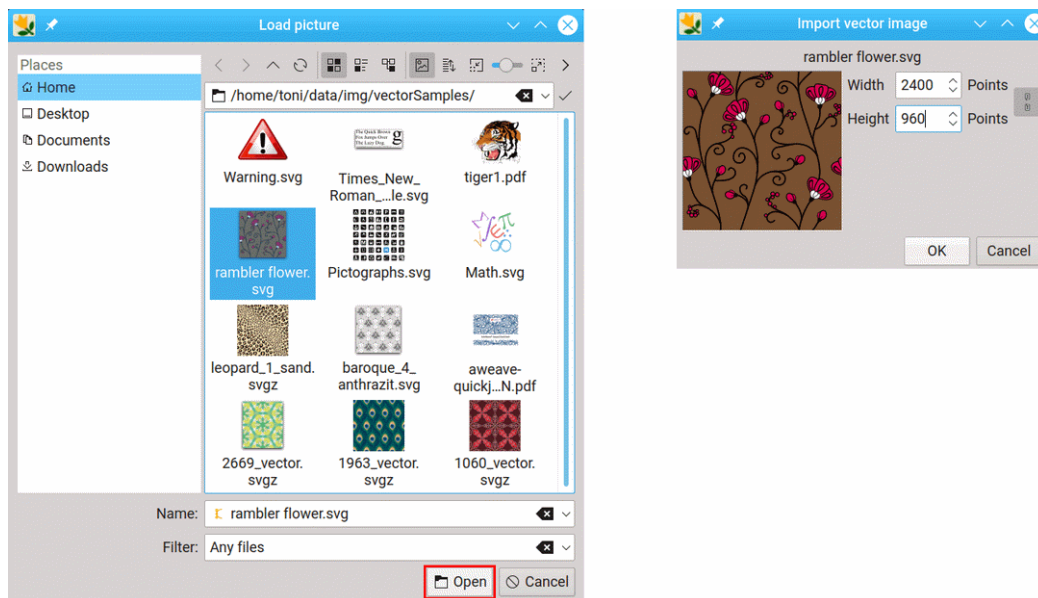


Figure 25: Importing vector image into ArahPaint

After clicking the OK button, the image appears in the main ArahPaint window.

If you import a PDF file, the Import vector image dialog is slightly different, because a PDF file can consist of several pages. You can select more pages of the image (document) for importing, which are then opened as layers in ArahPaint. Also, you can set the density and size of the imported image.

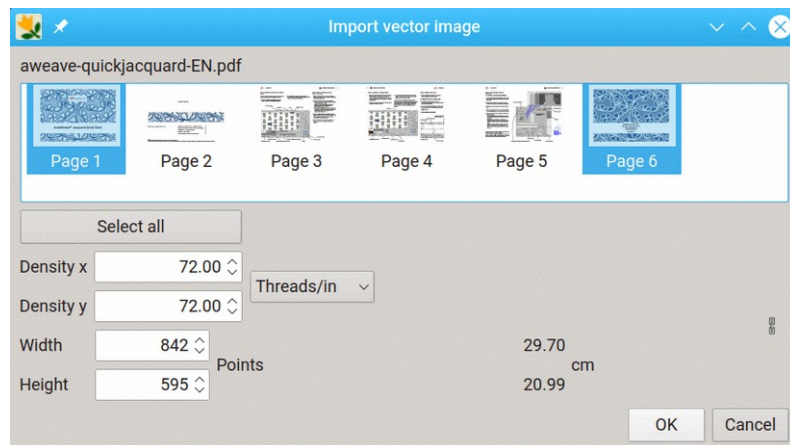




Figure 26: Importing a PDF file into ArahPaint

4.8 CLEAR IMAGE

You can get a new image from the previously loaded one. Use **Edit > Clear**, and all colors in the image change into the currently selected foreground color. The difference to the **New image** function is that you keep colors from the old image in the Color palette. If you use the **New image** function, you get sixteen random colors in the Color palette.

4.9 UNDO / REDO



We want you to be able to freely experiment with the program, without fear of damaging the image. So you need to be able to undo the drawing operations.

The **Undo** command in the **Edit** menu (**Ctrl+Z**, ) restores the picture to its previous state. To **Redo** last operation, choose **Edit > Redo** (**Ctrl+Y**, ) . The number of the undo steps is unlimited.

4.10 MAGNIFYING OR REDUCING THE VIEW

You can magnify or reduce your view using various methods. The main window's title bar displays the current zoom level.

There are four ways to change the zoom level in *ArahPaint*:

1. Press the plus key (+) to zoom in, or press the minus key (-) to zoom out.
2. Press Ctrl on the keyboard and roll the mouse wheel up or down.
3. Click the icon  or  in the toolbox.
4. If you press any number from 0-9 on the keyboard, you will change the zoom directly to that level (1 means 100%, 6 means 600%, 0 means 1000%).

The program will zoom in or zoom out at the current position of the cursor. You can also change the zoom level during drawing operations.

4.10.1 FIT TO WINDOW

If you want that an image fits the entire available space in the main *ArahPaint* window, choose **Fit to window** from the **View** menu or select **Ctrl+0** (zero).

4.10.2 ALTERNATING BETWEEN CURRENT ZOOM AND 100% ZOOM

Pressing the **Esc** key on keyboard toggles back and forth between currently selected zoom level and 100% zoom.

4.10.3 GRID

At zoom levels higher than 300%, the program shows a grid between pixels if the grid view is enabled.

To show or hide the grid, choose **View > Show Grid** (**Ctrl+G**).

To change the grid properties, choose **View > Grid properties...** You can change the grid color to black, gray or white color. The second level grid determines after how many thin lines a thicker one will be drawn.

If you select the Unit(cm) checkbox, the program will match the Width and Height to the density, which is set in the Resize image window.

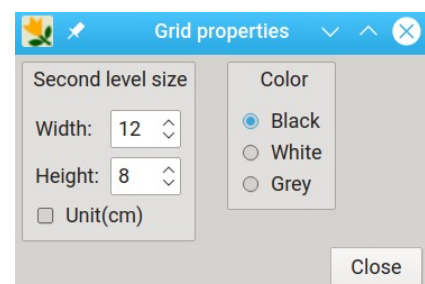


Figure 27: Set grid properties

4.10.4 ANTI-ALIASING

When you zoom out the picture, the anti-aliasing (**View > Antialias**) smooths the jagged edges in the image by softening the color transition between edge pixels and background pixels.

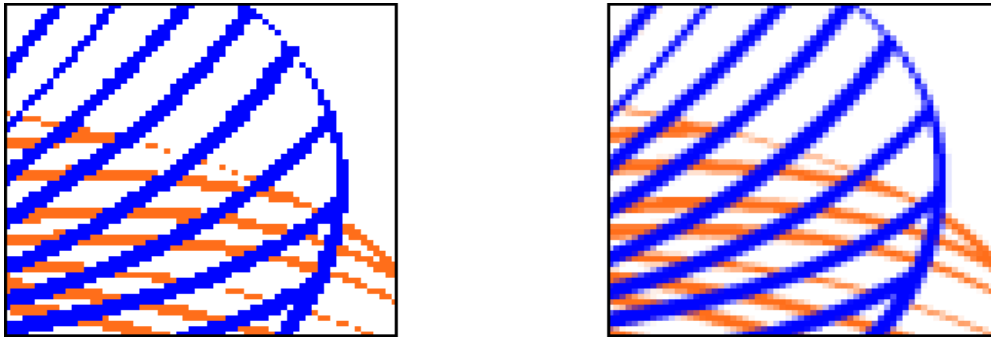


Figure 28: Same design, viewing at zoom out 30%, with anti-alias off and on

4.11 RULER

Ruler helps you position items (such as selections, layers, and shapes) precisely across the width or length of an image. When visible, ruler appears along the top and left side of the main window. Markers on the ruler display the pointer's position when you move it. To show or hide ruler, choose **View > Ruler** or press **Ctrl+R** on the keyboard. It displays the length and position in pixels or in centimeters. To switch between the two units, click the ruler unit indication (points, cm) (see Figure 29).

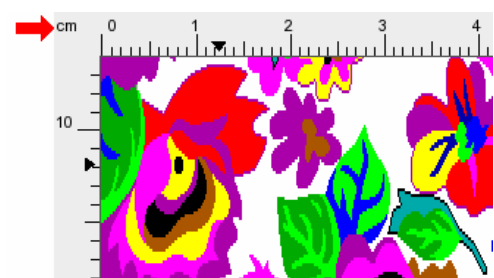


Figure 29: Ruler unit

4.12 DISPLAYING THE RGB COLOR VALUES

ArahPiant displays the color RGB values of the pixel under the mouse pointer, while you move it across the image. If you work on indexed color image, then the color position number (index) is displayed next to the color RGB value.

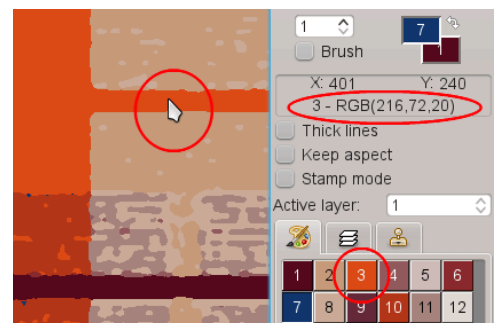



Figure 30: Displaying the color's position number and the RGB color value of the pixel under the pointer

4.13 GUIDES

In addition to the image grid, ArahPaint also gives you a more flexible type of positioning aid: guides. These are horizontal or vertical lines you can temporarily display on an image while you are working on it.

To create a guide, simply double-click one of the rulers in the main window. The guide is then displayed as a blue, dashed line, which follows the pointer.

You can create as many guides as you like, positioned wherever you like. To move a guide after you have created it, hover a mouse pointer over the blue arrow, which indicates the position of guide in the ruler. The mouse pointer changes to the move guide icon . You can then click and drag a guide to a new location. To delete a guide, double-click the blue arrow in the ruler.

To remove all guides at a same time, choose **View > Remove guides**.

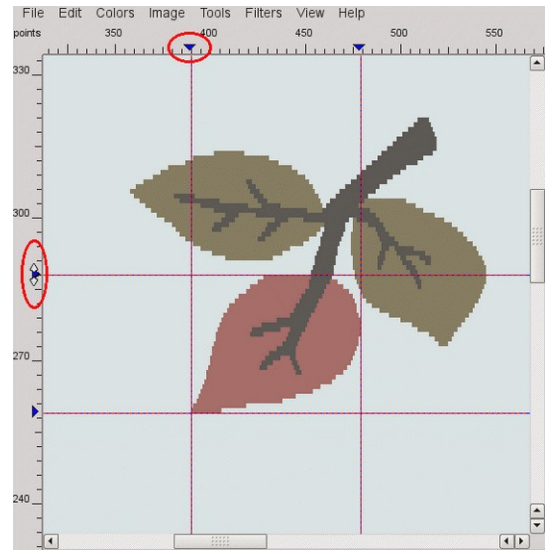


Figure 31: Double-click in the ruler creates a guide

4.14 MEASURE TOOL


The measure tool lets you measure the distance between two pixels in the image. To use it, click  icon in the Toolbox (shortcut **Shift + I**), draw a line between two points, and the program will display the length in points, cm and inches.



Figure 32: Measure tool displays distance in points, cm and inches

The measure tool has additional tools beneath it— **Split**, **Merge**, **Move**, **Tilt**, and several parameters for each of these tools. Value, x, and y are also used for some of the Filter tools (Chapter 13).

4.15 CROSS-HAIR CURSOR

The cross-hair cursor helps you drawing or checking the picture more precisely. To switch it on, use **View > Crosshair cursor**, or more convenient, use the keyboard shortcut **Z**.

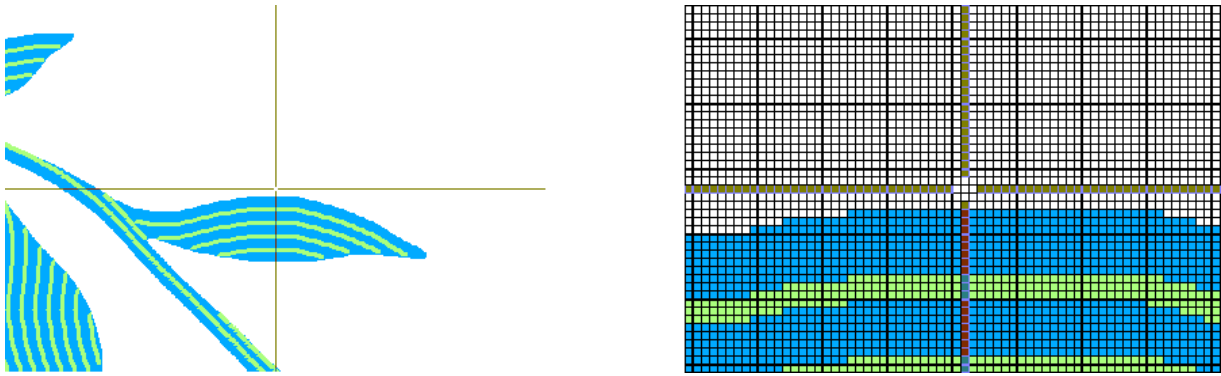



Figure 33: The cross-hair cursor (mouse pointer) at zoom 100%, and at zoom 500%

4.16 PAN TOOL

To pan the image, move it while holding the middle button down. When you press the button, and during moving, the cursor pointer changes to four arrows shape ().

4.17 USING THE TOOLS

Some tools in the toolbox let you select, edit, and view images; other tools let you paint, draw, and type.


Toolbox: You can view information about any tool in the toolbox by positioning the mouse pointer over it. The name of the tool appears below the pointer. You must click a tool's icon in order to use it. The currently selected tool is highlighted (or colored) in the toolbox.

To select a tool, click its icon in the toolbox or press the tool's keyboard shortcut. The keyboard shortcut is displayed in its tool tip. For example, you can select the **Magic wand** selection by pressing "w".




Foreground (upper square) and **background color** (lower square) are used in drawing operations.

Foreground color determines the color drawn with the left mouse button, and background color drawn with the right button. In this way, you can contemporarily draw with two colors, without the need to constantly change drawing color. This is particularly handy, when you are fixing borders between two color areas. To change the foreground color, click a desired color in the color table panel.

Some drawing operations, like gradient tools, use both colors at same time, and you may get interesting effects, if you set one of them to be transparent. You achieve this by right-clicking on a colored tile that represents the color of the drawing or the background color. The clicked

tile changes the color surface into the gray-checked pattern .

Option area: The first thing you should do after you select a tool is to set its options (if the tool has them). The options appear below the toolbox. The options area is context sensitive—it changes as you select different tools. Some settings in the options area are common to several tools, and some are specific to one tool.

Panels: Colors, Layers, Brushes. To switch between panels, just click one of the Panel tabs (colors tab  F6, layers tab  F5, brushes tab  F7). Tools unique to each panel are at the bottom of the panel area.

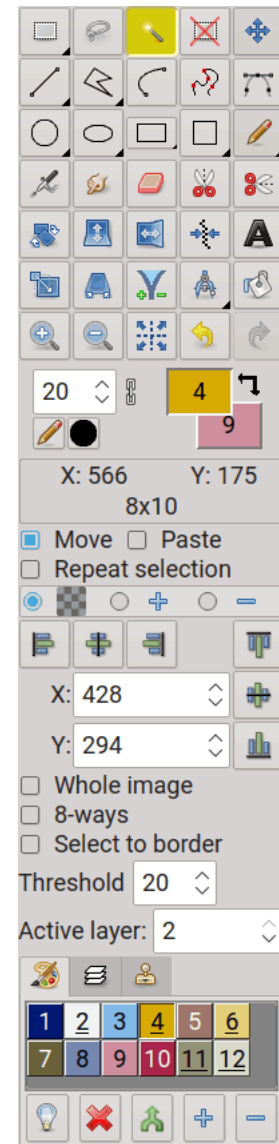



Figure 34: Toolbox, tool options, and color palette

4.18 SELECTING A RECTANGULAR AREA OF THE DESIGN

We often want to limit the area of an operation to a specific part of the image. By selecting a particular rectangular region, you set the boundaries of the operation.



The selection tool works in the following way:

1. Select the rectangular selection tool by pressing the icon in the toolbox .
2. Move the mouse pointer to one of the corners of the area you want to select.
3. Press left button and drag the mouse until the desired area will be inside the dashed rectangle. By default, a selection border is dragged from its corner.
4. Release the button.

If you want to change the size of the selection, you can do it by:

1. Moving the pointer to the border of the dashed rectangle (from the inside out) until the pointer shape changes.
2. Pressing the left button and dragging the mouse until the desired rectangle size is achieved.

The selected area becomes a layer, which can be moved, copied, pasted, or saved as an image. The information about the size and position of the layer indicates the presence of the selection in the image. It is displayed in the option area in the toolbox. This. Figure 35 shows layer size of 360 pixels by 400 pixels, while the layer's left bottom corner is at pixel x=825, y=556.

The dashed line which limits the selection in its creation phase looks like this: . In this phase you can still change the size of the selected area. But after you move it, or select the **Repeat selection** checkbox, the line is changed to a dotted line , and you can't change the size of selected area anymore.

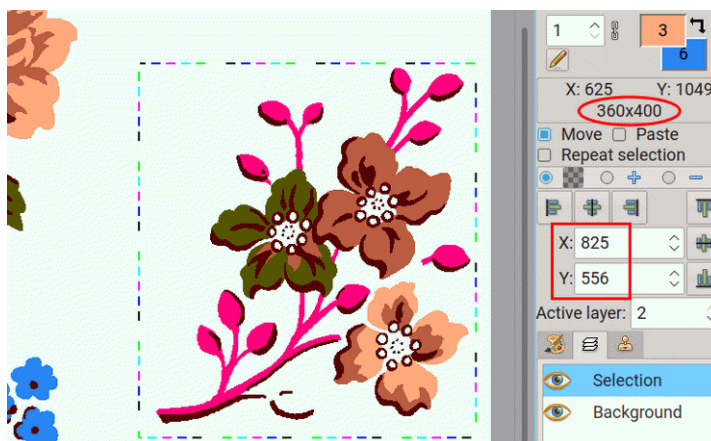


Figure 35: The size and position of a layer. You can still change the size of the selected area in this phase (the line is dashed and not dotted).

4.19 CROPPING TO SELECTION

Using the **Crop to selection** command from the **Image** menu, you can remove the area that falls outside of the current selection.



Figure 36: Before and after cropping

4.20 TRIMMING PICTURE OR LAYER

Using the **Trim** command from the **Image** menu, you can trim off the area which consist only from pixels of background color. The remaining area is a rectangle, whose sides touch the outermost pixels of non-background colors. If you apply the function on layer, the result is a new shrunk layer.

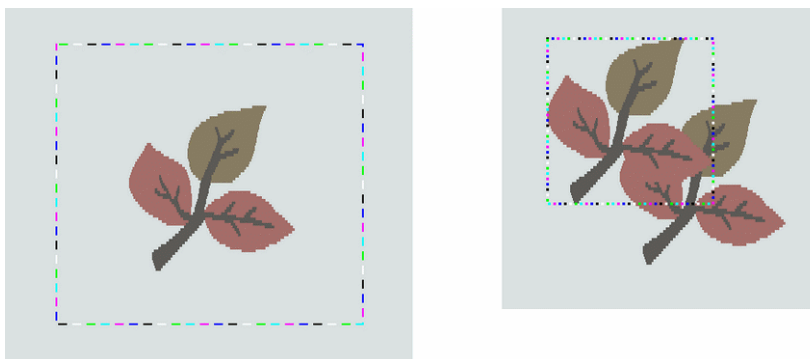



Figure 37: After applying the Trim command on the layer, the selection area is shrunk to the rectangular area that covers all non-background color pixels.

4.21 Deselecting a layer

If the selected area-selection is no longer needed, and you want to put it back into the background image do **one** of the following:



- Click  in the toolbox.
- On keyboard, press **Ctrl+D**.
- Right-click outside of selection somewhere on the background image (works, if one of selection tools is active).

The selection will be merged into the image at its current location.

4.22 Deleting a layer

To delete a selection, press **Backspace** or **Delete** on the keyboard. To cut a selection to the Clipboard, choose **Edit > Cut** (keyboard shortcut **Ctrl+X**).

5 DRAWING OPERATIONS

Drawing operations are drawing tools like line, freehand, polygon, rectangle/square, ellipses/circles, arc drawing, fill area and eraser. All these tools are accessible through icon buttons in the toolbox. Tools use the foreground (drawing) color to draw with the left button, and background color with the right button. The icon below the line width field (the default is the solid mode, indicated by the pencil icon ) lets you choose among different drawing modes. For instance, if you have a brush selected, and the brush mode  is chosen from the pen mode selector you will paint with a brush (pattern). The other modes are the gradient type of tools, mixing foreground or background color in a specific way, indicated by the selected mode icon.

The options for the selected tool appear below the toolbox. The options area is context sensitive, which means that it changes as you select different tools. Some settings in the options are common to several tools, and some are specific to a single tool.

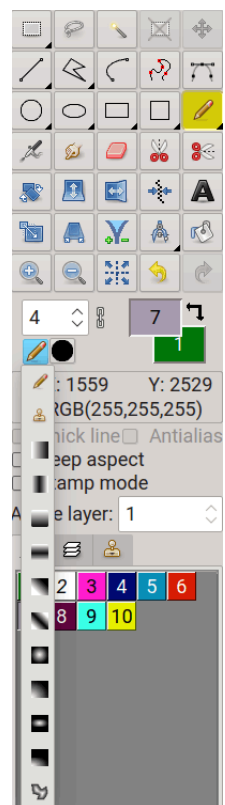


Figure 38: Toolbox and pen modes

5.1 LINE WIDTH

The line width determines the width of drawing with the free-hand drawing tool, the line tool, and the width of the border of geometrical shapes. (The line width number serves as a parameter in some of the filter operations; more about this in later chapters.)

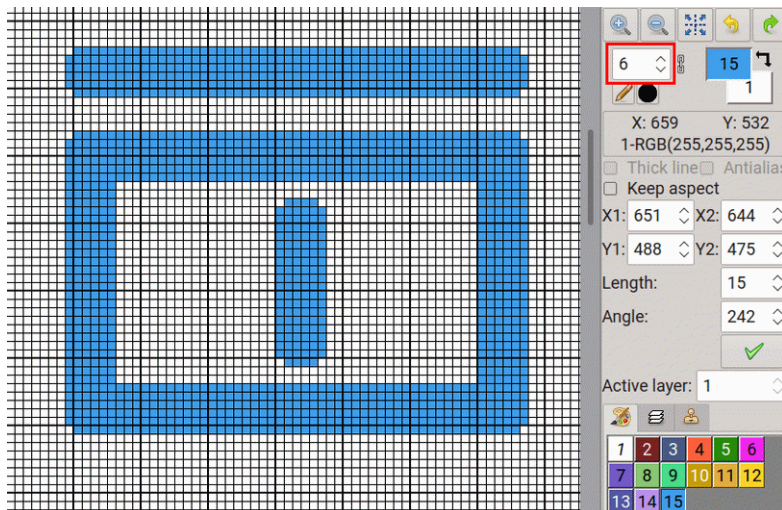



Figure 39: Drawing with a line thickness of 6 pixels.

The breaking a chain link  next to the Line width field allows you to set the width of drawing in horizontal and vertical direction independently, usually according to the density (image dpi) settings.

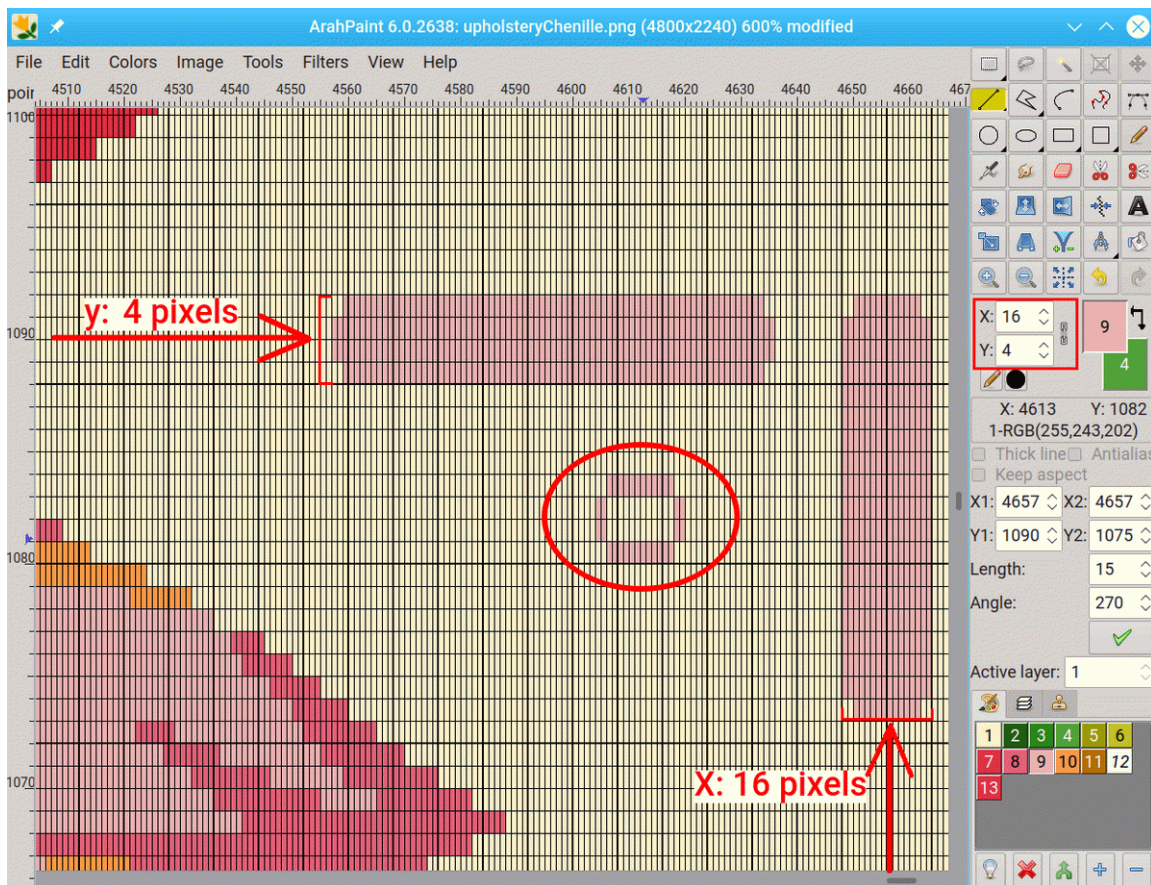




Figure 40: Setting different widths in x and y drawing direction.

5.2 PEN MODES

In addition to the default drawing mode (solid color), each drawing tool can use additional modes selected from the icon menu accessible with a click the currently selected mode's icon. The pencil icon  represents the default, drawing with a foreground color. After the brush , there are twelve gradient modes. The mode's icon indicates the direction of the gradient effect.

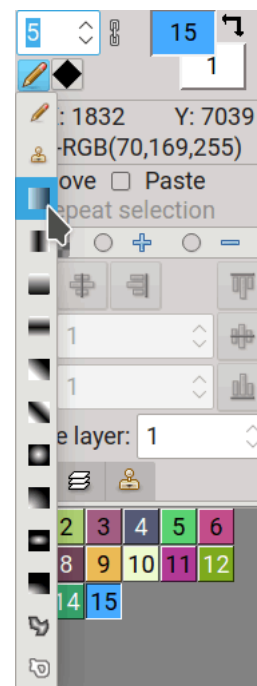


Figure 41: Choosing the pen mode.

5.3 PEN SHAPES



























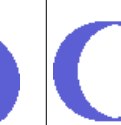

If the line width is set to value higher than 1, you can choose among seven different pen shapes. As you click the icon next to the pen mode chooser, the drop-down list of pen-shape icons appears, and you can select one of them.

The pen shape influences the starting and ending of the line/free-hand/arc/curve drawing, the shape of angles of drawn rectangles and squares and the shape of spray dots.




Figure 42: A drop-down list of pen shapes

The table below displays results of drawing at line width of 16 pixels with different pen shapes.

							
Line							
Rectangle							
Circle							

5.4 DRAWING STRAIGHT LINES

Use the straight-line icon button  (keyboard shortcut **I**) to activate this tool. Then move the mouse pointer to a line starting point in the picture and press the left button. Drag the mouse until the line is of the desired length and angle. Then release the button.

Tool options are:

Thick lines: use this option when you want to have diagonal pixels connected (it works only at line width 1). The line on the left is “normal”, the one on right is thick.

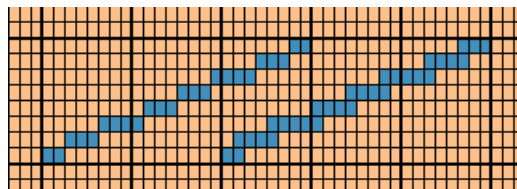


Figure 43: Normal line and thick line

Keep aspect: if your image density (dpi) ratio is different from 1, the physical size of horizontal and vertical lines, drawn with the same pixel width, is different. By using the keep aspect option the pixel width of one of the lines (that one which would be thicker) is reduced to be similar as the thinner one. In Figure 44, lines and circles, which are drawn in normal mode (line width is set to four pixels) in blue, lines drawn while the **Keep aspect** option is on, are in red color.

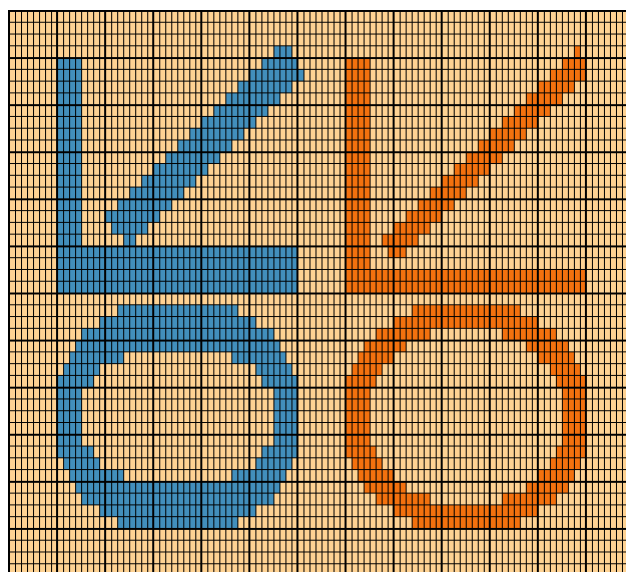



Figure 44: Lines in red are drawn using the Keep aspect mode

5.5 DRAWING PERFECTLY HORIZONTAL, VERTICAL OR DIAGONAL LINES

Drawing straight lines has a powerful extension: if you double-click the **Straight line** icon, it changes to . Now you can draw horizontal, vertical or diagonal lines. If you move a mouse horizontally—it doesn't need to be perfectly straight, the drawn line is horizontal. If the angle between a line and the horizontal axis exceeds the angle of 23 degrees, the drawn line will be diagonal at 45 degrees. If you move the mouse toward the vertical axis, the line will be drawn as a vertical line.

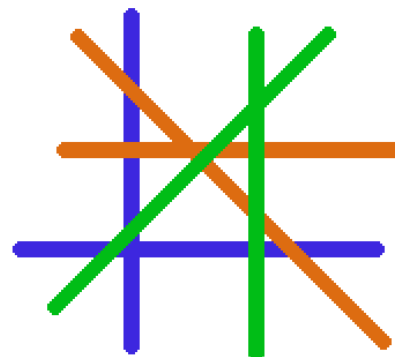




Figure 45: Drawing straight lines

5.6 FREEHAND DRAWING

To activate freehand draw; one of the most frequently used tools, click the freehand draw icon  (keyboard shortcut **P**). Simply move the mouse pointer to a starting point in the picture, hold the left button and drag the mouse as if a pencil would be in your hand. To stop, release the mouse button. It has one more option, namely the **Stamp tool** (see Chapter 10.2.2), than drawing of straight lines.

5.7 POLYGON DRAWING

The polygon is a series of straight lines, whose ends are connected, so that the ending point of one line is the starting point of the next line. It is useful for drawing figures which will be colored later with the fill area tool. Since lines are connected, coloring the figure will not leak out of the figure's boundaries. Polygon drawing is different from line drawing:

1. Select the polygon icon .
2. Move the mouse pointer to the starting point and left-click.
3. Move (not drag) the mouse to the next point and left-click again.
4. Repeat step 3 until the desired polygon is drawn.
5. Press the right button to stop polygon drawing or middle mouse button to erase the last polygon point.

5.8 DRAWING RECTANGLES/SQUARES AND ELLIPSES/CIRCLES



Drawing ellipses/circles is very similar to drawing rectangles/squares.

First click the desired icon button -  or  or  or .



1. Move the mouse pointer to the one corner and press the left mouse button.
2. Drag the mouse to the opposite corner of the (bounding) rectangle.
3. Release the mouse button.

In the case when physical width and height of the repeat are not equal and you are drawing circles/squares, the program calculates the size of the circles/squares to match the ratio of width to height.

When drawing in zoom, if the ratio of the resizing factor of width to height matches the ratio of the picture's real size width to height (in mm), then the objects will be visible in the right proportions as well.

If the icon button of the selected operation is filled (not empty), the object will be filled as well. You can toggle the fill attribute by double-clicking on the same icon button (for instance square). The icon will be changed from  into  and the next drawn object will be filled. This works also for the **Polygon** drawing.

5.9 DRAW A LINE ACROSS THE IMAGE

The drawing lines across the image is the extension of the rectangle tool. The rectangle tool should be in the “fill” mode  (double-click  icon to change the mode). In the option bar, select either you want to draw horizontal or vertical lines. To draw a line, just click the image, hold the button, and drag a mouse till the line reaches the desired width.

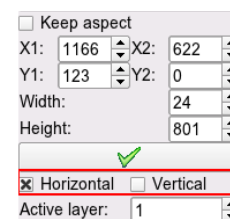
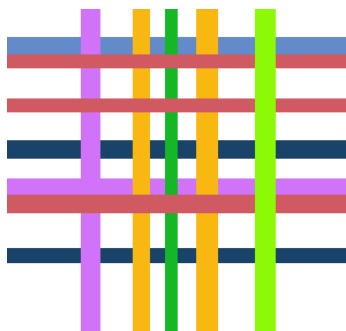



Figure 46: Drawing lines across the image


5.10 DRAWING ARCS

An arc is a part of an ellipse or a circle. It is used for drawing round shapes like flower leafs and similar round objects. Three points determine an arc: first and second mark the starting and ending point of the arc, while the third one sets the curvature.

1. Select the arc icon button  or use the keyboard shortcut **D**.
2. Move the mouse pointer to the point where the arc will start, and press the left button. The program will draw a cross on that point.
3. Move the mouse pointer to the point, where the arc will end, and press the left button. The program will draw a cross on that point.
4. Now move the mouse pointer to the point of maximum extent of the arc's curve, and press and hold the left button.
5. Drag a mouse until the desired arc is drawn, and release the mouse button.


5.11 DRAWING CURVE

The curve tool lets you draw or trace curved shapes. The last three clicked points determine the curve between those three points. Follow these steps to draw the curve:

1. Select the icon .
2. Move the mouse pointer to the starting point, and press the left button.
3. Move (not drag) the mouse to the next point and press the left button again.
4. Repeat step 3 until the desired curve is drawn.
5. Press the right mouse button to stop curve drawing.

5.12 BÉZIER TOOL

It allows you to create a complex object quickly and simply. A combination of linked bézier curves is commonly called a path. The path consists of two components: straight and curved segments.

To draw the bézier curves, select the Bézier tool  from the toolbox, then click in the image to create the first point. To draw a straight line, click where you want to end it. Move the mouse to a new point and left click the mouse to create another point linked to the previous point. The blue circles are anchor points, two green squares are control points (sometimes referred to as handles associated with the selected anchor). You can change the appearance of the curve by moving the anchor points, handles or curve itself (click and drag the curve to move it).

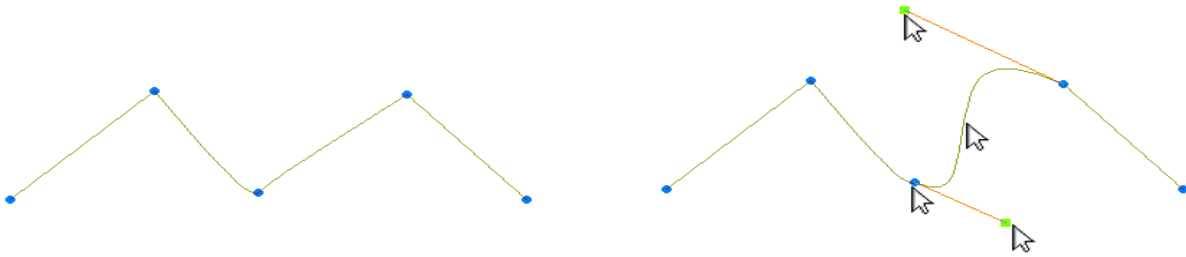


Figure 47: Drag anchor point, handles, or curve to change the appearance of it

If you click close to the anchor point, both handles are at the same anchor. Clicking somewhere between the curve's anchor points draws one handle at each point.

With the middle mouse button you can add new anchor points to the curve. Press the right mouse button to finish the curve.

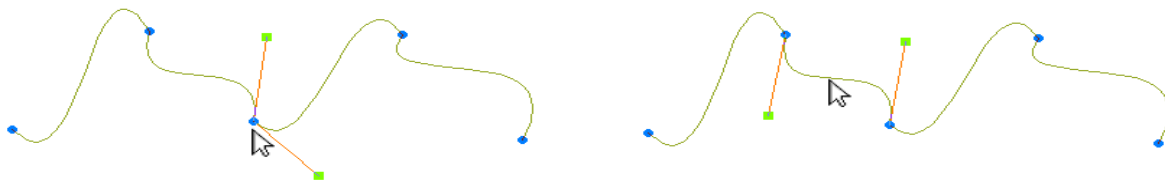



Figure 48: Handles

5.13 FILL

This tool replaces the color of an area, that you click with a foreground color or brush (pattern). Filling stops when it cannot pass through groups of dots of different color from the pointed one, or when the borders of the selection are reached.

Click the fill icon  or use keyboard shortcut **K**.

1. Move the mouse pointer inside the selection and point to a color, which should be replaced with the foreground (fill) or a pattern. Pattern fill works if the brush is chosen from the pen selector, and you have selected a brush (pattern) in the brushes panel.
2. Press the left mouse button. After a few moments, the filled area is displayed.
3. Repeat the steps 3 and 4 as many times as desired and change the foreground color if necessary.

5.13.1 FILL OPTIONS

- **Fill to border** is used for cleaning scanned images. It fills all pixels, no matter which color they are, until it hits the background color border.
- **Whole image** means that the operation works on the whole color area in the picture, no matter if the pixels are connected to each other or not.
- **Threshold** defines how similar in color a pixel must be to be filled. Values can range from 0 to 127. A low tolerance fills pixels within a range of color values very similar to the pixel you click. A high tolerance fills pixels within a broader range.
- **Fill(%)**: program fills the area with a mixture (like the spray tool) of foreground and background color in the preset ratio. If the **Whole image** option is on, then the program works slightly different- it mixes foreground color to the current color in the area.

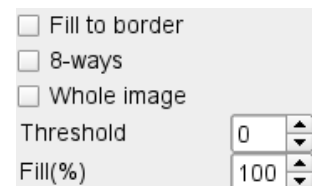


Figure 49: Fill options

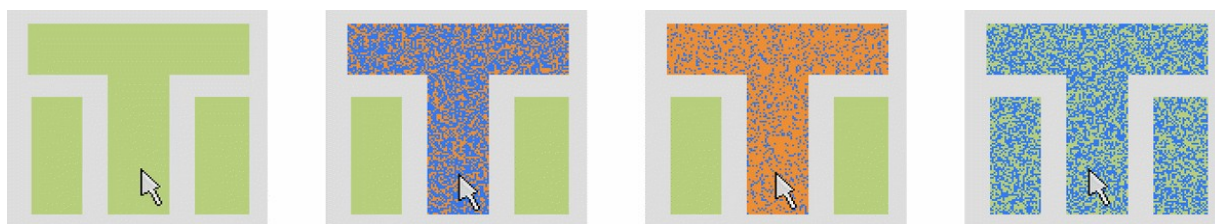


Figure 50: Initial image

Fill at 60%

Fill at 25%,

image activated

Fill at 50%, whole

- **8-way fill** also fills adjacent pixels which are connected on corners. The middle image in Figure 36 shows the default behavior of the fill tool: if you click in the blue leaf, only the leaf changes the color. The image on the right shows what happens if you click in the blue leaf and the 8-way fill option is switched on: a green color jumps from the leaf through connected pixel corners to other (blue) parts of the flower. The 8-way fill operation checks 8 points around the clicked point. Normal fill could also be called 4-way fill, since it only checks 4 points (top, left, right, bottom).

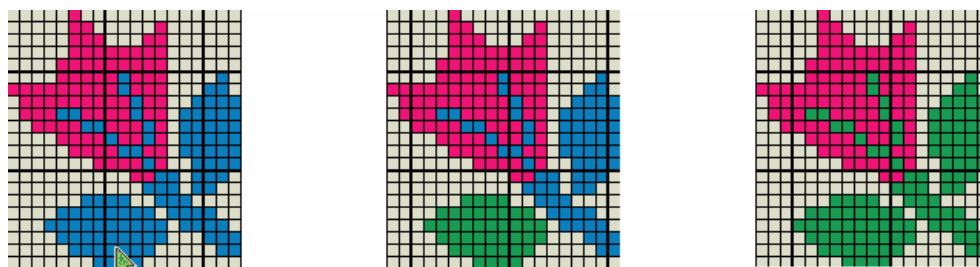



Figure 51: Click in leaf to fill

Normal fill


8-way fill

5.14 STITCH TOOL

The **stitch** tool helps you to draw points in the larger color area to prevent long floats in the fabric. Normally, you correct the long floats in *ArahWeave*, but the stitch line follows the shape of the color area, so it is sometimes more convenient to draw points (lines) in *ArahPaint* to prevent long floats. The stitching lines can be used also as a design decoration and not only as a long float control.

To use the stitch tool, click its icon  in the toolbox, or use shortcut **Shift + K**, and click the color area, where you want to add stitching points. If you add stitching points in the ground, you should work in the repeat mode.

There are different stitch options below the toolbar:

- **Direction** (left, right, left-right, up, down, up-down) determines which shape should the stitch line follow
- **Length** is the distance between two points in the chosen direction.
- **Plain weave** – if you enable it, then there will be a plain weave pattern  instead of connected pixels in the stitch line.
- **Whole image** means that the operation works on the whole color area in the picture, no matter if the pixels are connected to each other or not.

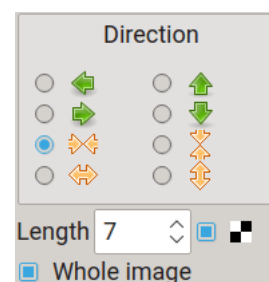


Figure 52: The stitch tool options

Figure 53 shows the usage of the stitching tool—all images were made with the Length of 7 pixels. You can choose the direction of drawing the lines, depending on the shape of the motif, and the desired effect.

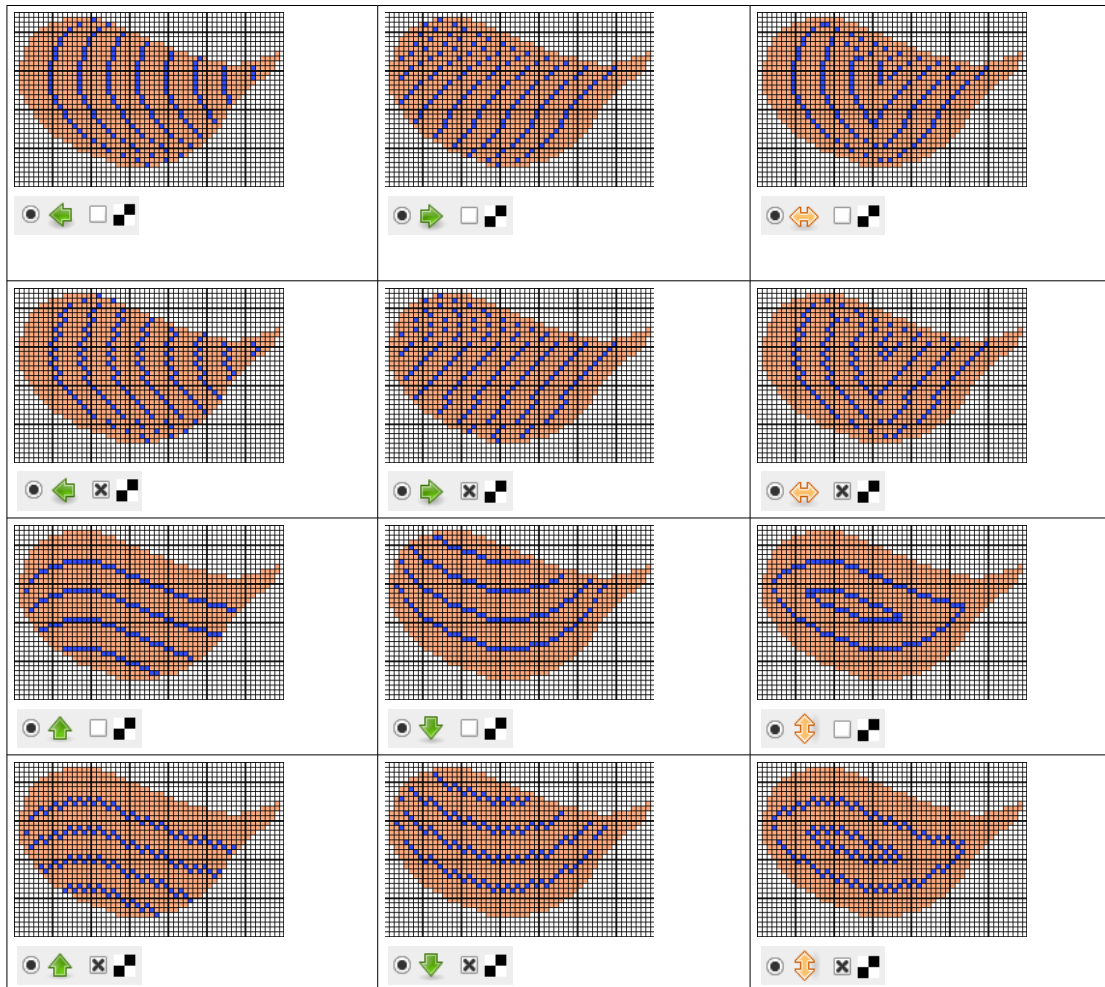




Figure 53: Stitching points: all possible combinations

5.15 SPRAY

Spray tool draws many randomly distributed dots or selected shapes in foreground color around the mouse pointer.

1. Select the icon  or use the keyboard shortcut J.
2. Set the size and shape. By default, the dot size is one by one pixel. By increasing the number in the Line width field, the size of the dot or shape also increases respectively. Figure 54 shows the line width numbers with corresponding dots. The pen shape is set to the default shape (circle), but the spray tool can be used by other pen shapes too . Note, that the line width should be more than 1 for the Shapes icon menu to be available.

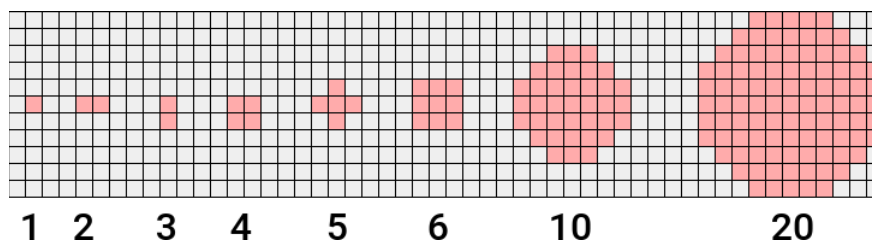
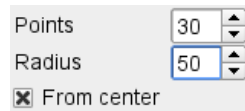


Figure 54: The spray dots at various line width sizes

3. Set the number of points (default is 30). A higher number means spray fills in the picture faster.
4. Set the radius of the sprayed area (default is 30 pixels).

5. As with “analogue” spray, dot density diminishes from the center (of the mouse pointer) to outside (the **From center** option enabled), or can be regular across the area (the **From center** option disabled).



6. Move the mouse pointer to the desired spot and press the left mouse button. Drag the mouse to other areas, or leave it on the same spot if a stronger effect is desired. The program will spray dots until you release the button.

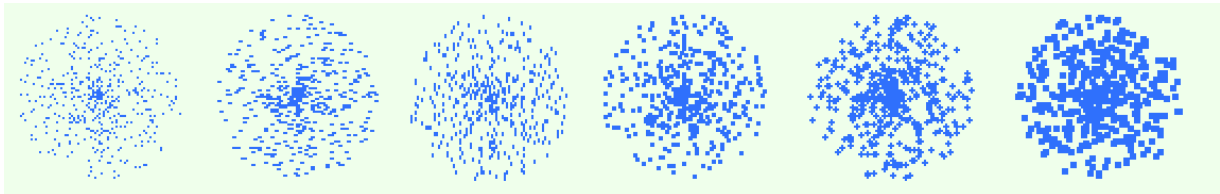



Figure 55: Spray with different dot size

If you disable the **From center** option, you can also simply achieve different random fill levels of a single color, by pressing down the mouse for the desired quantity of time.



Figure 56: Spray from center, and three different intensities of regular spray

Figure 57 shows an image drawn with spray, using four different shapes , applied one after another.

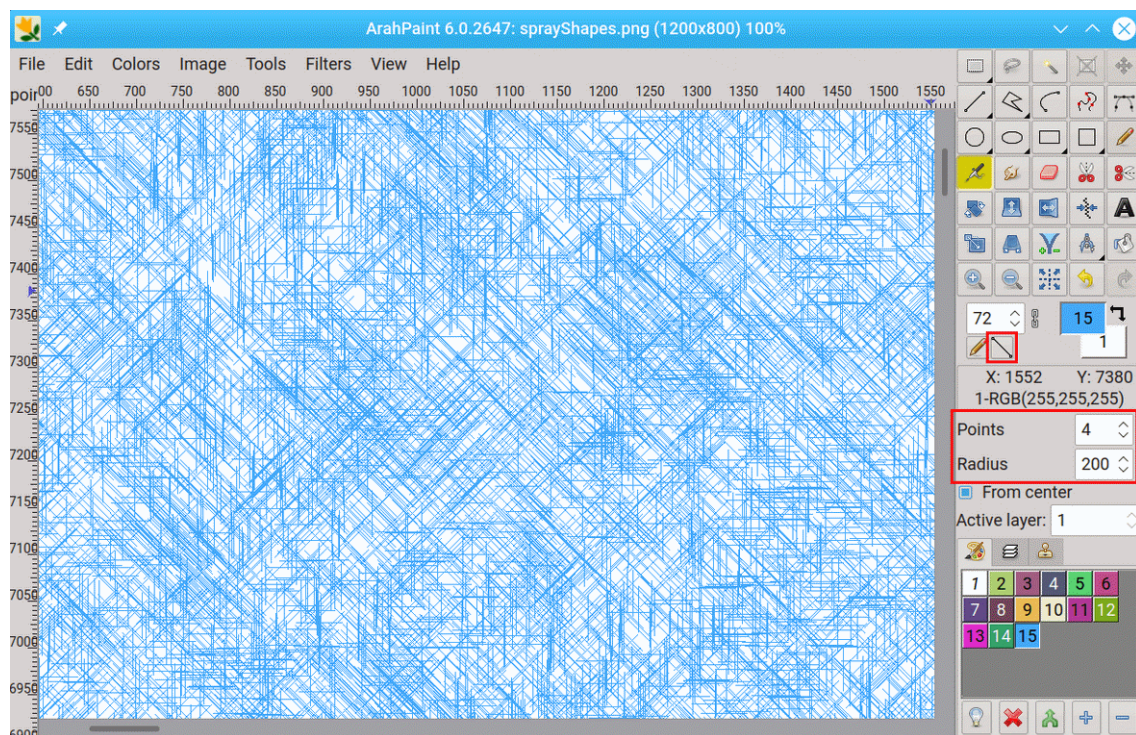


Figure 57: Using shapes as the spray component.

5.16 MIX COLORS


The Mix tool  with keyboard shortcut **Shift+J**, is similar to spray, but it exchanges existing colors in the image. Use it to soften the border between two or more colors, without introducing new colors. The foreground and background colors are disregarded in this operation.



Figure 58: Mix colors

5.17 COLORING SHORTER THAN DECLARED DISTANCE AREA BETWEEN PIXELS

When you draw the image for the fil coupe, you need to place different motifs (flowers, dots, squares, whatever) with a certain distance, so that there is enough space between them in order to cut the long float threads (the fil coupe). If the distance is too short, then the shearing machine is not able to cut off the floats, and such uncut threads look like a defect in the fabric. To get an overview of distances between different color surfaces, there are two tools: **Color shorter inside** and **Color shorter outside**.


To use the tool, set the distance in pixels first: click the **Measure** tool icon  and enter the value in the X field for the horizontal (weft) direction (if you for some reason want to mark the distance-shorter-than in the vertical direction, enter the shorter value in the Y field). Then choose the foreground color (you can use a new color which you have added to the Palette, or you can use an already existing color) which will be used to mark the distance. As a background color, choose the color on which you want to apply the distance measurement. Then use **Filters > Color shorter outside > Horizontal**. Program colors all pixels which fall into the declared distance value between pixels of the background color.

Figure 59 shows the situation where we want to color the distance between red pixels which are closer than 50 pixels. We will use **Color shorter outside**, because we want to paint outside of the red-pixel area.

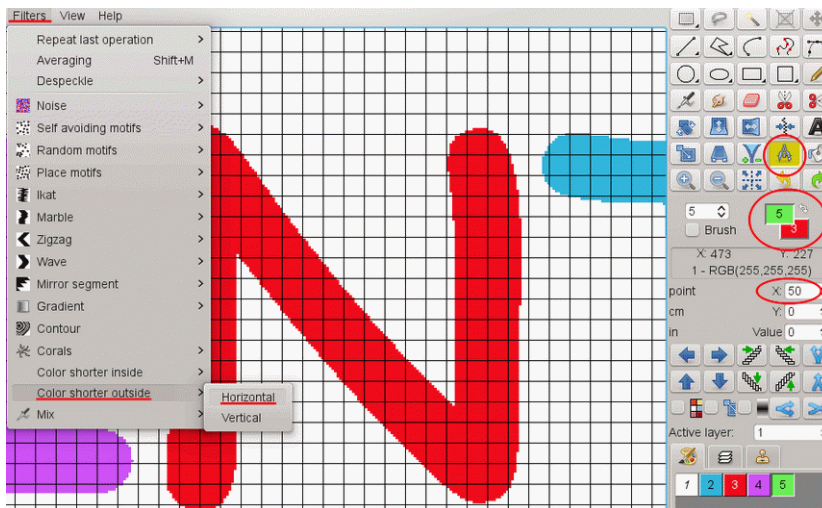


Figure 59: Coloring shorter-than distance between red pixels with green

After applying the command, the program draws lines in the color of the foreground (green) color.

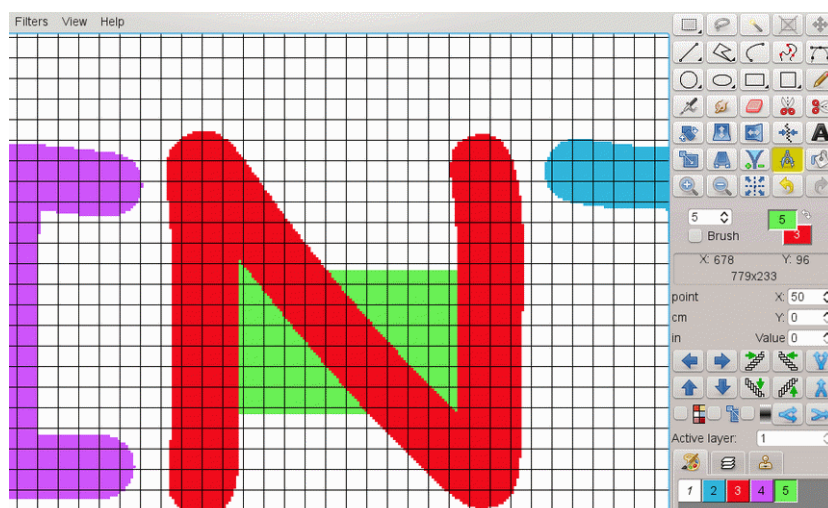


Figure 60: After applying the horizontal color shorter outside

The **Color shorter inside** function measures the distance between two pixels on the color surface edges (left-right for horizontal, up-down for vertical), and paints all pixels that fall within a certain limit. This is mostly used to create fill coupe designs.

Figure 61 shows a situation, where we want to mark all horizontal lines of green pixels, which are shorter than 15 pixels. In the option section of the Measure tool set the x value to 15, and choose **Filters > Color shorter inside > Horizontal**.

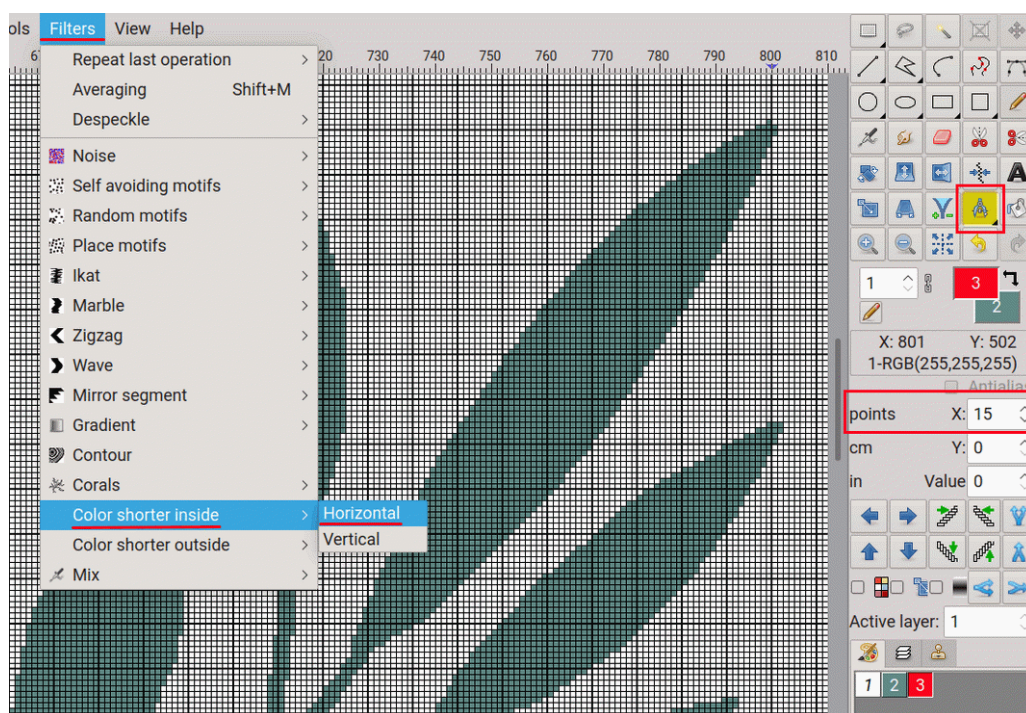


Figure 61: Applying the Color shorter inside function

Now the lines which are shorter than 15 pixels are colored in red and we can use a different weave on them than on the green color area.

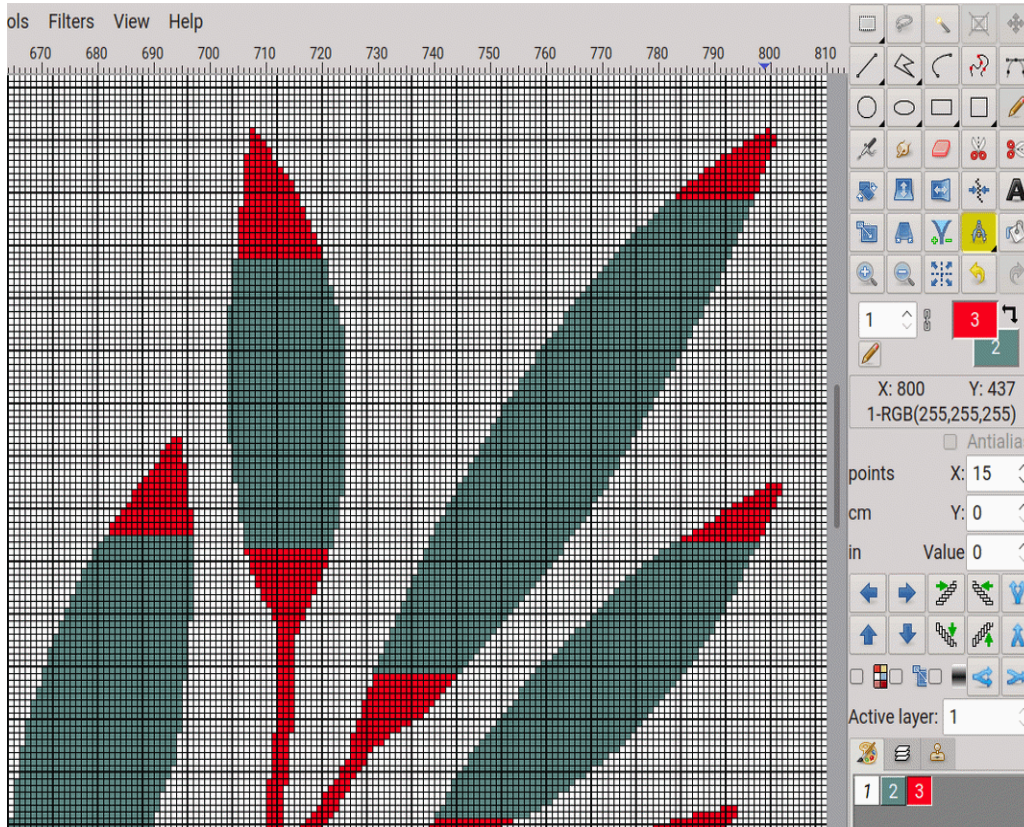


Figure 62: The resulting image; horizontal lines shorter than 15 pixels are now in red color.

6 WORKING WITH COLORS

ArahPaint uses two color spaces: RGB (Red Green Blue) and HSL (Hue Saturation Luminance) in two modes:

Color palette (colormap) mode (8 bits per pixel), also known as Indexed color mode, is the default mode for new *ArahPaint* images. This mode allows up to 256 colors. The Gray-scale **mode** is a special case of This mode uses up to 256 shades of gray. Every pixel of a gray-scale image has a brightness value ranging from 0 (black) to 255 (white). Gray-scale values can also be measured as percentages of black ink coverage (0% is equal to white, 100% to black).

True Color mode (24 bits per pixel) uses the RGB color model to specify an intensity to each pixel ranging from 0 (black) to 255 (white) for each of the RGB components in a color image. RGB images use three color channels, to reproduce up to 16.7 million colors ($256 \times 256 \times 256 = 16,7$ million). Additionally, *ArahPaint* supports RGBA, which stands for red green blue alpha. It is the three-channel RGB color model supplemented with a 4th alpha channel (transparency). Alpha indicates how opaque each pixel is and allows an image to be combined over others using alpha compositing, with transparent areas and anti-aliasing of the edges of opaque regions.

Color values inside *ArahPaint* are mostly of informational value. They give the designer the overall look of the picture, dominance of particular colors etc. The final colors of the fabric will be set in *ArahWeave* and will depend on the colors of the yarn and weaves selected.

Some color related functions are available in the **Color palette** window, while others are located in the **Colors** menu of the main *ArahPaint* window.

6.1 CONVERTING IMAGES FROM ONE MODE TO ANOTHER

To convert an image from one mode to another use command **Color > Convert** and choose either **24->8**, **8->24** or **Grayscale** from the menu (shortcut **CTRL+J** toggles between the **True color** and the **Color palette** mode).

When converting from true color mode to color palette mode, *ArahPaint* builds a color palette, which contains the list of the colors used in the image. If a color in the original image does not appear in the table, the program chooses the closest one or simulates the color using available colors.

6.2 COLOR PALETTE

Figure 63 shows the appearance of the color palette. It will always display the colors of the active layer. If the active layer or image is in the true color (24 bits per pixel) depth, then the palette will not be shown. If you want to see the color palette of a different layer, you have to select that layer in the Layer palette, or in the Active layer field (this is faster, since you don't need to switch a view to the Layer palette. Figure 63 shows a color palette of a second layer).

6.2.1 COLOR PALETTE TOOLS

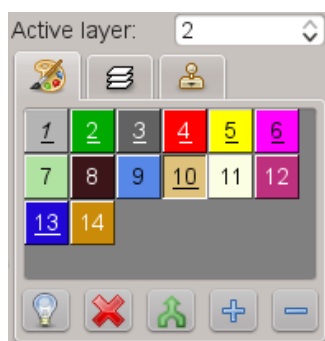


Figure 63: The color palette of a second layer (the Active layer field is set to 2).

Color palette tools are located at the bottom of the palette area:



Show used colors—if you press this icon the program will underline colors, which are actually used in the image.



Remove unused colors—will remove all colors from the palette, which are not used in the image: light brown 14, blue 15, light violet 16.



Remove duplicate colors—use this command after you copied one color to another, and you don't want to treat them as separate colors.



Add color to color palette—if you need a new color in the palette press this icon.



Remove color from color palette—will remove last unused color from the palette. If all colors are used, you must use color reduction tools instead of this instrument.

The underline number in the color swatch indicates that a color is used in the image. The number in italic indicates that a color belongs to a grayscale—Red, Green and Blue values of that color are equal.

6.2.2 EXCHANGING/PASTING COLORS

You can also exchange or copy colors in the image by using the color palette. First, use left-click to select a color in the color palette, then point to another color in the palette and use:

- Middle button click to exchange colors.
- Right button click to copy a color.

Note that when you paste one color to another, you have two swatches of the same color in the Color palette. You can still modify each of them. But once you use **Remove duplicate colors**, all pixels in the image with the same color will be reduced to one color, and there will be only one color swatch per color in the color palette.

6.2.3 CHANGING THE POSITION OF THE COLOR IN THE PALETTE

To switch the position of two colors in the palette, click the color in the palette, move the cursor to the color you want to switch the position with, and press the left mouse button while holding the Ctrl key on the keyboard.

6.2.4 DEFINING TRANSPARENT AND PROTECTED COLORS

Transparent and protected colors are used in layer placement and drawing operations. A transparent color means all areas of this color in the layer will become transparent to show the design below the layer. Protected colors are colors that can never be overridden by layer placement or drawing operations.

Let's say the layer contains a figure, surrounded by some white space. Pasting such a layer will inevitably erase some undesired areas of the main picture. By making the white color transparent, only the main figure will be placed on the picture.

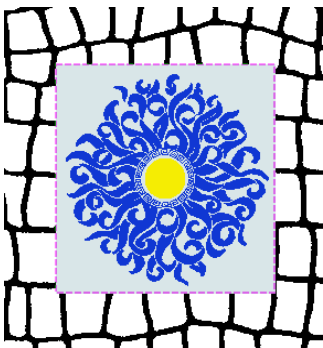


Figure 64: Normal layer on top of background picture

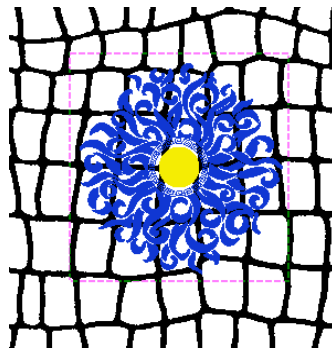


Figure 65: Grey color in the layer is transparent

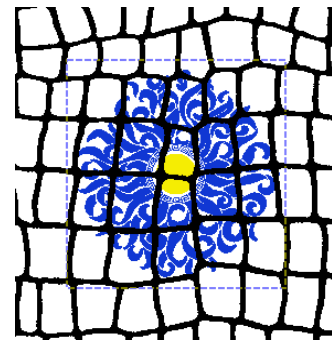


Figure 66: Grey color in the layer is transparent, black color in the background is protected



Figure 67: Transparent and protected colors

Setting transparent colors (only in a layer; you can't have a transparent color in the background image): double-click a color tab in the color palette window to make that color transparent; a check pattern indicates a color state (in Figure 67 white color and red color are transparent; the color palette shows the colors in layer 2).


Setting protected colors: double-click the transparent color to change it into protected one. A little lock on the color tab indicates the protected state (in Figure 67, the protected colors are light blue, green, and orange).

Clear transparent/protected colors: double-click the protected color tab to change it back into a 'normal' color. There is also a function in the Colors menu (**Colors > Transparent colors > Clear**; **Colors > Protected colors > Clear**), which enables you to clear settings on all colors in one step.

6.2.5 SETTING FOREGROUND AND BACKGROUND COLOR


On the toolbox, click the foreground or background color square, to select which color you want to change. Then move the mouse pointer inside the palette region so that the mouse pointer is inside the desired color, and press the left mouse button to select a new color.

The toolbox also contains an arrow to switch between the Foreground and Background colors. You can also switch colors by keyboard shortcut X.

Foreground color  Switch foreground / background

Background color

You can also select the foreground color from the image, loaded in the main window—move your mouse over the desired color pixel and press the **Space** key. This way, you can quickly change the foreground color without having to move the mouse pointer to the color palette window.

Another way to select color from an image is by the Color picker. Press **Shift** (mouse pointer will change to ) and click the pixel in the desired color.


Some drawing operations, like gradient tools, use both colors at same time, and you may get interesting effects, if you set one of them to be transparent. You achieve this by right-clicking on a colored tile that represents the color of the drawing or the background color. The clicked tile changes the color surface into the gray-checked pattern .



Figure 68: Setting a background color as transparent for drawing operations.

6.2.6 CHANGING A COLOR

To modify the selected color, choose **Colors > Edit (Space+Shift)**, or double-click the foreground or background color square on the **Toolbox**. The **Colors** dialog box will pop up.

You can modify a color using two different ways:

- Choose color from **Basic colors**—this color will become your selected color.

- Drag the cursor in  and  to define the color in the color space.

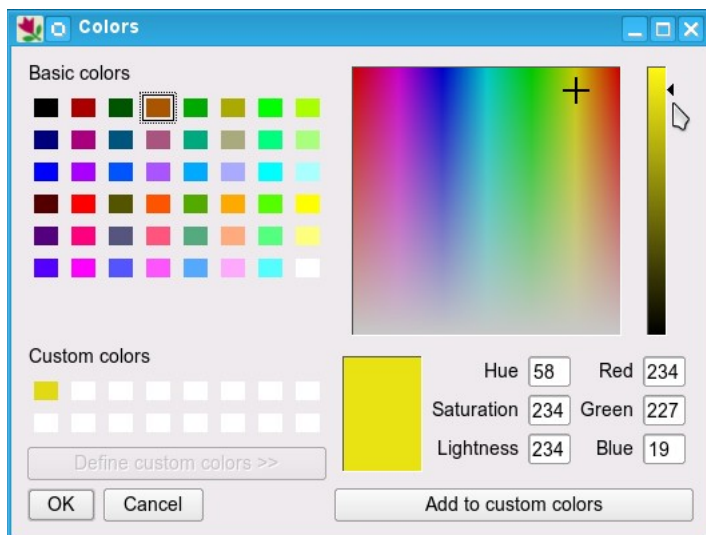


Figure 69: Colors window

6.2.7 SORTING COLORS

After color reduction, the colors are sorted randomly in the Color palette. You can sort colors in the color palette by different criteria: **Popularity (Ctrl+1)**, **Hue (Ctrl+2)**, **Saturation (Ctrl+3)**, **Lightness (Ctrl+4)**, or **Similarity (Ctrl+5)**. To sort colors, choose **Colors > Sort colors** and select the sort key from the drop down menu.

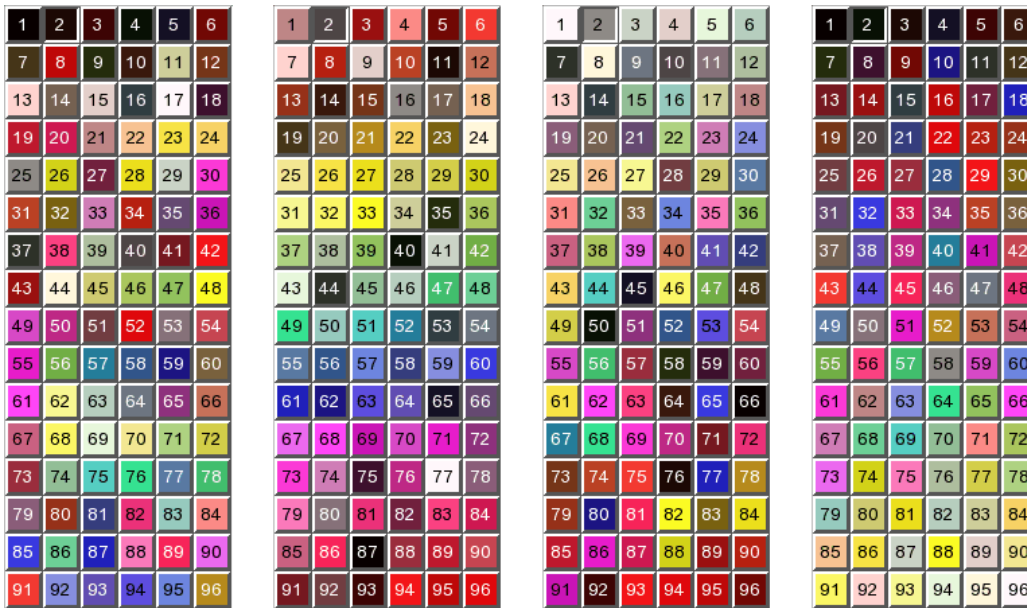


Figure 70: Sorting by popularity, hue, saturation, and lightness

Sorting by **similarity** works in the following way: choose the color in the palette, to which you want to find similar colors. The program puts the color to position 1 in the palette, and sorts the rest of the colors from most similar to most different colors to the selected one.



Figure 71: Sorting by similarity to the selected color

6.3 FINDING FOREGROUND COLOR IN THE IMAGE

Due to similarity between colors in the image, or if there are just a few pixels of a particular color, sometimes it is difficult to find an individual color in the image.

If you can't find the color in the image, choose that color as a foreground color from the palette, and press **Enter**. The pixels of that color will blink. If you press **Enter+Shift**, the program will position the first pixel of foreground color to the top of the program window.

6.4 HIGHLIGHTING FOREGROUND COLOR

This function highlights the foreground color, so it is easy to check if the design repeats correctly, or to find isolated pixels of a particular color, or just to review the color distribution.

Highlighting depends on the lightness of the foreground color: if it is in the light part, then the rest of the image becomes darker, if the color is in the darker part of the specter, the rest of the image becomes lighter.

There are two ways you can use the function:

Pressing the asterisk key (*) highlights the foreground color for a few seconds, and then reverts the image to its original state.

Pressing the slash key (/) toggles the image state from original to highlighted and back.



Figure 72: Highlighting -> the yellow is the foreground color; the image on the right side shows the "highlighted" view

6.5 CHANGING THE NUMBER OF COLORS (WEAVES)

A scanned image will have more colors, then what you need in a jacquard fabric. The number of colors in the picture determines the number of weaves you will use in the jacquard fabric. For most fabrics, twenty colors are more than sufficient. There are two ways of decreasing the number of colors used in the picture:

- automatic decreasing/increasing function
- user defined reduction of number of colors

6.5.1 AUTOMATIC DECREASING/INCREASING OF NUMBER OF COLORS

6.5.1.1 TRUE COLOR (24-BIT) IMAGES

It is available through command **Colors > Set number of colors**.

The **Number of colors in the palette** field displays the number of available colors (256). You can change the number by typing or by arrows at the right side of the number.

Click the **Preview** button to display a preview of the changes and when you like the result, click the **OK** button.

By default *ArahPaint* reduces the number of colors according to the presence of a particular color. Colors, which cover smaller areas of the picture, will be converted to the most similar from the remaining ones (most frequently used colors).

If enabled, the **Color dither** mixes the pixels of the available colors to simulate the missing colors.

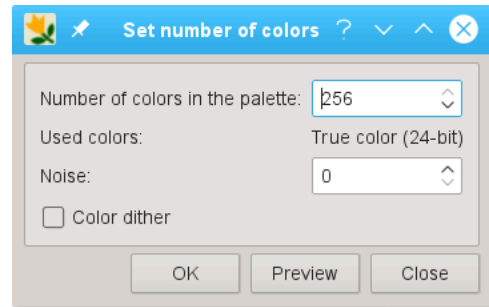


Figure 73: Set number of colors window on true color image (24 bits per pixel)



Figure 74: Original image in true color mode; image with number of colors reduced to 7; image with number of colors reduced to 7 using a dithering algorithm

The **Noise** option helps to reduce sharp borders between colors. It has 12 levels. This option is not available, if the **Color dither** option is on.

Scaling dithered images by certain factors introduces numerous artifacts, so it is essential to apply dithering after you have scaled the image to its final size.

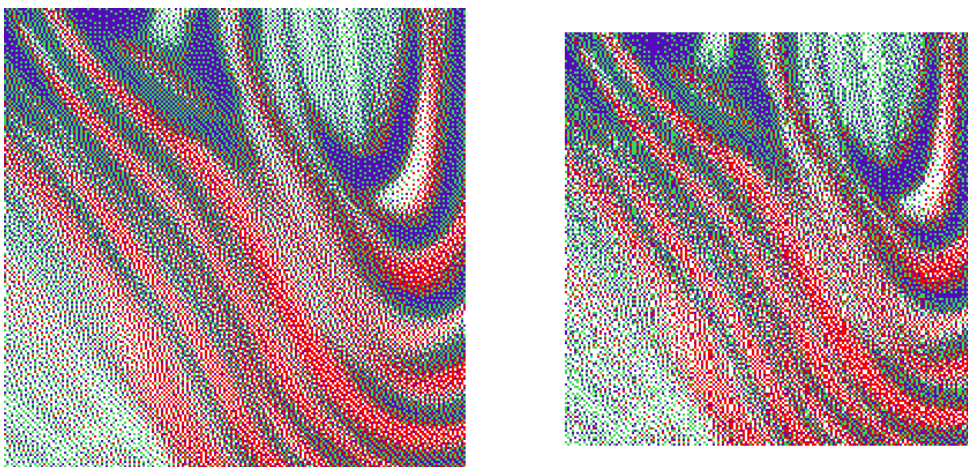


Figure 75: Dithered image on the left, and same image after resizing it to 90 % of its original size; you can notice the artifacts caused by scaling

6.5.1.2 8-BIT COLOR IMAGES

The **Set number of colors** window (Figure 76) is slightly different, when you reduce the number of colors of indexed-color images. The **Noise** and the **Color dither** options are not available.

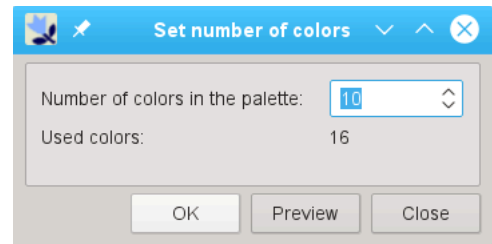


Figure 76: Setting number of colors on palette image (8 bit per pixel)

6.5.2 USER DEFINED COLOR REDUCTION

If you want to manually control the removal of colors from the picture, use the command **Color > Reduce number of colors (Alt+C)**. The appearance and functions of the **Reduce number of colors** dialog depend on the color depth of the image that you want to process.

6.5.2.1 TRUE COLOR (24-BIT)

This function enables you to reduce the number of colors to a predefined palette. A color palette is actually a “normal” image in indexed color mode (8-bit). The program will use its colors to form the group of **Selected colors**. To load a palette, click the **Load** or **Browse** button. Loading or browsing work as described in Chapter 4.2 and 4.3.

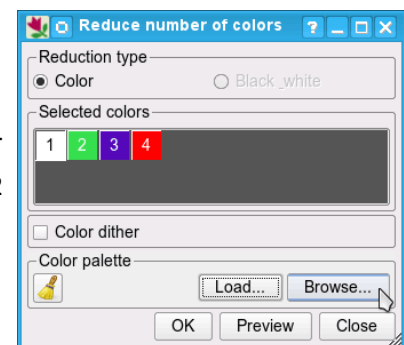


Figure 77: Reduce number of colors dialog, showing colors loaded from palette (image)

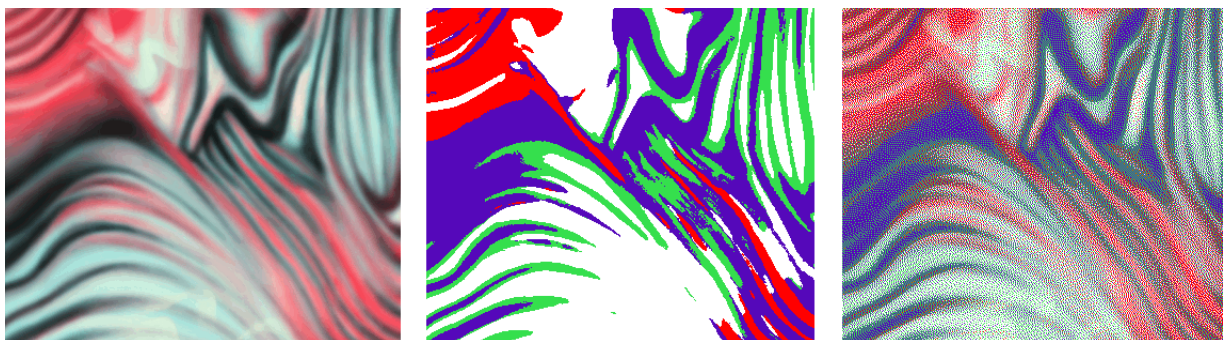


Figure 78: The original image, the image reduced to four colors from figure 77, and image reduced to same four colors with “Color dither” option enabled

6.5.2.2 8-BIT COLOR

There are two types of the number of color reduction of the 8-bit color (indexed color) images, **Color** and **Black and white**.

- **Color**; the user selects the colors, which should remain in the picture. Selection of remaining colors can be done in three ways:

1. From the color palette; as you click the color in the palette, it appears also in the **Selected colors** section of the Reduce number of colors dialog. To remove a color from Selected colors, click it and press the Delete button on the keyboard.
2. From a picture;
3. By loading a **color palette** from any indexed color image.

As you click the **OK** button, ArahPaint converts every color from image to the most similar color of the Selected colors group.

- **Black and white**; the picture will be converted to black and white; you can adjust the threshold value.

Picture will be transformed to black and white picture using the threshold value. Every color in the picture is first converted to gray, and depending on its gray value it is either converted to black or white. If its gray value is lower than the threshold value it will be converted to black, otherwise to white. You can play with the threshold value until the desired effect is achieved.

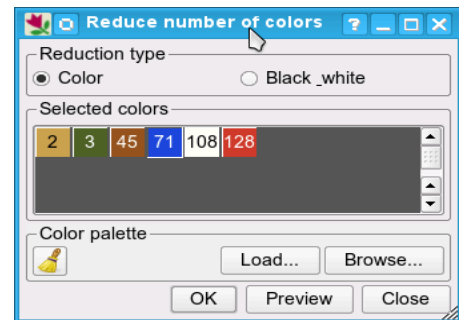


Figure 79: You can choose Selected (remaining) colors from the current palette, or by loading colors from another palette

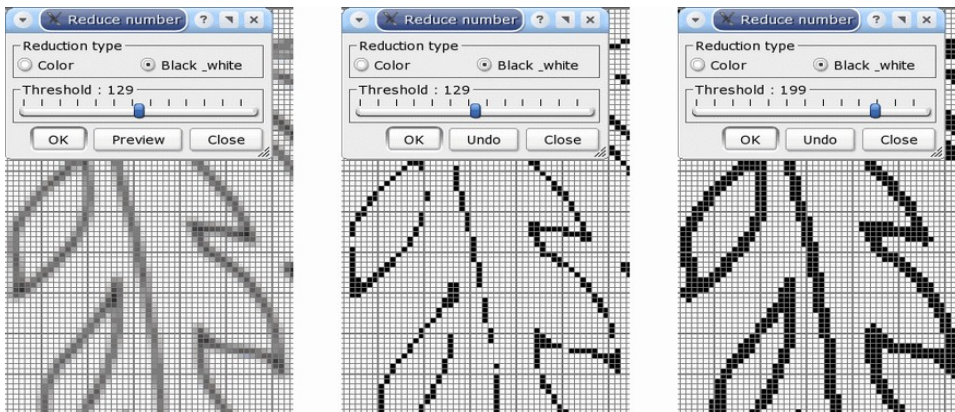


Figure 80: Black and white color reduction using threshold

Both modes have the **Preview** button; highly recommended.

6.5.3 COLOR REMAPPING

Color remapping is another way to decrease the number of colors. This time we will define both colors which will remain in the picture, and which colors will be mapped to these colors. Choose **Colors > Color remapping**. The window is split into two areas. In the left one (the **Colors in selection** table), all colors of the selected area are drawn (see Figure 81).



Figure 81: Color remapping

The right area displays the **Color remapping table**. Its first column shows destination colors. Colors, which are going to be mapped to destination colors, are on the arrow's right side (see Figure 82).

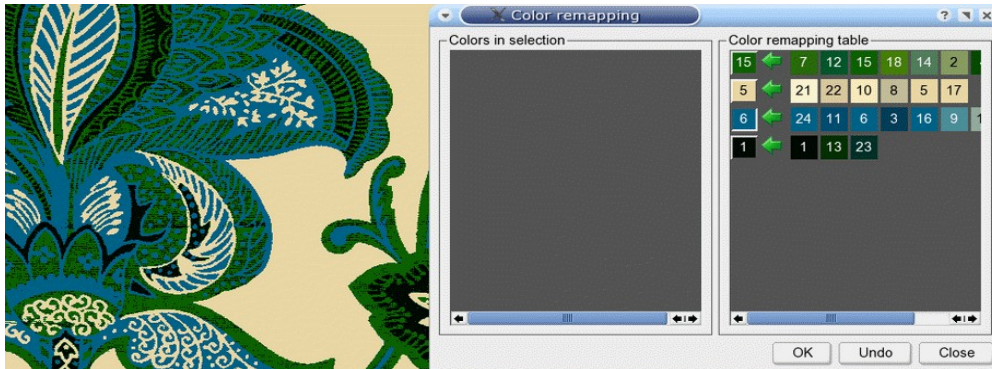


Figure 82: Color remapping table

Procedure:

1. Select destination colors from the color palette; the color is shown in the first column of a new row.
2. In the color mapping table, point to the desired destination color.
3. Go to the **Colors in selection** area and click every color, which you want to map to a currently active destination color. The color will be removed from the selection color area and added to the currently active destination color row.
4. Select another destination color and repeat the above two steps.
5. Colors in selection, which are not in the **Color remapping table** will remain unchanged in the image.
6. The **Preview** button gives you the preview of the color mapping result, **Undo** restores to the initial condition.
7. If you want to remove a (non destination) color from the mapping table, just click it and it will be added back to Colors in the selection area. If you want to erase the entire mapping row, press the right mouse button on the destination color (left column in the **Color remapping table** in Figure 82), and select **Remove** in the pop up menu.

6.5.4 INVERTING COLORS

Color inverting means changing each color in an image to its inverse on the color wheel. For example, applying the function to a blue object ($R=0$, $G=0$, $B=255$) changes the color to yellow ($R=255$, $G=255$, $B=0$). To invert colors, choose **Colors > Invert** and select the color channel you want to invert from the menu.



Figure 83: The invert colors menu

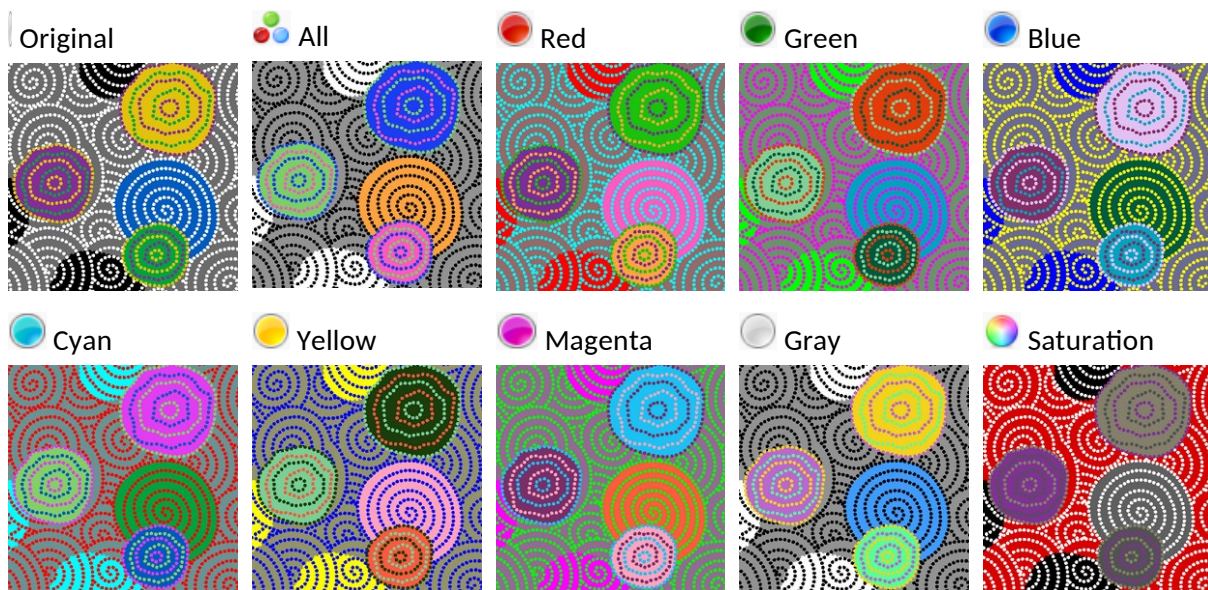


Figure 84: Different invert color modes

If there is a selection in the image, then the **Invert** function works only on the selection.

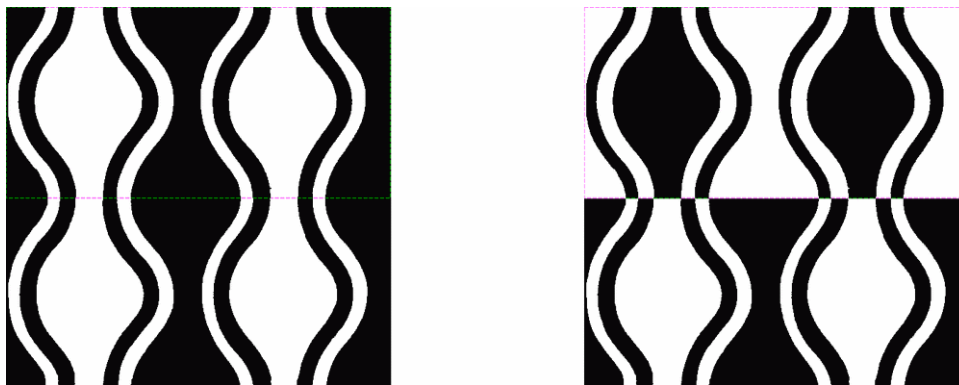


Figure 85: Before and after inverting colors in the selection

6.6 SWAPPING COLORS

To access the **Swap** function, choose **Colors > Swap**, and select a desired mode from the menu.



Figure 86: The swap colors menu

The swap colors function has three different modes:

- Color palette (8-bit) – exchanges colors between different color areas – colors in the image remain the same, just position is changed.



Figure 87: Images with same color palette

- True color mode enables exchanging two or more color channels in the picture.

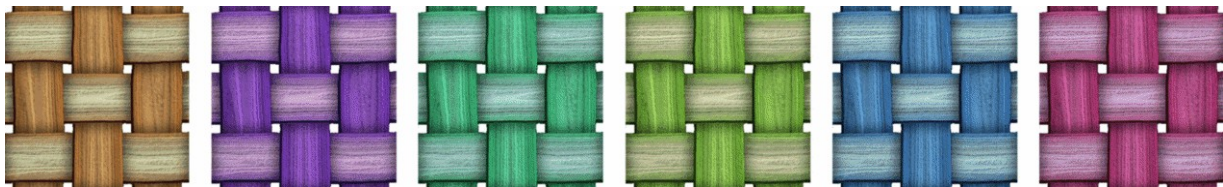


Figure 88: From left to right: original and results after applying the swap by color channels function

- Swapping saturation and lightness

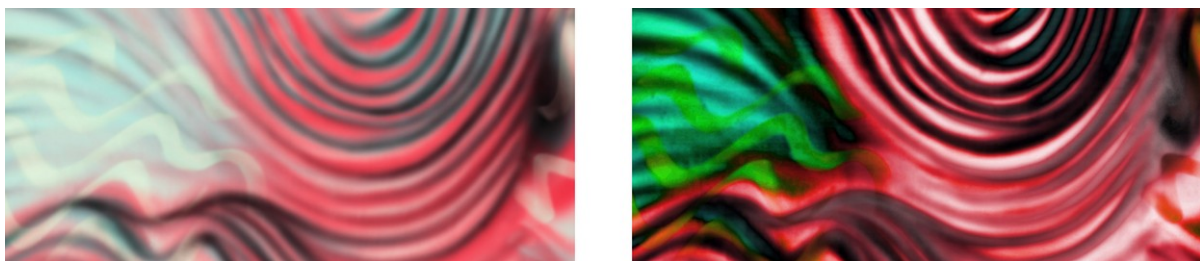


Figure 89: Swapping saturation and lightness

6.7 CONTRAST STRETCH

This tool increases the contrast in the image. It maps the input pixels with the lowest value to black (0); and the ones with the highest to white (255).



Figure 90: Before and after contrast stretch

6.8 KEEP COLORMAP FROM FILE

When you load an indexed-color image into ArahPaint, by default it displays only colors which are used in the file in the color palette panel. If you want, that it displays also other colors, which are not used in the file, but are written in the file's color table (256 colors), check the **Keep colormap from file** checkbox in the **Colors** menu.

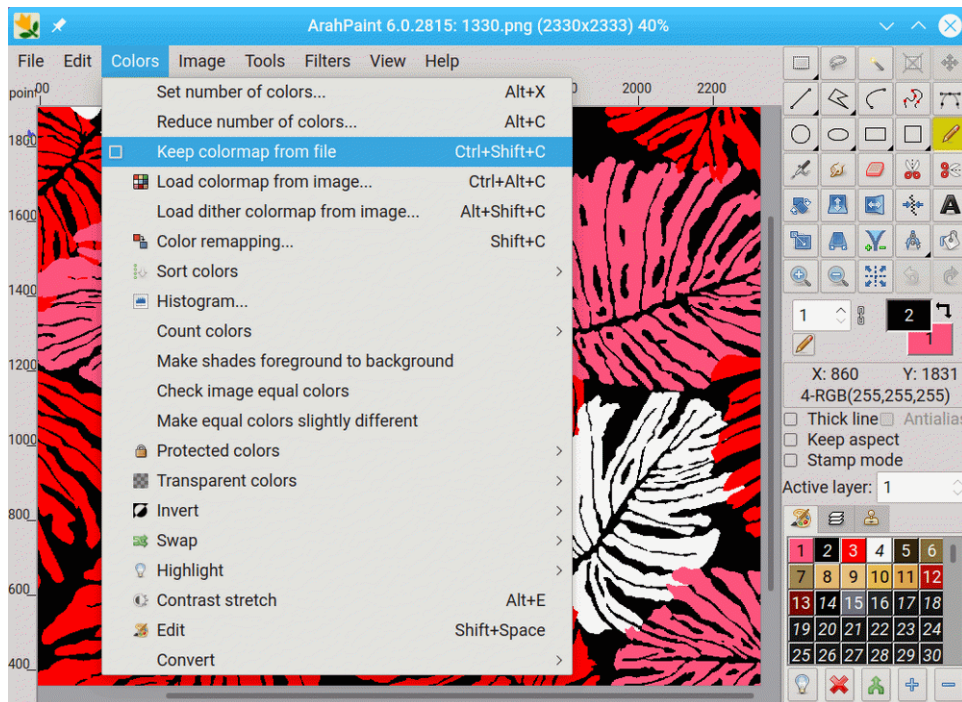


Figure 91: The Keep colormap from file option

If you want that the option is checked permanently, save the setup (**Help > Save setup**).

7 WORKING WITH CONTOURS

You can access three of the Contour operations (**Remove**, **Thin**, **Prune**) from the **Selected colors** of the **Tools** menu, while adding and thickening of contours have more options, thus they are controlled through the **Contour** dialog (**Tools > Contour**).

When you apply any of the contour operations, *ArahPaint* uses the currently selected foreground color as the color of the contour.

Note that contour operations will work over the borders of repeat only if the View mode is set to Repeat.

7.1 THINNING

Thinning serves for reducing the contour line width to one point, while keeping the continuity of the lines. Eliminated contour dots are replaced with the color of its neighbors. We want to keep the continuity and connectedness of the lines, since we will later fill the picture with colors, and we do not want the fill operation to leak.

To use thinning, choose **Tools > Selected color > Thin**.



Figure 92: Original image and image after thinning

7.2 PRUNING

Applying the thinning may produce some undesired contour dead ends, visible as “twigs”. This undesired side effect is more likely to occur in the corners of the original design. The pruning algorithm looks for such dead ends in the image and prunes them (cut them off).

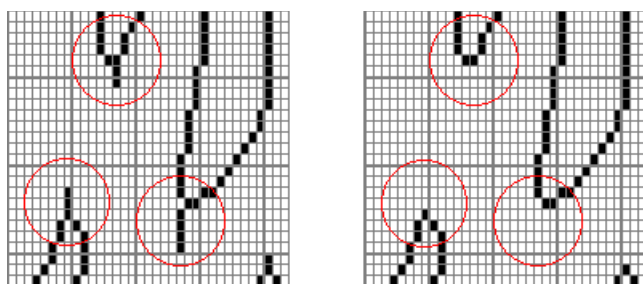


Figure 93: Before and after pruning

7.3 ADDING CONTOURS

Add contour will add contour between areas of different colors.

When you want to add a contour between different colors, open the **Contour** dialog (**Tools > Contour**). Select the color, which you want to outline, from the Color palette, and right-click into the **Around** color square to paste a color into it. The color which will be used as the contour color is currently selected foreground color.

Two options give you control over contour placement:

- **Into** means that the contour will use the border pixels of the color we want to outline (in Figure 94, **Into** is not checked, so the contour uses border pixels of the neighboring colors).
- **All**: if enabled, a contour will be drawn on all borders. If unchecked, then the Contour dialog gets a new color field: **With**. You set the **With** color in the same way as the **Around** color by pasting it from the Color palette. The contour will be drawn only on the border between the **Around** color and the **With** color (in Figure 94 contours will be drawn between orange and green color).

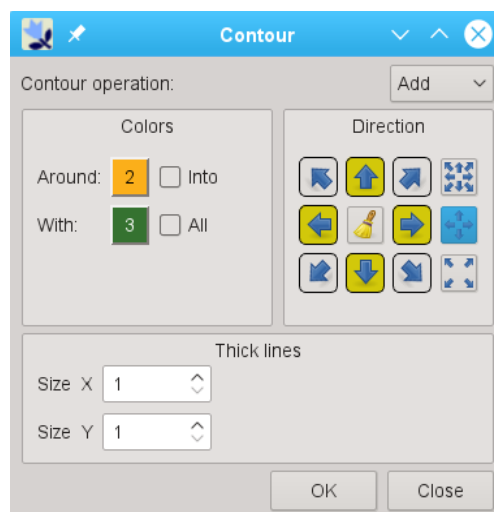


Figure 94: The Contour dialog




The arrows adjust the direction of adding the contours. Click an arrow to select it; click the already selected arrow to deselect it. You can have selected more directions at the same time. There are three additional icons ( ,  , ) to the right of the arrow icons. They serve as a tool for quick selecting of contour directions (all directions, left-right-up-down direction, diagonal directions). When you make all the settings, click **OK** in the **Contour** window to apply the contours.

Figure 95 shows the original image on which we will apply some contour operations. The color of contour is blue in all examples.

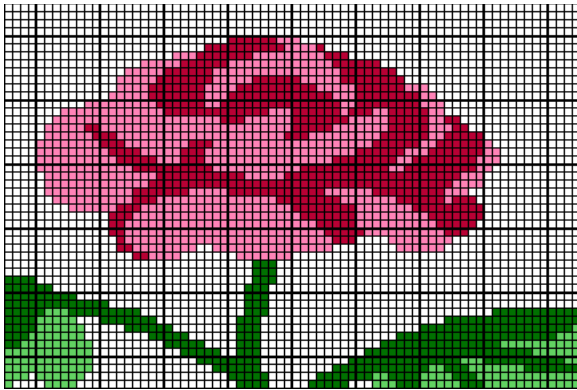


Figure 95: Original image

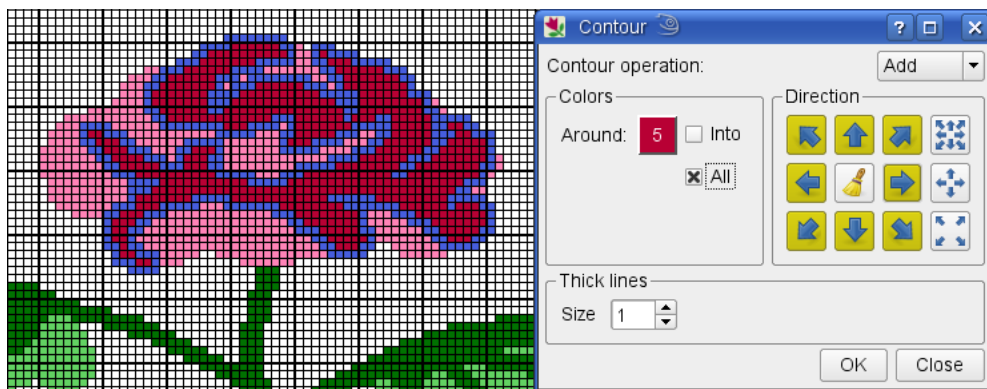


Figure 96: Adding contours in all directions (all around dark red)

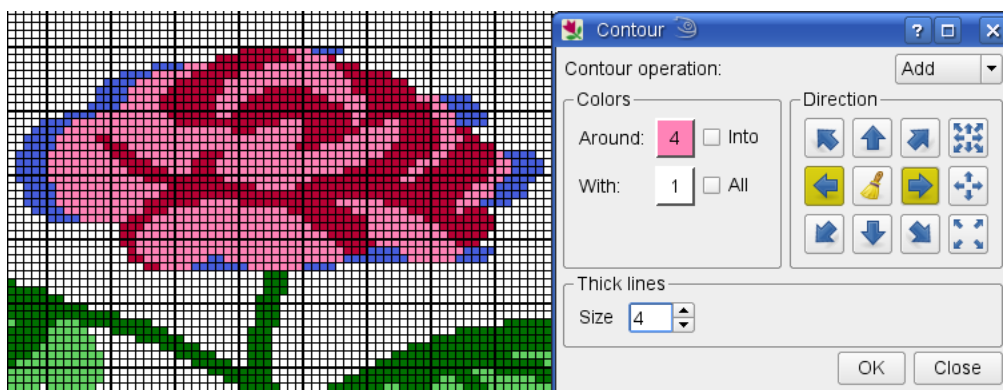


Figure 97: Adding contours only in one direction (left of light red on the border with white)

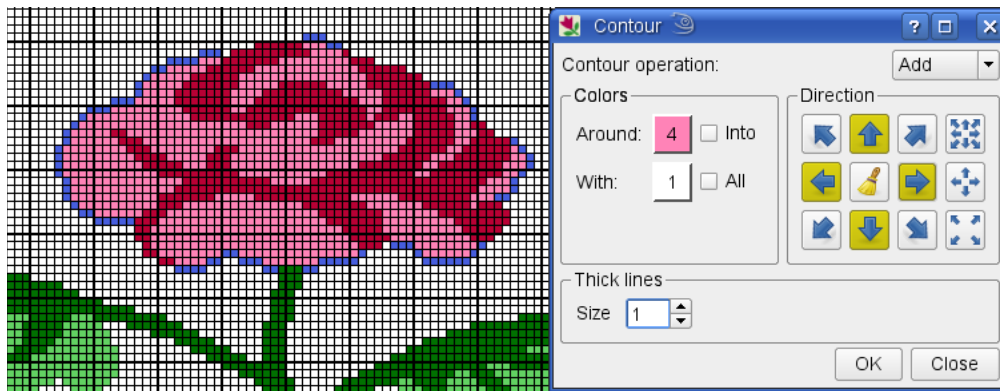


Figure 98: Adding contours between two colors (light red and white)

7.4 THICKENING CONTOURS

It increases the contour width by user defined number of pixels. You have to set the following parameters:

- Contour color (in our example: blue).
- Size, number of dots to be added (in our example: 2).
- Direction (in our example: to the left, right, up and down).

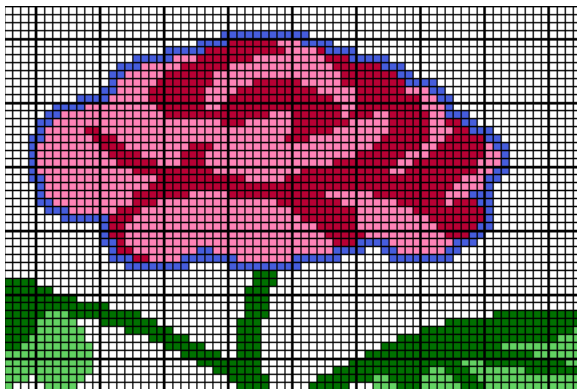


Figure 99: Image before applying thickening

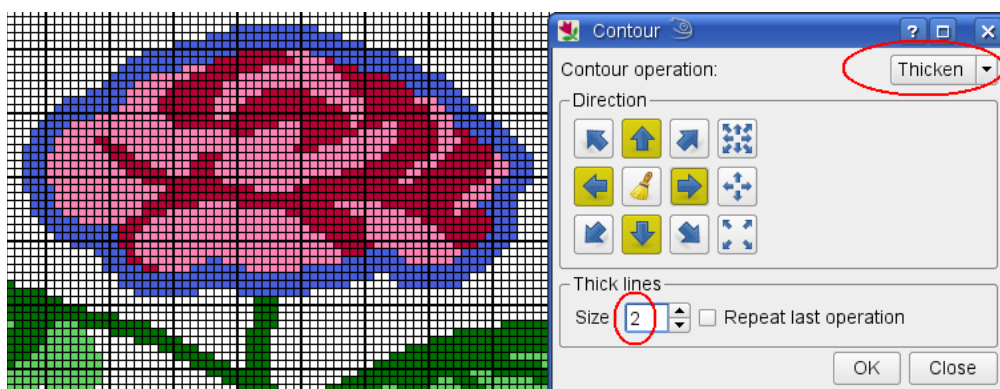


Figure 100: Thickening contours in one direction

You can combine this function with protected colors, to ensure that thickening does not affect the colors, which you want to keep unchanged.

7.5 REMOVING CONTOURS

This operation will remove the contour and replace it with the neighboring colors. Normally it is used after filling the image with colors, and the contour is no longer needed. But it can be used simply to remove a particular color from the image. To use it, choose **Tools > Selected colors > Remove**.

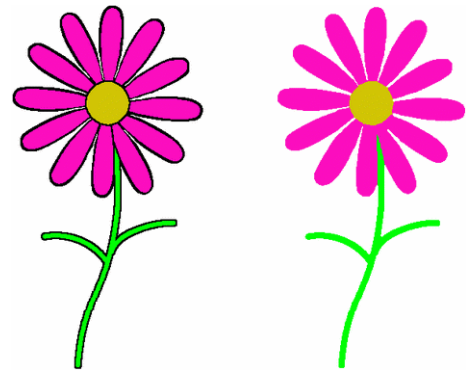




Figure 101: Before and after removing the contour

8 USING LAYERS

When you create or load an image in *ArahPaint*, the image consists of a single layer (background layer). If you are simply retouching the image, you don't have to create new layers. But if you plan to add different designs to your image, layers will make your task a lot easier. Layers allow you to work on one element of your image without disturbing the others. Until you merge the layers, each layer remains independent.



You can get layers into the image by loading them (they are actually normal images) or by selecting a part of the image, thus transforming it into a layer.

8.1 SELECTING

The selected area is indicated by a dashed or dotted selection border. The dashed line which limits the selection in its creation phase looks like this: . In this phase you can still change the size of the selected area. But after you move it, or select the **Repeat selection** checkbox, the line is changed to a dotted line , and you can't change the size of selected area anymore. The area outside the selection border is protected while you move, copy, paint, or apply any other tool to the selected area.


In Chapter 4.18 we have learned how to make a rectangular selection. But often we need to make a more complicated selection. *ArahPaint* allows you to make freehand selection, selection by color, a magic wand, and inverted selection.

8.1.1 ELLIPTICAL SELECTION

To use the elliptical selection tool, double-click the rectangular selection icon , which changes to the elliptical selection icon . Drag the mouse from the center of the selection. After you release the mouse button, you can still move the selection boundary by moving the mouse pointer to the border of the dashed ellipse (from the inside out) until the mouse pointer shape changes to double arrow. Now drag the mouse to change the size of the selected area.

8.1.2 FREEHAND SELECTION

You can select the area of any shape in the picture. The procedure is very similar to freehand drawing:

1. Click icon  (keyboard shortcut L)
2. Move the mouse pointer to the place where the freehand selection should begin.

3. Press the left button and drag the mouse to draw a freehand selection border. As the mouse moves, the dashed line follows the mouse pointer.
4. To draw a straight selection border, release the button, and click where the segment should end. You can switch between freehand and straight line borders as you draw it.
5. Right-click to stop drawing selection. The program automatically connects the first and last point by line.

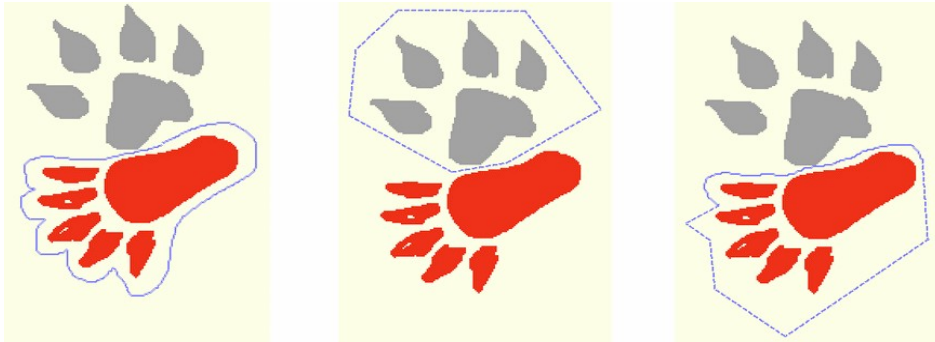



Figure 102: Three modes of freehand selection: freehand, vector, and combined mode

8.1.3 USING THE MAGIC WAND TOOL

The magic wand tool lets you select a consistently colored area without having to trace its outline. You may specify **Threshold** (color range) before using the magic wand. To use the magic wand tool:

1. Select the magic wand tool .
2. For **Threshold**, enter a range of pixel values, ranging from 0 to 255. Enter a low value to select colors very similar to the pixel you click, or enter a higher value to select a broader range of colors (for instance **Threshold**).
3. In the image, click the color which you want to select. All adjacent pixels within the threshold range are selected. If the **Whole image** option is on, all pixels within the threshold range in the whole image are selected.
4. You can select 8-ways, which adds adjacent pixels which are connected on the corners to the selection. Normal Magic wand mode could also be called 4-way fill, since it only checks 4 points (top, left, right, bottom).
5. If the selection does not cover the desired area, undo the operations (or press Delete to delete the selection), adjust **Threshold**, and try again.

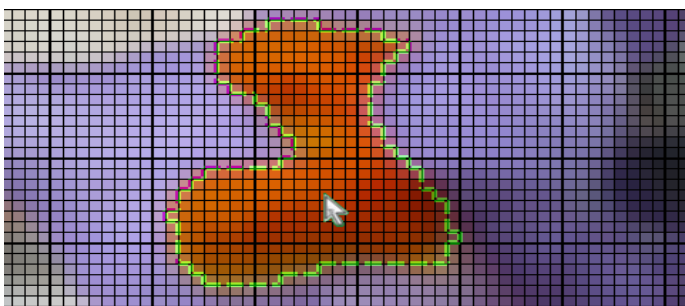


Figure 103: Magic wand selection: green line indicates selection's border

8.1.4 THE WHOLE IMAGE OPTION

If the **Whole image** option is on, all pixels within the threshold range in the whole image are selected. In this way you can select all areas of one color.

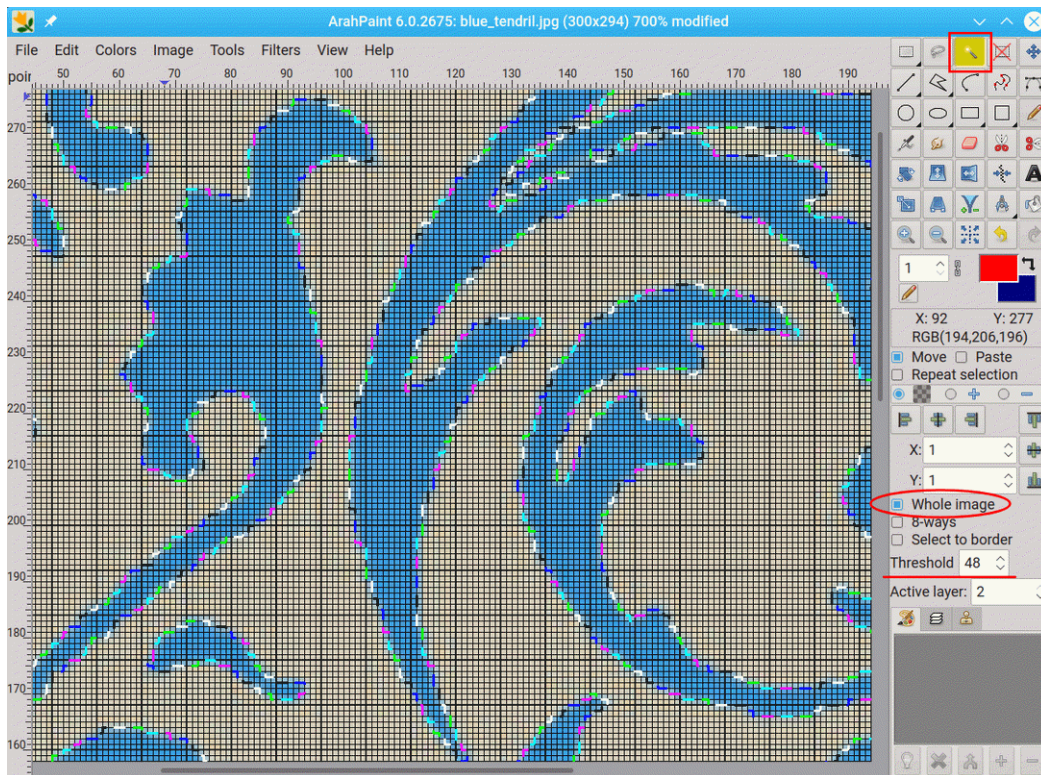


Figure 104: Magic wand with the Whole image option on

8.1.5 SELECTING AREA BY COLOR

You can select all pixels of foreground color using **Tools > Select by color (Shift+W)**. This function only works on 8-bits per pixel images.






8.1.6 SELECTING AREA OF MORE THAN ONE COLOR

You can define more than one color as a criterion for selecting by setting the protected colors in the color palette. After choosing **Tools > Select by protected colors**, all areas in protected colors will become a selection.

8.1.7 INVERTING A SELECTION

Choose **Edit > Invert selection** to invert your selection to the opposite of its current state.

8.1.8 MOVING LAYERS

To use this function, one of the selection tools    or the move tool  should be selected. Move the mouse pointer inside the selection/layer until the mouse pointer changes its shape into a cross with four arrows . Then press the left button and drag the mouse. The layer will move with the mouse pointer. To stop, release the mouse button. Alternatively, you can move a layer by changing coordinates of its lower left angle point (see Figure 106). While moving, the layer is transparent, so the correct placement is easier achieved. However, if you don't like this behavior, just clear the **Move** option below the toolbox.

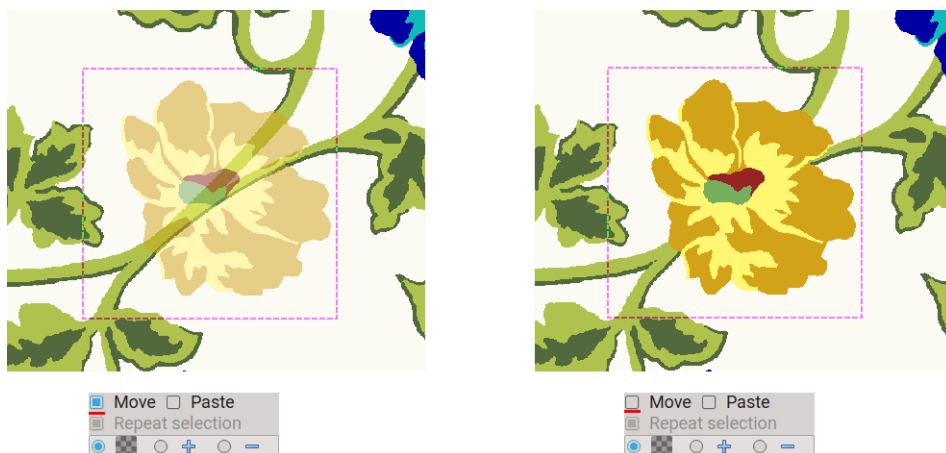









Figure 105: Transparent and opaque layer move

If you have several layers, then the currently selected layer will have a different selection border from the other ones. If you are using the move tool , you can change the active layer by clicking on a layer.

For a more precise layer placement, you can use keyboard arrow keys: move selection 1 pixel left, right, up, down. If you keep pressing **Shift** on the keyboard while using the arrow keys, you will move the selection by 10 points instead of 1. If you need your selection to be placed at a specific location, observe the layers coordinates above the palette (see Figure 35).

8.1.9 PLACING A LAYER TO PREDEFINED AREA

If one of the selection tools is selected, and there is a selection in the image, you can move the selection to the edge of the image, or to the center of the image using icons in the option area. There are three icons for vertical placement (top , bottom , center ) , and three icons for horizontal placement (left , right , center ).

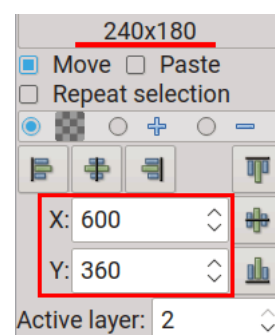


Figure 106: Option area with selection positioning icons

8.2 LOADING/SAVING A LAYER



Selection can be saved as a layer so you can reuse it in different pictures. Saving layer is identical to picture saving with the obvious exception that it only saves the selected area (layer). Use the command **Save layer as** in the **File** menu and use the same procedure as in chapter 4.6.

Loading a layer is only slightly different from loading a picture. Use the **Load layer** command (keyboard shortcut **Ctrl+Shift+L**) in the **File** menu. After you add layers to an image, use the **Layers panel** to manage them.

8.3 LAYERS PANEL

The **Layers panel** lists all layers in an image, starting with the topmost layer.

8.3.1 ORDER OF LAYERS

The order of layers in the Layers panel indicates the order of layers in the image—the topmost layer in the Layers panel is the topmost layer in the image. You can change the stacking order of layers by clicking on  or  in the palette's toolbar (keyboard shortcuts (**Ctrl+]** or **Ctrl+[**). The background cannot be moved from the bottom of the layer list.

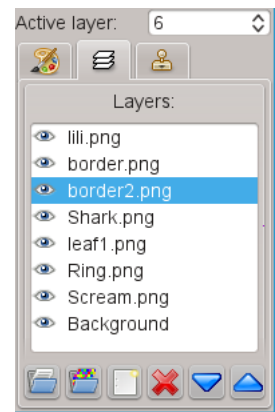



Figure 107: Layers panel

8.3.2 ACTIVE LAYER

Drawing operations only affect the highlighted or active layer. You select a layer to make it active, and only one layer can be active at a time. Active layer's border is different from other layers. To select a layer do one of the following:

- In the **Layers panel**, click a layer to make it active.
- Change the number of the active layer in the field below the palette's toolbar.
- You can descend through layers by holding **Alt+]** or ascend through layers by holding **Alt+[**.
- Select the move tool , and click the selection/layer in the image.


8.3.3 RENAMING LAYERS

As you add more layers to an image, it's helpful to rename layers based on their content.




To rename a layer, double-click the layer's name in the Layers panel. Type a new name for the layer, and press Enter.

8.3.4 DELETING LAYERS


To delete a layer, select the layer in the Layers panel and do one of the following:

- Click the Delete layer icon  at the bottom of the Layers panel.
- Press **Delete** on the keyboard.

8.3.5 LOADING LAYERS FROM LAYERS PANEL

The **Load layer** command is also accessible from the Layers panel: click  in the panel's toolbar to open file selection dialog, or click  to open Browse window, or  to open the **New layer** dialog box.

8.3.6 VISIBLE LAYERS

In the Layers panel, you can control whether a layer is visible or not. To show or hide a layer in the Layers panel, click the eye icon  next to a layer to hide that layer. The icon will disappear. Click in the column again to redisplay the layer.

8.4 CUT/COPY A SELECTION:

First make a selection; then use the command from the **Edit** menu:

- **Cut (Ctrl+X)** to cut out the selected area into the buffer. The selected region in the picture will be filled with the background color.
- **Copy (Ctrl+C)** to make a copy of the selection without changing the contents of the picture.

Cut-copy-paste also works between several ArahPaint programs. It works also for files copied from other Desktop programs, like office and web browsers.


8.5 PASTING A LAYER

To paste a layer, choose **Edit > Paste** (Ctrl+V). ArahPaint positions a copy of a layer on the top left area of the drawing window. You can move the layer to a desired location.

8.6 FLATTEN IMAGE

In a flattened image, all layers are merged into a background image. To merge all layers at once, choose **Tools > Flatten image** (Ctrl+Shift+E).




If you want to merge only the active layer with the background image, do **one** of the following:

- Click the deselect icon  in the toolbox.
- On keyboard, press **Ctrl+D**.
- Right-click outside of selection somewhere on the background image (works, if one of selection tools is active).

8.7 SUPERIMPOSING LAYER OVER IMAGE

Superimposition is the placement of a layer or image over an image, so that colors from layer and image are summed up (blended) into new colors (when we normally paste a layer onto image, they don't interact or blend with each other).

There are three different blending modes:

- **Transparency** : ArahPaint uses the average color of the top and bottom pixel as the color of blended pixel.
- **Addition** : ArahPaint sums colors of both pixels to get the color of blended pixel. It is useful, when colors we get with a transparent blend are quite similar and difficult to distinguish. If you blend two relatively light images, the result will be very light and maybe not so useful.
- **Subtraction** : ArahPaint uses a color difference of both pixels to get the color of blended pixel. It is useful to find differences in two images that appear to be the same, because the blended color of two pixels of same color is black after subtraction, thus all non-black resulting pixels represent the difference in two images.

To use one of these blending modes, select the **Paste** option, and choose one of them; transparency is selected by default.

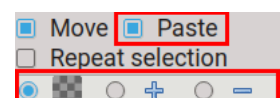


Figure 108: Three modes of superimposition

If you work on 8-bit images (and usually you do), the images should have quite small number of colors, otherwise the final number of colors will be too large and difficult to manage. The program adds $M \times N$

colors to the number of ground image colors as a result, where M is a number of colors in the ground image, and N is a number of colors in the layer. At the end, it removes any duplicate or unused colors.

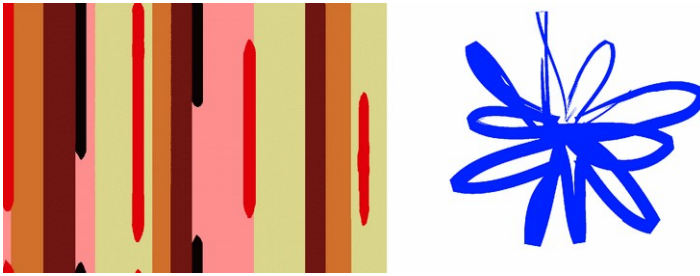


Figure 109: Two images that we will merge

Figure 110 shows placing a layer (blue flower) over the background image. The background image consists of 6 colors, adding blue from the layer we got 7 colors all together in the new image.

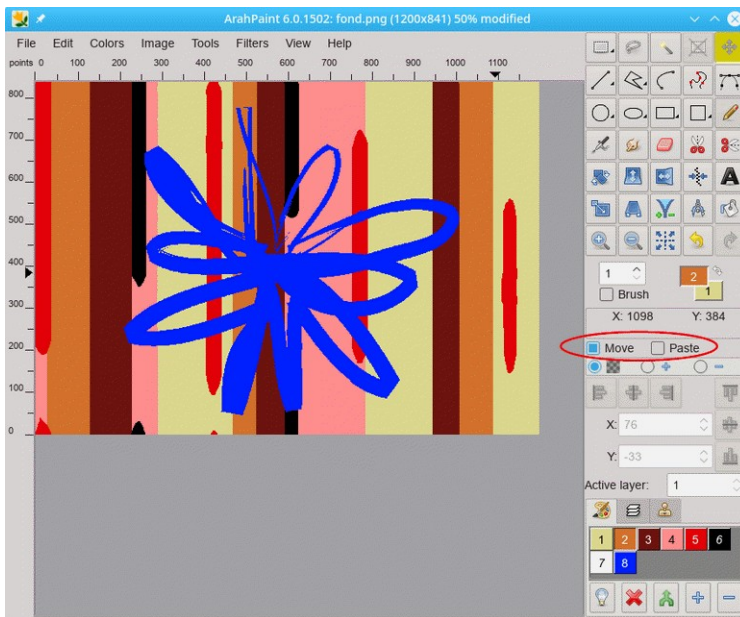


Figure 110: By default, a layer covers area below it completely.

Figure 111 shows the same layer, merged with the background image in the transparent mode. We got 6 new colors in the image and the color information of the covered area of the background image was preserved.

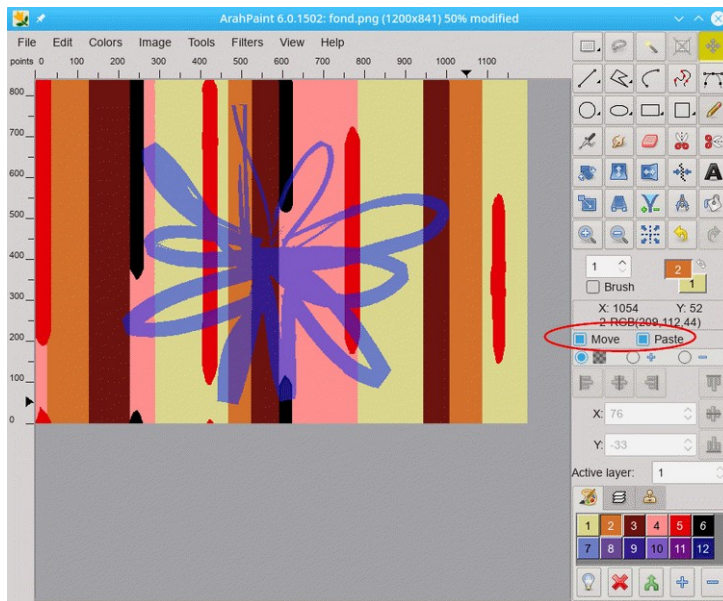


Figure 111: Transparent layer merging

8.8 REPEATING A LAYER

The purpose of the **Repeat layer** function is to lay down many copies of a single layer (selection). In this way, you can fill the entire picture with layers, laid in a particular order. Choose **Tools > Repeat layer (Ctrl+Shift+V)**—the menu is only available, if there is a selection or a layer in the image.

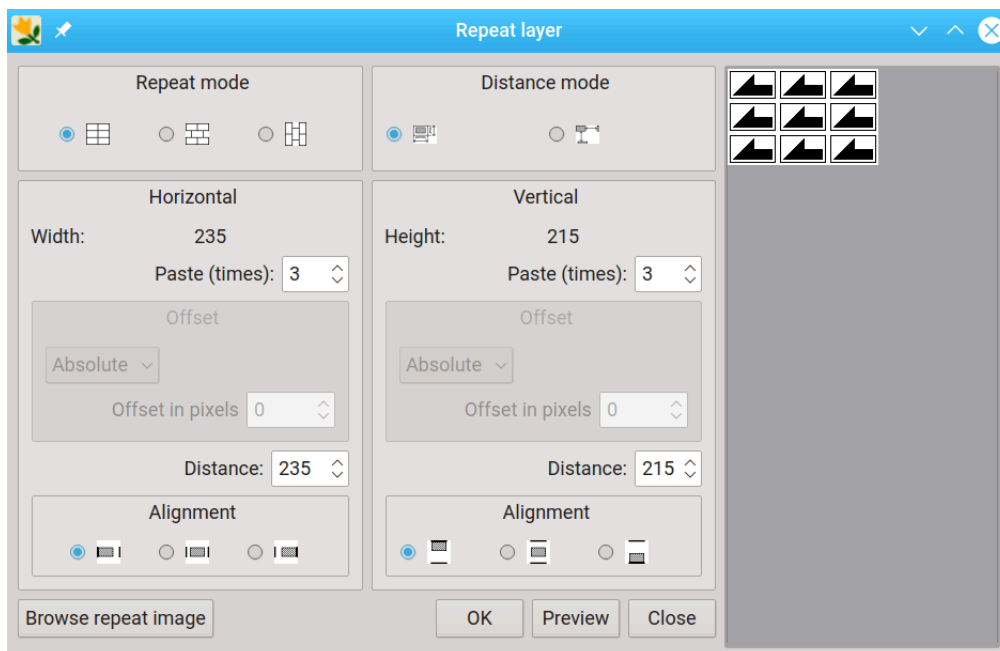












Figure 112: The repeat layer window

Let's explain every element of this rather complex window:

- **Repeat mode.** There are three different repeat modes possible: block , brick , and pillar . Picture beside each option explains how layers are laid down.
- **Distance mode.** The top right icons determine the value of the Distance field. In case the left icon is selected (default ) the distance parameters sets the distance between two consecutive layer placements. If the distance value set is bigger than the layer size, this can be aligned inside the

virtual frame determined by the distance parameter. When the rightmost icon is selected () , the distance parameter sets the distance between the two nearest borders of two consecutive layers (as depicted on the icon). In this mode the Alignment parameter has no meaning and therefore it is not visible.

- **Horizontal/Vertical.** The window is separated into two identical parts; the layer's width/height are displayed at the top.
- **Paste times.** Enter the value how many times you want to repeat the layer in each direction.
- **Offset** sets for how much every row/column of pasted layers is shifted with respect to its predecessor. Offset can be relative or absolute. In the first case it can be only a fraction of the repeat width/height ($1/2$, $1/3$... $1/n$); in the second case, you can change the offset value in pixels. Offset setting depends on the repeat mode: when block repeat is selected, offsets are disabled, while with brick or pillar mode, only one of the offsets can be set.
- **Distance** value determines the distance between two consecutive layer placements or the distance between the two nearest borders of two consecutive layers (see above). It can also be smaller than the size of the layer. If the preview is on, as you change the distance the program interactively displays these changes in the layer.
- **Alignment** sets the alignment inside a virtual frame, when distance parameter value is greater than the layer size in the particular direction.
- A graphical configuration of the repeat pattern is placed at the right side of the dialog window; each repeat is displayed as an arrow. It can assume five different positions, which decide the mirroring of the layer:
 -  no mirroring of the layer
 -  horizontally mirrored layer
 -  vertically mirrored layer
 -  horizontally and vertically mirrored layer
 -  empty space (no layer at all)
- To change the mirroring type, place a mouse pointer over the arrow that you want to change, and press the left mouse button. The arrow will jump to the next mirror type. Since there are only 5 mirror types, you will get what you want in a maximum of 4 clicks. If you press the right mouse button, it will put the arrow to the default orientation.
- Click the **Browse repeat image** button to open the Image browser, from which you can load a weave into the Repeat layer window. Black and white points of the weave serve as a pattern for placing a layer: a black point – layer on, a white point – layer off. The extension of this layering pattern function is using a 5-color image, where pixels of each color represent one position of mirroring a layer, enabling you to create complicated layering patterns and reuse them in future.
- **Preview/Undo** button gives the possibility to see the result of settings made, without leaving the window. If you are not satisfied, you can change the parameters and try again.
- **OK** button will confirm the values. You will get a new layer, which you can still move to the desired place.

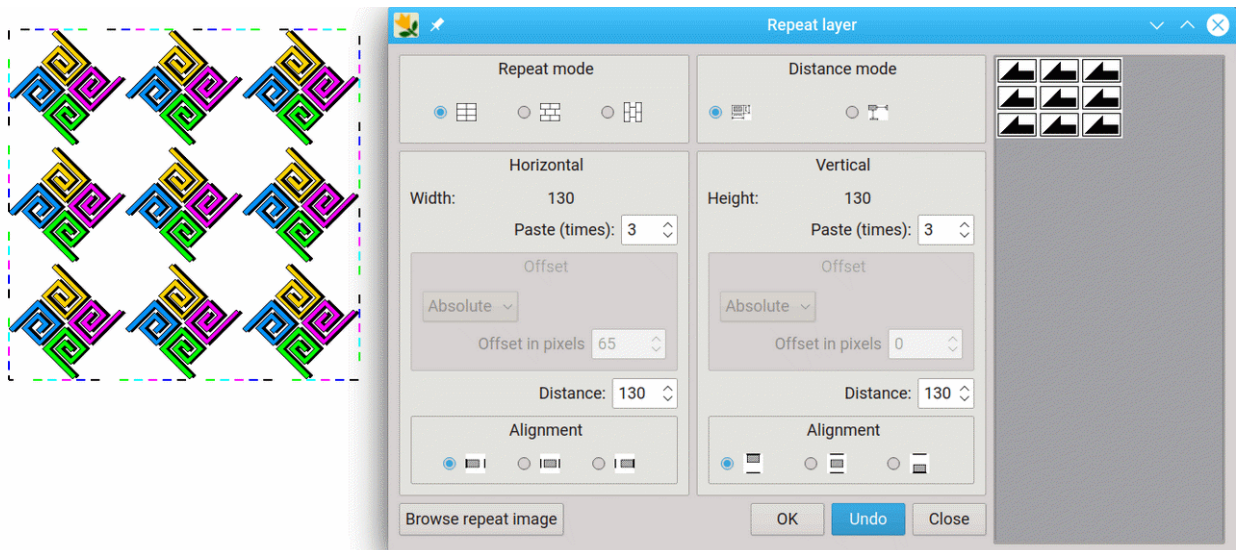


Figure 113: Repeat layer – the distance is equal to the layer size

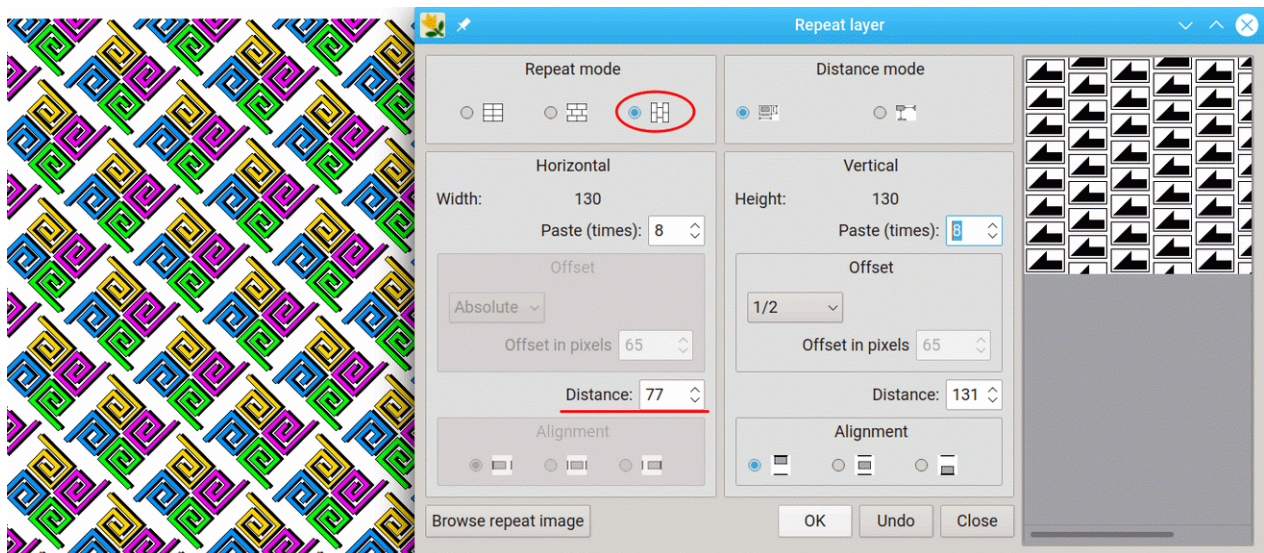


Figure 114: Repeat layer in vertical half-drop mode – the distance is smaller than the layer size, so one layer goes into another; the background color (white) must be transparent.

8.8.1 LOADING AN IMAGE (WEAVE) AS A LAYERING PATTERN


Let's say that you want to arrange the design like satin 5 weave , where each point represents a place for a basic design. You can do such an arrangement manually in the Repeat layer dialog, but it takes a lot of clicks to set all 25 elements into desired position.

Figure 115 shows a situation, where we want to repeat a layer in a satin5 way. In the Repeat layer dialog click the Browse repeat image button to open the image button. Navigate to the folder, where your intended repeating pattern is, and load it by double-clicking into the Repeat layer dialog. The horizontal and vertical Paste(times) numbers are set automatically to match the width and height of the loaded weave.

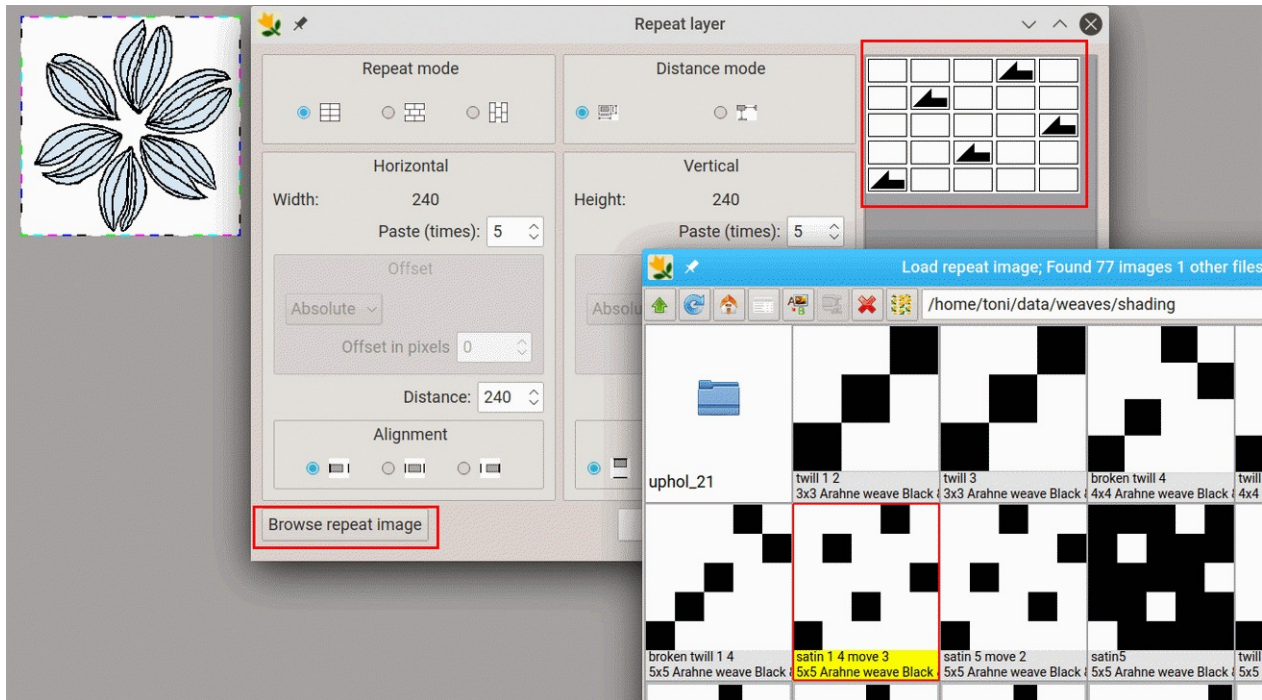


Figure 115: Setting a repeating pattern using an image (weave).

As you click **OK**, the previously single layer is multiplied according to the repeating pattern, becoming a new layer. If the background image is too small and our aim is just to create a new image using the Repeat layer tool, you can use **Image > Crop to selection** to get this new layer as a new image.

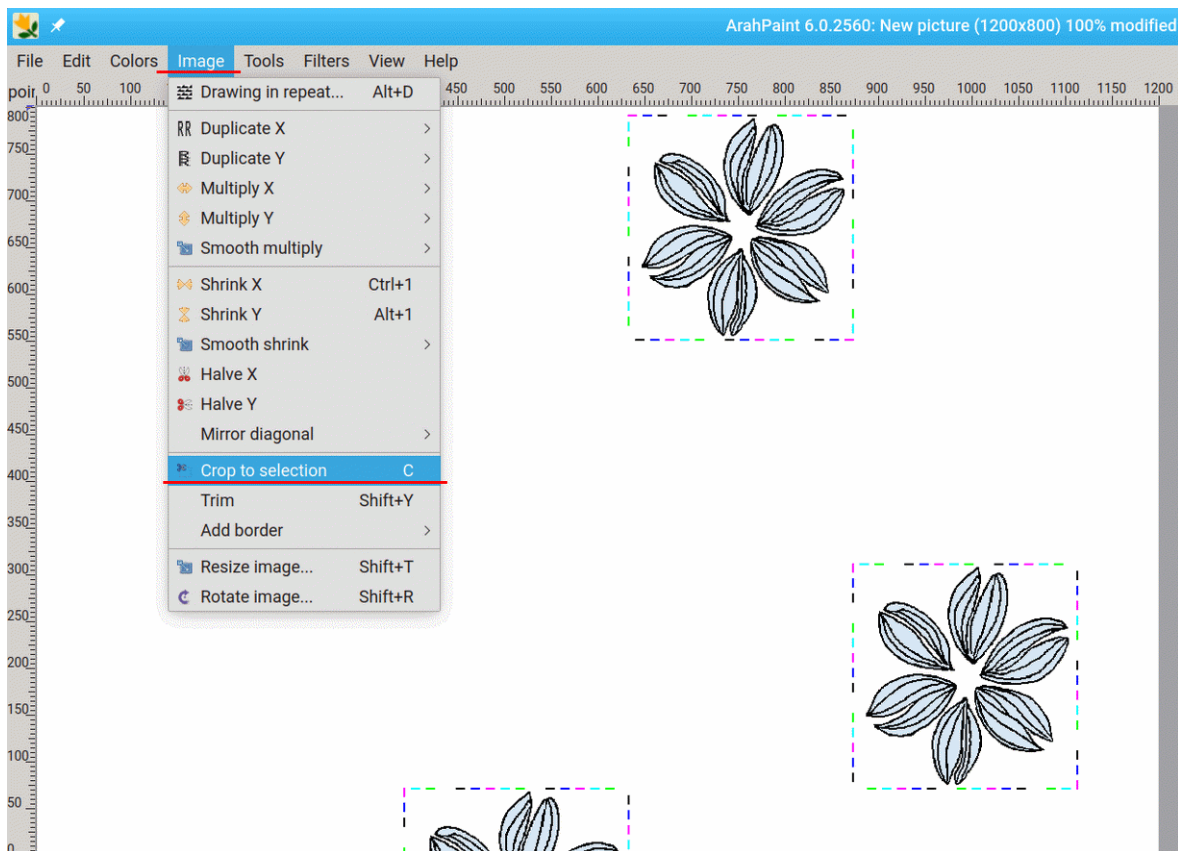


Figure 116: Cropping to selection results in a new image from layer.

Figure 117 shows a newly created image, where the basic motif is repeated in the same manner as weaving points in the satin 5 weave.

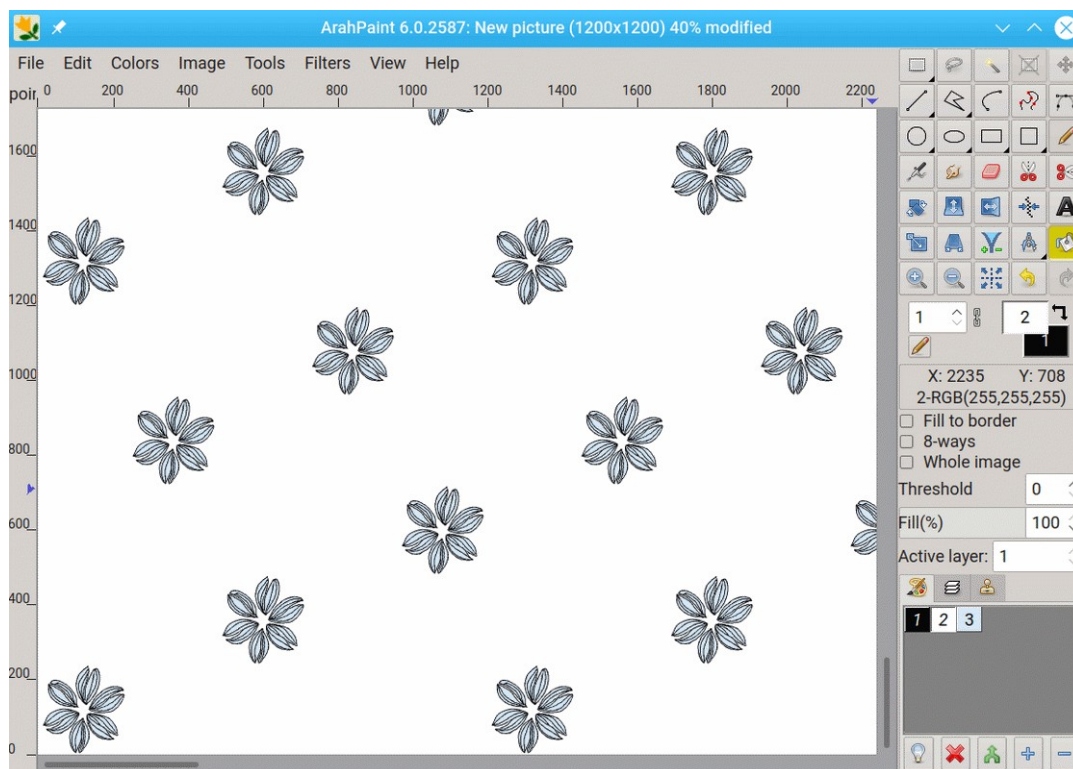


Figure 117: A motif repeated in a satin 5 way.


9 TRANSFORM TOOLS

The transform tools let you modify the presentation of the image or the presentation of an element of the image, selection or layer.

9.1 IMAGE SCALING

The Resize image dialog that lets you change the physical size of images or layers or change (reduce or enlarge) the area that images or layers cover.

You can access the Resize image dialog in different ways:

- From the main menu **Image > Resize image**.
- By clicking the tool icon:  in the Toolbox.
- By using the Ctrl+T key combination.

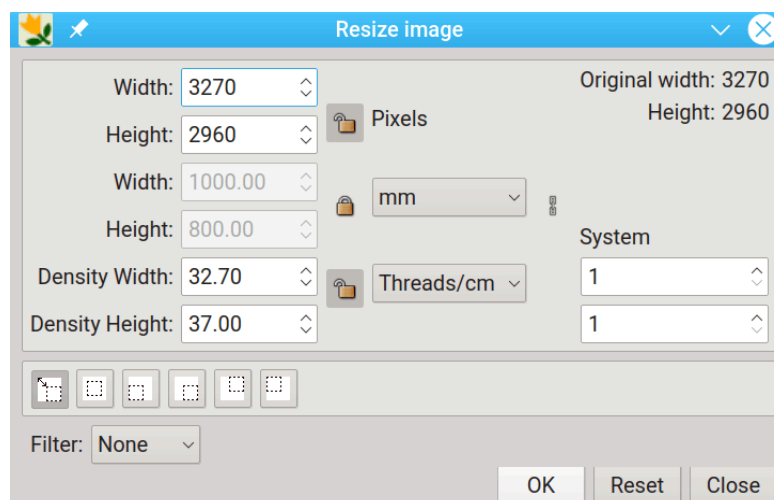











Figure 118: The Resize image dialog in ArahPaint

The Resize dialog-box of ArahPaint is divided into four parts:

- The information about the current image size is in the upper right corner.
- The main section, where you change the dimension (in pixels or in physical size in length units (mm, cm, inches, or percent of original size), and change the density (dpi) of the image. If the associated

linking chain  is broken  , you can change the Width and Height independently. Click the lock icon  beside the value fields you want to prevent from changes.

- Section, where you choose either you will scale the whole image () or just add extra space in the foreground color to it (

9.1.1 CHOOSING THE SCALING MODE

Yo choose the mode of resizing by clicking one of the icons in the scale-mode bar. The first icon selects the resize image mode, while the others determines the position of added (or removed) pixels.

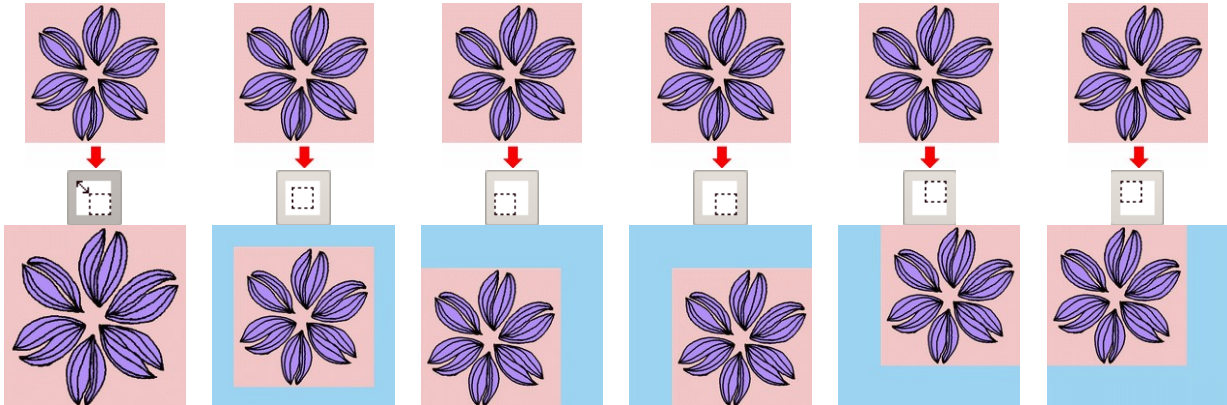



Figure 119: First picture shows the scaling of the image content; others show adding the space to the image.

9.1.2 SETTING REPEAT DIMENSIONS

To maintain the original ratio of width to height measurement, make sure that the Constrain Proportions option  is enabled. If you want to scale the width and height independently of each other, break the chain by clicking on its icon.

Default ArahPaint image resolution is 100 dpi in both directions. But fabrics normally have different warp and weft density. One of the most important *ArahPaint*'s features is the ability to draw images in real size mode, which means that pixels are not squares, but rectangles.

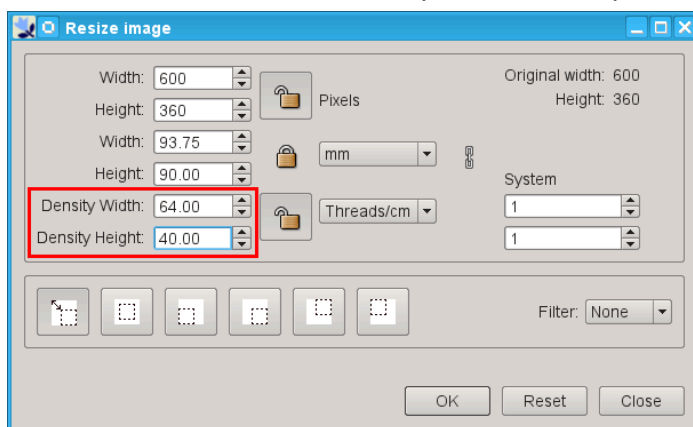


Figure 120: The density section of the Resize image dialog

Both images in Figure 121 show the same image viewed at a different density.

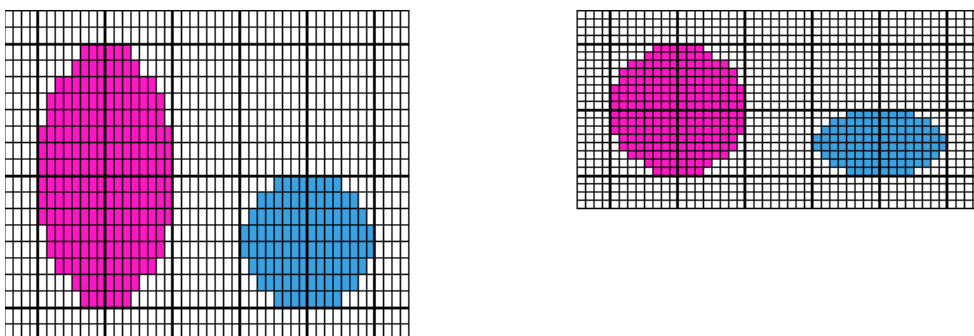


Figure 121: Vertical density (weft) is lower than horizontal density (warp); density is the same

9.1.3 SCALING THE IMAGE TO MATCH THE NUMBER OF HOOKS AND FABRIC DENSITY

Scaling the image size to match the number of hooks and fabric density can be done in a few steps in the Resize image dialog.

1. Load the image and open the resize image dialog.

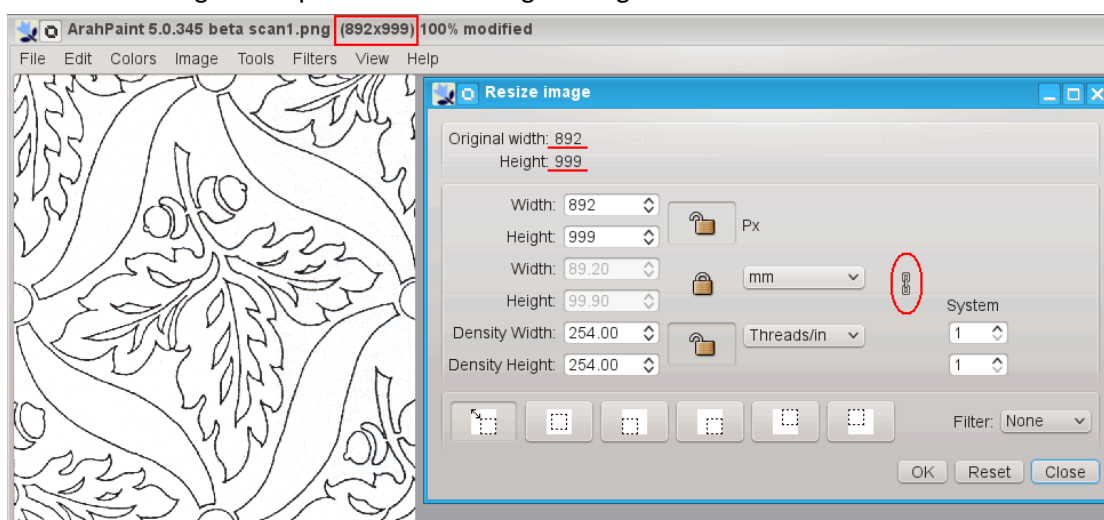


Figure 122: The default state of Resize image dialog

2. Before setting the warp and weft density, break the chain by clicking on it (🔗). It changes to the broken chain icon (🔗). Now you can set each density independently.
3. Set the unit of the density (Threads/inch, Threads/cm) and the density of the fabric.

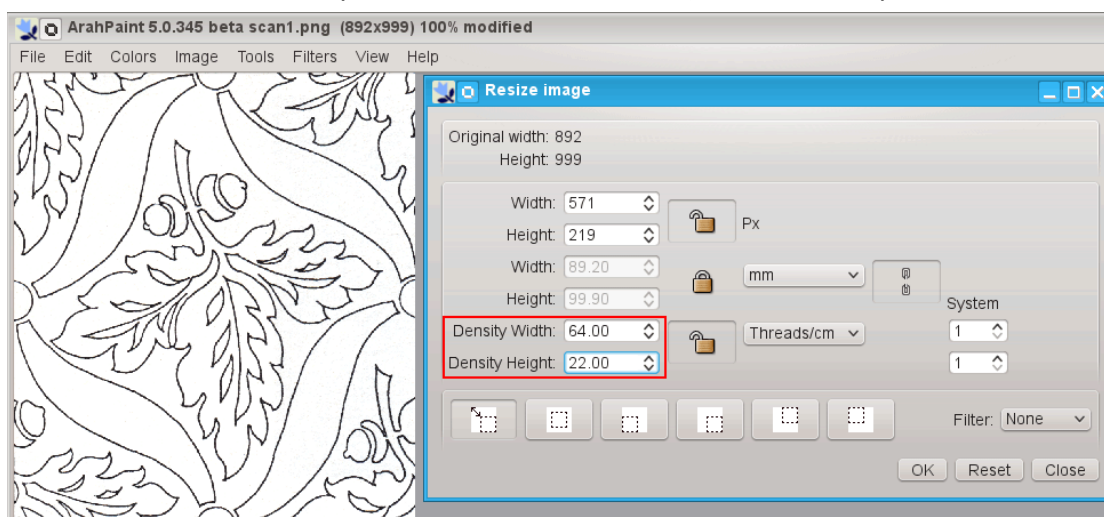


Figure 123: As you set the density, the width and height values change too.

4. Close the chain again, so that the width and height will be calculated in the proportion to the density. Lock the density—it means that it will remain the same, when you change other parameters.

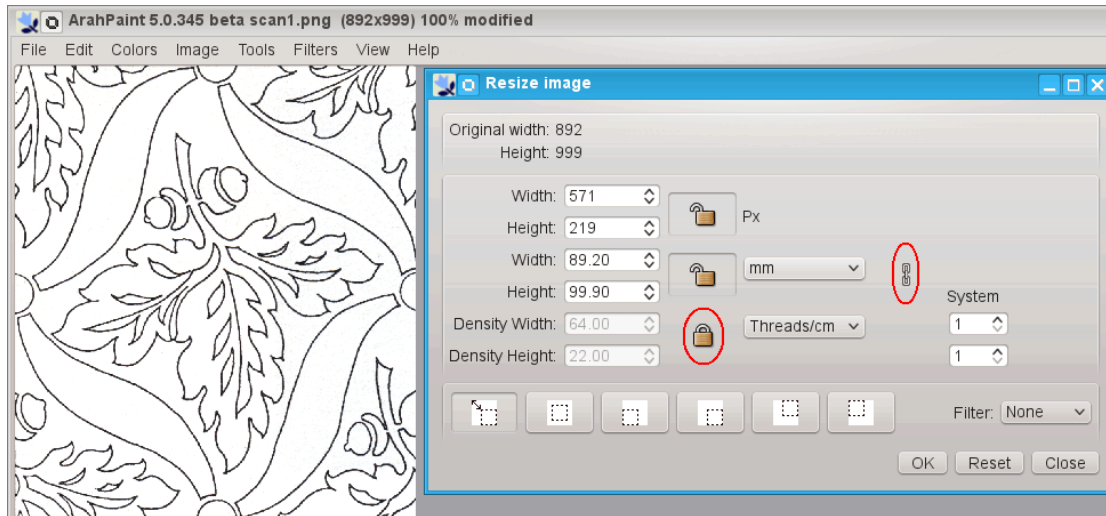


Figure 124: Before changing the width and height

5. Set the new width dimension in pixels (usually it matches the number of hooks). Accordingly, the height is changed, as well as physical dimensions (you can choose different units from the drop-down menu).

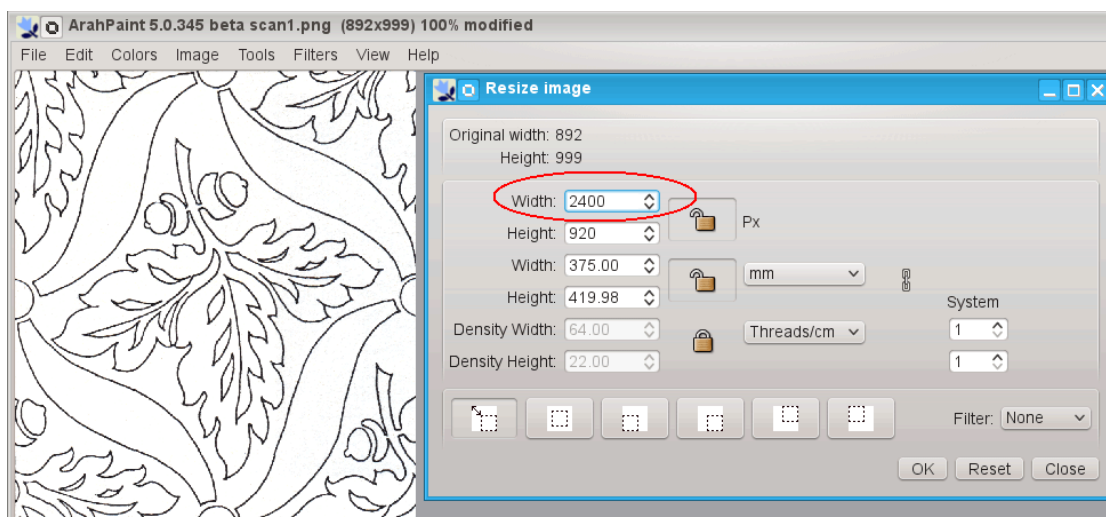


Figure 125: Setting the new width

6. If the calculated number of pixels in height doesn't exactly match the size of the weave you want to use in your design, you have to change it. Broke the chain, so that you can change the height independently and type in the new value. Click the **OK** button.

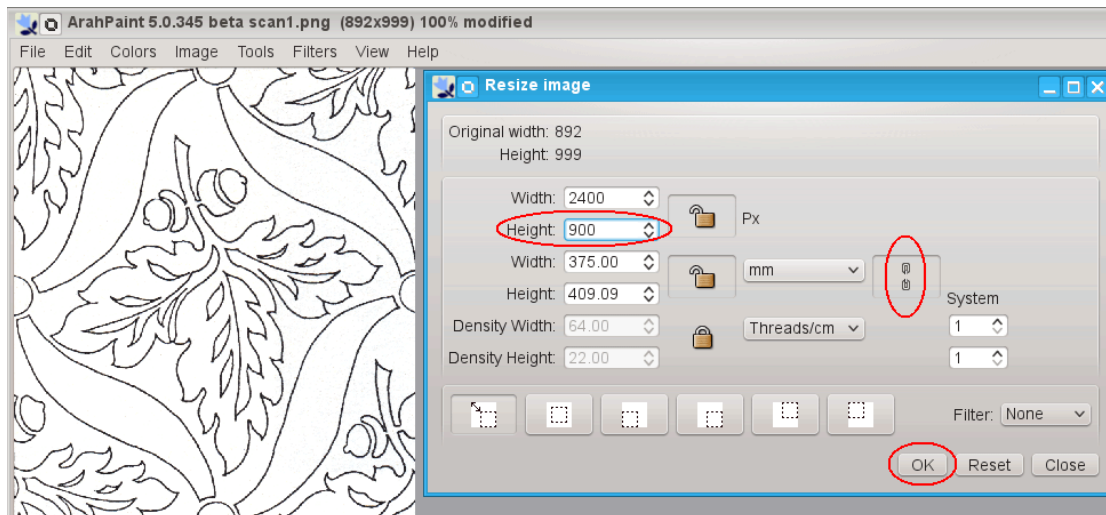


Figure 126: Correcting the height (number of wefts) in design

7. The final result is a re-sampled image in a new size.

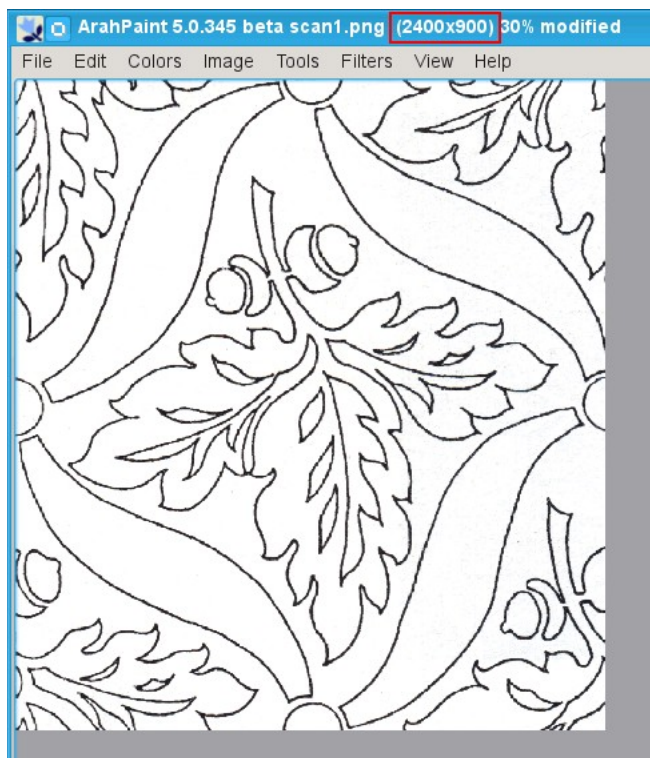



Figure 127: The resulting image of resizing

9.2 ROTATING AN IMAGE (LAYER)

You can rotate any selection (layer) around its center. After you have created or loaded a layer, choose **Image > Rotate image...(Shift+R)** or press  on the toolbox, and a rotation dialog will pop up (Figure 128).

Rotating an image turns it around its center point, while flipping an image inverts it across its horizontal or vertical axis.

To rotate a layer, selection, or image do one of the following:

- Move the pointer outside of the bounding border, and then drag the mouse while pressing the left button.
- Specify an angle of rotation in the degrees field.

- Change the position of the angle slider.
- Click one of the fixed angle rotation buttons (45 degrees, 90 degrees,...).

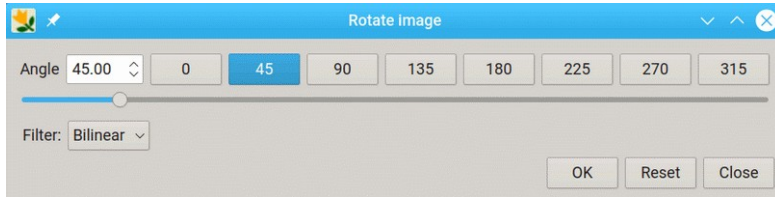


Figure 128: Setting a rotation angle

The **Filter** option works in the same way as during image resize (chapter 9.1). When an image is rotated, an interpolation method is used to calculate the new rotated image. The more sophisticated the method, the more details of the original image are preserved. The interpolation method is set on the **Filter** cascade menu.

- Resizing without any filter (**None**) is the fastest, but least precise method.
- **Bilinear** is the medium-quality method. The color of each pixel is computed as the average color of the four closest pixels in the original image. This gives a satisfactory result for most images and is a good compromise between speed and quality.
- **Bicubic** The color of each pixel is computed as the average color of the eight closest pixels in the original image. This usually gives the best result, but it naturally takes more time. Use it when you are rotating images in true color mode.

OK will confirm the settings and rotate the image, without closing the dialog, so you can continue adjusting the settings, and **Close** will close the dialog box.

9.3 ALIGNING THE IMAGE

After scanning, you should check whether the image is aligned horizontally and vertically to window borders. If not, you should rotate the whole image to achieve alignment. To do this, choose **Image > Rotate Image**. Draw a line, which follows the orientation marks (could be a line, two crosses, etc...) in the image.

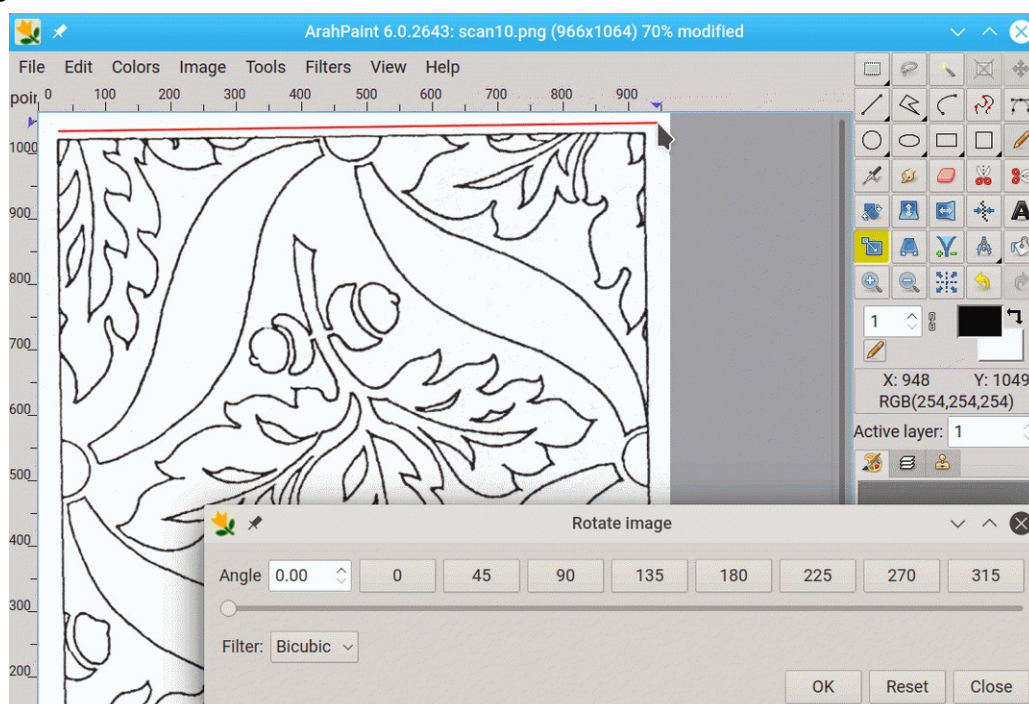


Figure 129: Drawing the alignment line

The program rotates the picture and informs you about rotation angle, so the line which you have drawn (red line in Figure 129) becomes straight. To confirm alignment, click the **OK** (or **Close** button) in the **Rotate image** window.

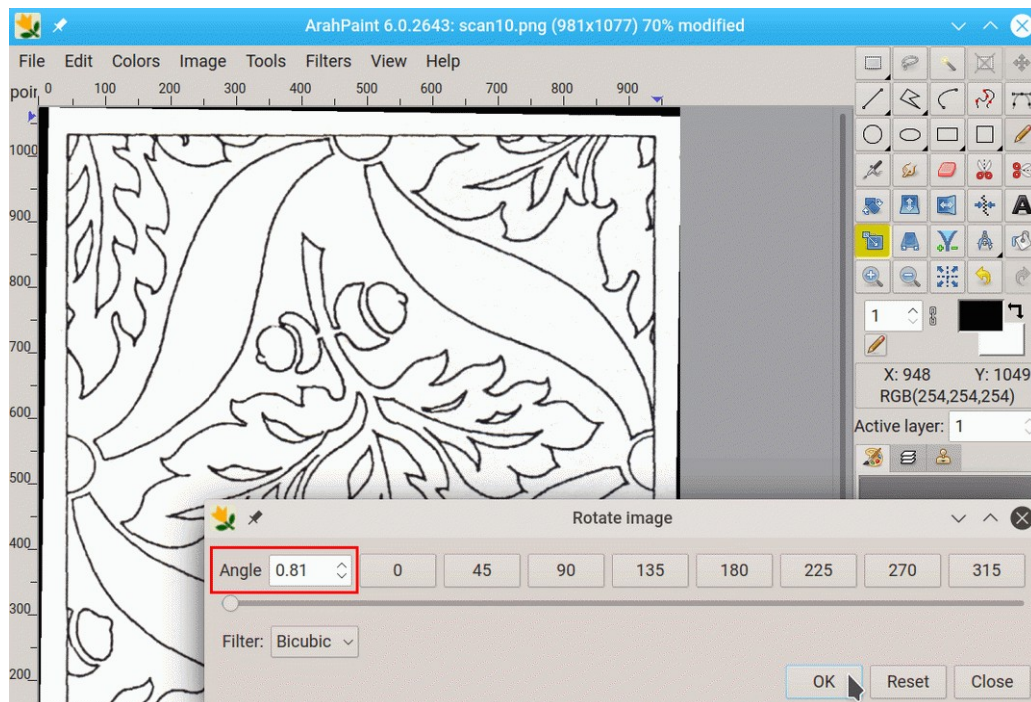


Figure 130: Preview of aligned image

9.4 DUPLICATE TOOL

The duplicate tool enables you to repeat an image or part of an image in a fast way. All duplicate tools, except **Mirror X – 1** and **Diamond**, work similar to the **Drawing in repeat** (if the **New picture** option is enabled) tool, or the **Repeat layer** tool.

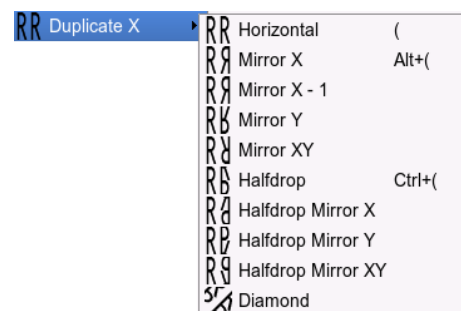


Figure 131: The Duplicate menu

You can use it in a horizontal (**Image > Duplicate X**) or vertical (**Image > Duplicate Y**) direction.

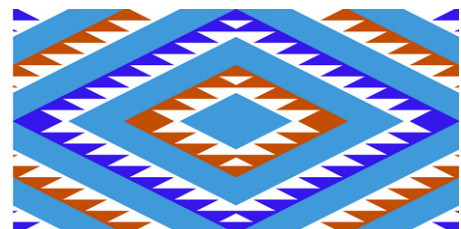


Figure 132: Original image, and image after mirroring, using the duplicate tool in X and Y direction

9.4.1 MIRROR X – 1 DUPLICATE

The mirror **X -1** function works the same as a “normal” mirror, except that the last pixel of the image is omitted from the mirrored image.

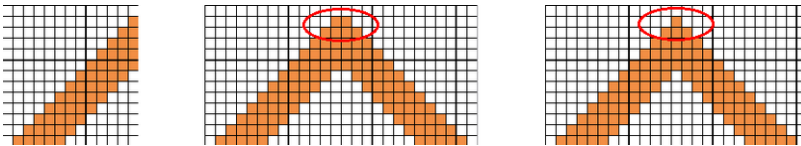


Figure 133: The original image, and image after Mirror X and Mirror X-1

9.4.2 DIAMOND DUPLICATE

The diamond duplicate tool rotates an image for 45 degrees and doubles the image size in the defined direction (x or y).

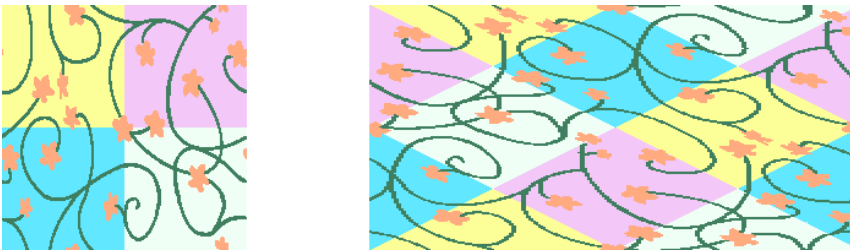


Figure 134: The original image, and image after diamond duplicate in x direction

9.5 SHRINKING AN IMAGE (OR LAYER)

The **Shrink** function (**Image > Shrink**) divides image size by 2 in the desired direction (x or y). It is alternative to image resizing, but it is accessible with a single click from the menu, which is faster then opening the resize image dialog and entering new size values.

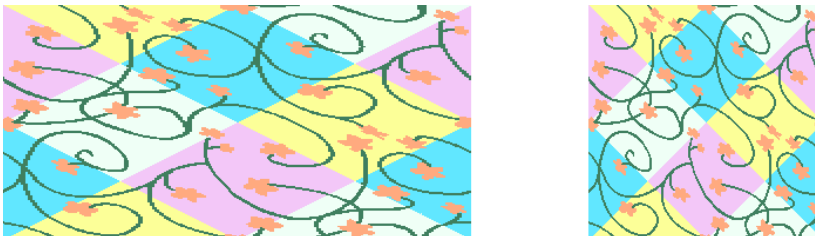





Figure 135: The original image, and image after shrinking

9.6 MIRRORING AN IMAGE (LAYER)





Use  button for mirroring of the layer along the vertical axis, or  button for mirroring along the horizontal axis, or  for mirroring along the diagonal. Non-rectangular layers can also be mirrored.

9.7 INSERTING OR REMOVING AREA FROM IMAGE OR LAYER



The **Insert or remove area** function lets you add or remove space at any position in an existing image.

To use the **Insert or remove area** function click  icon in the Toolbox.

Depending on the mode (adding or removing) and direction, you should check one of the four **Type** icons in the **Insert or remove area** dialog:

-  adds horizontal area
-  adds vertical area
-  removes vertical area
-  removes horizontal area

You have two possible ways to define adding or removing:

- By straight line (default—area is rectangular).
- By freehand line  —added area follows freehand drawn line.

You have three different choices to determine an appearance of the added area:

- **Color**: inserted area is in a currently selected foreground color (a default setting)
- **Area**: inserted area is a duplicate of the area, determined by **Position** and **Number of pixels**
- **Line**: inserted area is the copy of the horizontal or vertical line (can be straight or freehand drawn) at chosen **Position**, multiplied by the **Number of pixels** value.

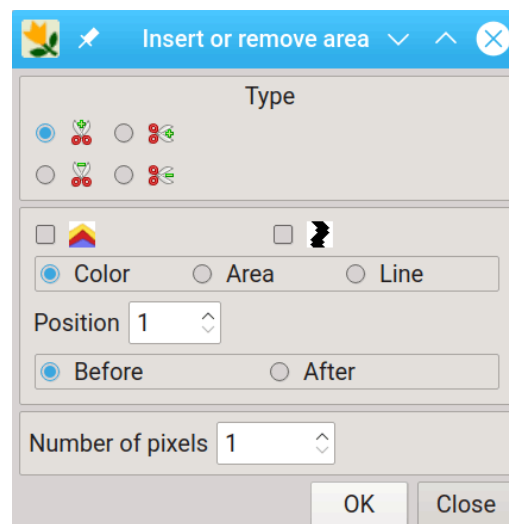


Figure 136: Insert or remove area dialog

9.7.1 INSERTING OR REMOVING RECTANGULAR AREA

You can insert or remove the rectangular area in two ways:

- By entering parameters:
 1. Set the pixel position, where you want to add or remove space.
 2. Decide whether the space will be added before or after pixel position.
 3. Number of pixels that you want to add or remove.
 4. Click **OK**.
- By drawing with mouse:
 1. Place the mouse pointer on the position, where you want to add or remove the area.
 2. Left-click, hold the button, and drag the mouse. The number in the **Position** field shows the position, where you have clicked, the blue rectangle indicates the size of added or removed space (Figure 137). Number in the **Number of pixels** field is changing as you drag a mouse and showing the numbers of pixels you will add or remove.
 3. Release the mouse button; a new area is drawn in the selected foreground color.

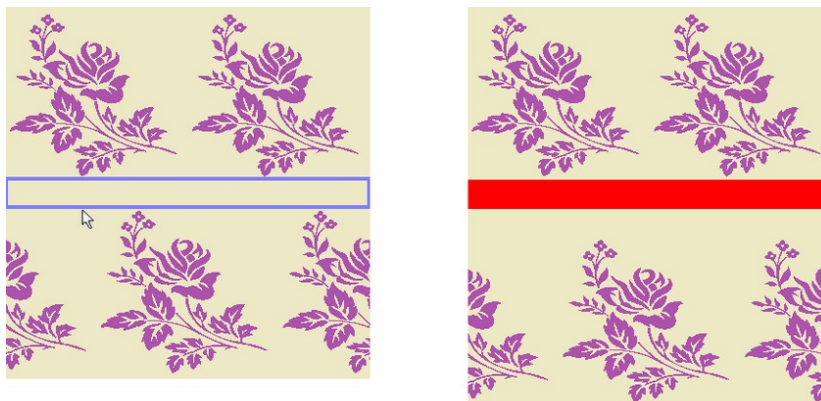



Figure 137: Add area with mouse - After releasing the mouse button

9.7.2 INSERTING OR REMOVING IRREGULAR AREA

Sometimes it is not possible to add the rectangular area without changing the original image. In this case you can draw a freehand line, and *ArahPaint* will add or remove the required number of pixels **before** or **after** the drawn line.

After selecting **Type** (adding or removing, direction), check the freehand drawing line icon  in the **Insert or remove** area window. Enter the **Number of pixels** that you want to insert. Draw the line, where you want to insert the area (Figure 138). Before reaching the edge of the image, click the right mouse button, so the program connects a line to the edge. Click **OK** in the **Insert or remove** area window. You can repeat the operation by clicking the **OK** button.

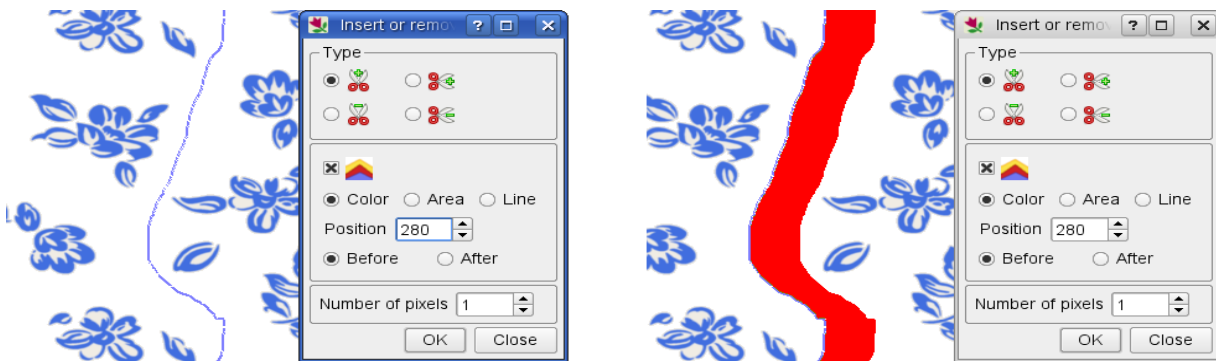


Figure 138: Inserting an irregular area. The newly inserted area is in foreground (red) color

9.7.3 INSERTING LINE OR AREA

The inserted area is by default in the color of the current foreground color, but you can also insert the area from the image itself. It works in two modes:

Area – it inserts chosen area determined by **Position** and **Number of pixels**

Line – it duplicates chosen line (**Position**)

Figure 139 shows an image, where we inserted 48 pixels of foreground color, which followed a freehand drawn line. Obviously, in this case it doesn't make a lot of sense, it would be better to use the **Line** option or **Area** option.

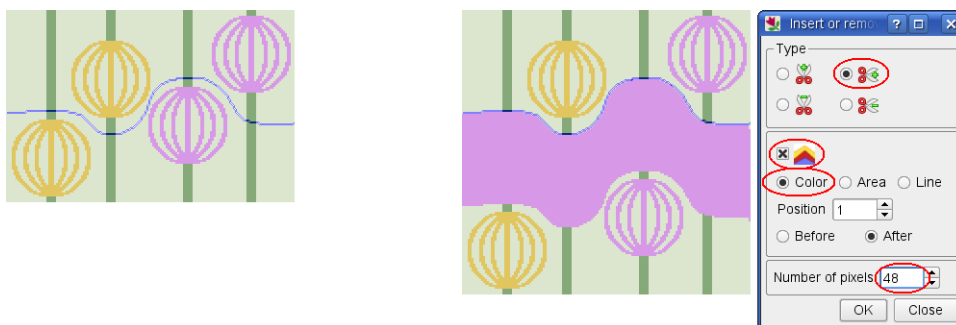


Figure 139: Inserting an irregular space – the Color mode

Figure 140 shows inserting of an area, which is a duplicate of 48 pixels below the drawn line.

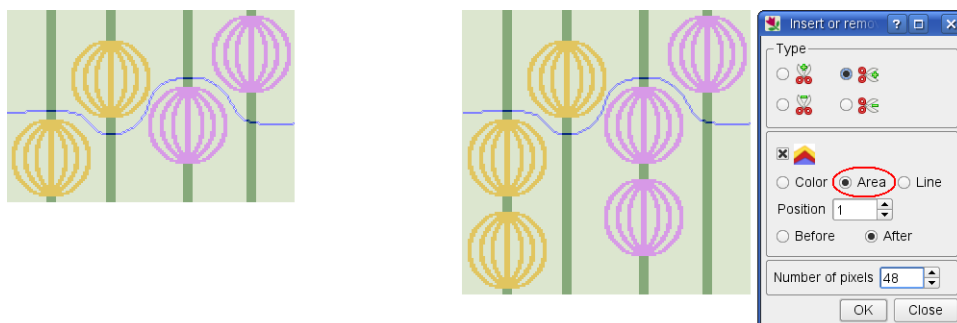


Figure 140: Inserting an irregular space – the Area mode

The inserted area in the right-hand side image in Figure 141 is 48 repeats of the area determined by drawn line (see the **Number of pixels** field).

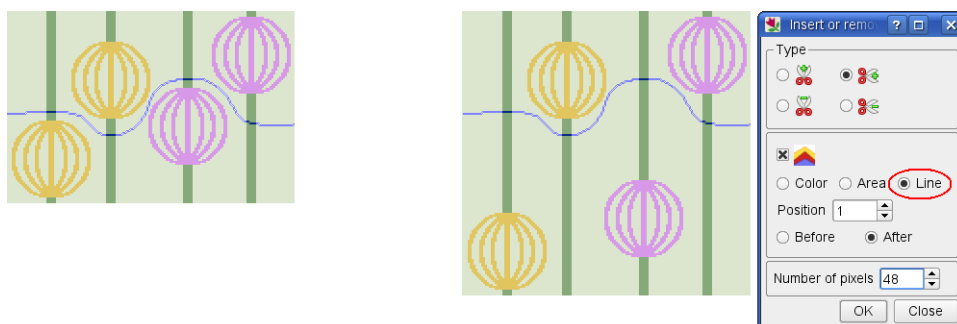


Figure 141: Inserting an irregular space – the Line mode

9.7.4 AUTOMATIC INSERTION OF IRREGULAR AREA (FINDING A PATH)

Figure 142 shows an image which we want to scale to width of 1260 pixels to match the size of our Jacquard loom, but without modifying the size and appearance of basic motif. So we need to add 60 pixels of background color somewhere. But leaves are tight packed and it is difficult to draw a line where we want to add pixels. But there is the **Find path** function in the Insert/remove area dialog, which, if possible, finds a path between motifs automatically.

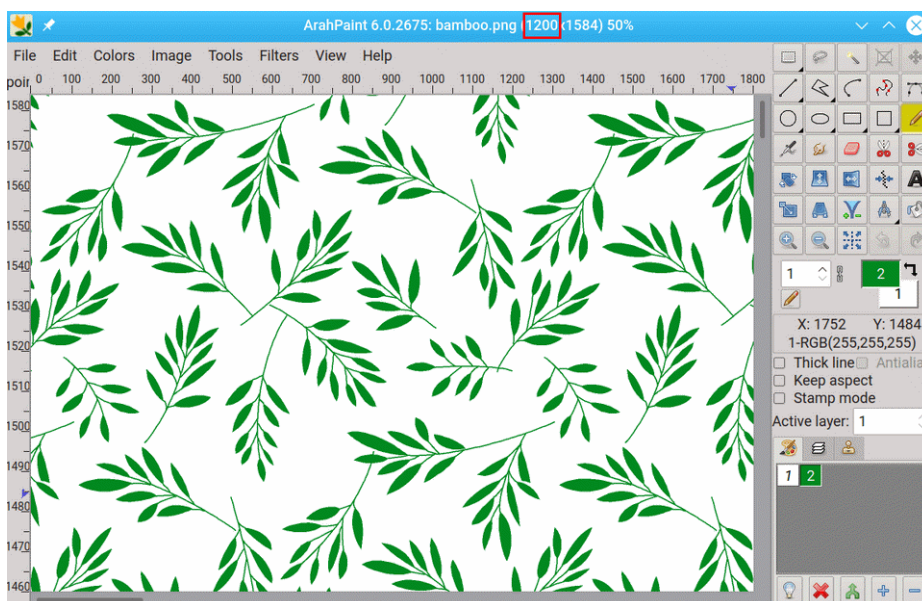


Figure 142: We want to increase the width from 1200 to 1260 pixels.

We will add two times 30 pixels to get the final width of 1260 pixels. Usually we add the area with another color so we can easier review the result. Select the Find path option, set the number of pixels to 30 and click in the image where you want to add area.

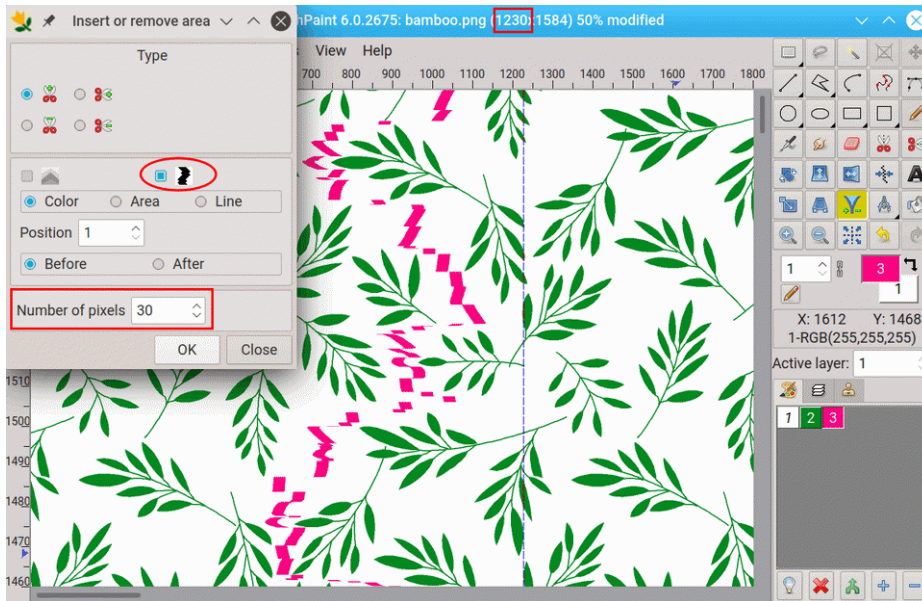


Figure 143: The Find path icon in the Insert/remove area dialog.

We repeat procedure somewhere else in the images adding additional 30 pixels. The end result is the 1260 pixels wide image with the motif size of the original image.

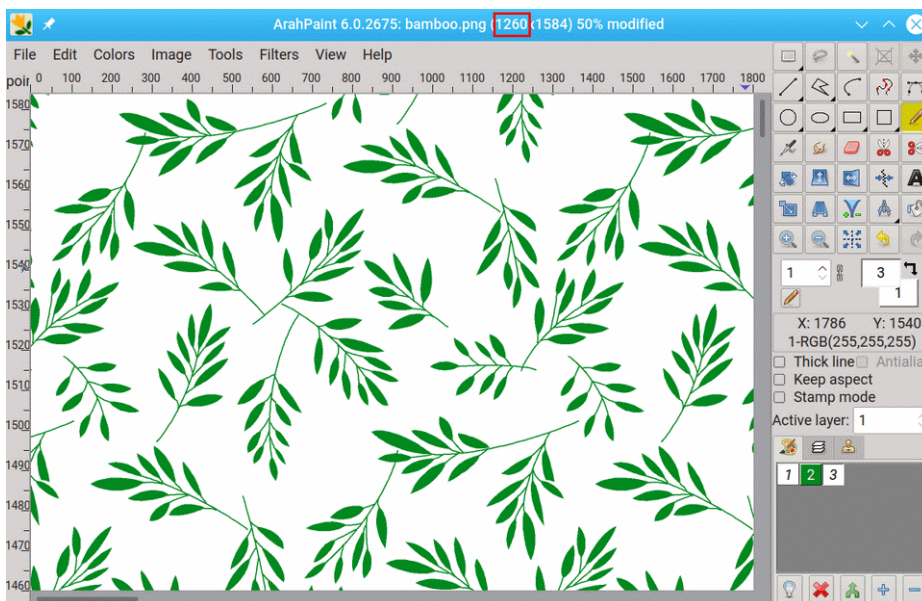



Figure 144: Final result

The Find path tool works only in one direction, adding or removing vertical area. If you need to apply the function in horizontal direction, first rotate an image , and then use the Find path tool.

9.8 UNSKEW TOOL

Using the **unskew** tool lets you fix the geometry of a layer, which is distorted by perspective. The tool is explained in the next three figures. This is useful for pictures where you could not use the scanner.

Make a rectangular selection  around the object which you want to unskew.

Click the **Unskew** tool icon .

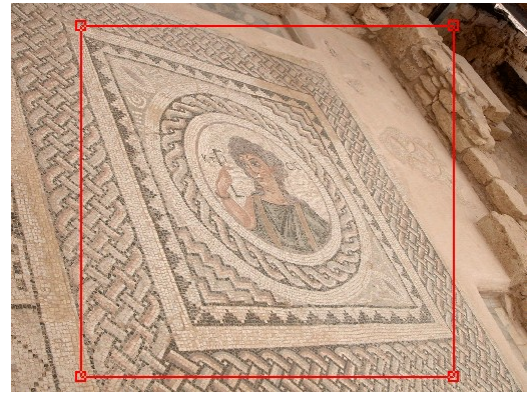


Figure 145: Make a selection

Drag the corners of selection to the corners of the distorted part of the image.

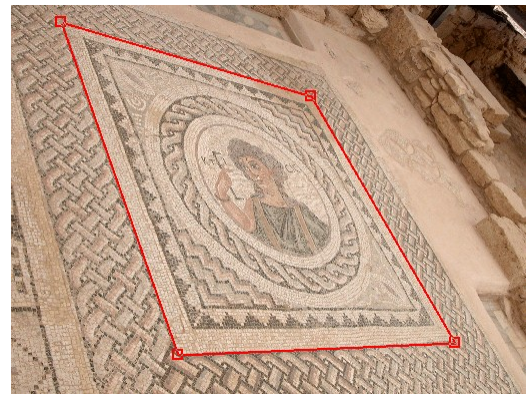




Figure 146: Adjust section borders

Click **OK** in the **Unskew** dialog box. The selection becomes a normal rectangular layer.



Figure 147: Unskewed selection


9.9 CHANGING THE START OF REPEAT

Sometimes, after the picture is put into repeat, it is desirable to move the starting point of the repeat up/down or left/right. This function is accessible through icons  and  in the toolbox. The first tool moves the starting point in horizontal direction, while the second in vertical direction.

The procedure is:

1. Select one of the icons.
2. Move the mouse pointer to the new starting point in the selected direction. The cut point is the middle of the mouse pointer, not its edge!
3. Left-click.

9.10 SHIFTING THE IMAGE OR LAYER

To access the *Shift* tool, click the *Measurement tool* icon . Among others, there are four icons with arrows, which determine the direction of shifting. For shifting left or right, enter the number of pixels in the **X** field and click the left or right arrow, for shifting up or down, enter the number in the **Y** field, and click the up or down arrow. You can repeat the operation as many times as you want.

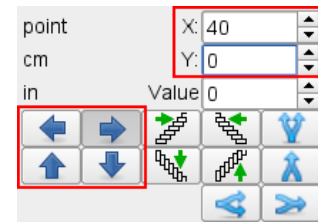


Figure 148: The shift tool and its parameters

9.11 TILTING THE IMAGE OR LAYER





To access the *Tilt* tool, click the *Measurement tool* icon . The tilt tool shifts every next line of pixels (set the width of the line in the **X** field for the horizontal tilt , or set the width of the line in the **Y** field for the vertical tilt  in the image (layer) for the preset number of pixels in the **Value** field. You can repeat the operation as many times as you want.

Figure 149 shows the basic use of the tilt function. Default values are set to 0 (actually it is the same as there are set to 1). You just have to click the tilt icon . An important feature of the tilt tool is that after applying it, the image keeps the repeat.

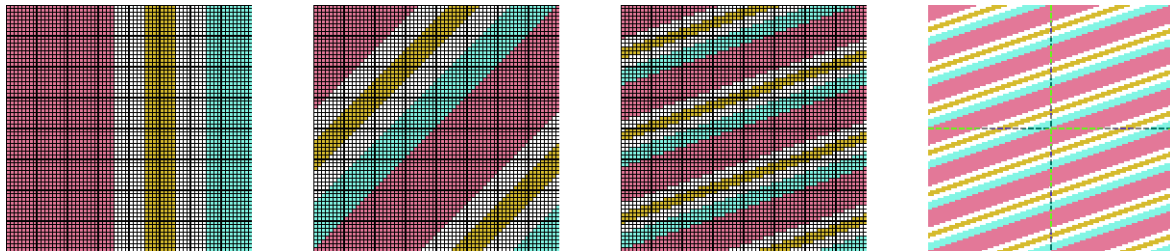


Figure 149: The initial image; the initial image after tilting for one pixel and after tilting for one pixel three times, and the repeat view of the last image

By setting the **X** (or **Y**) and **Value**, you can change the tilting preferences to tilt a block of pixels instead of a single pixel. Figure 150 explains how to do it.

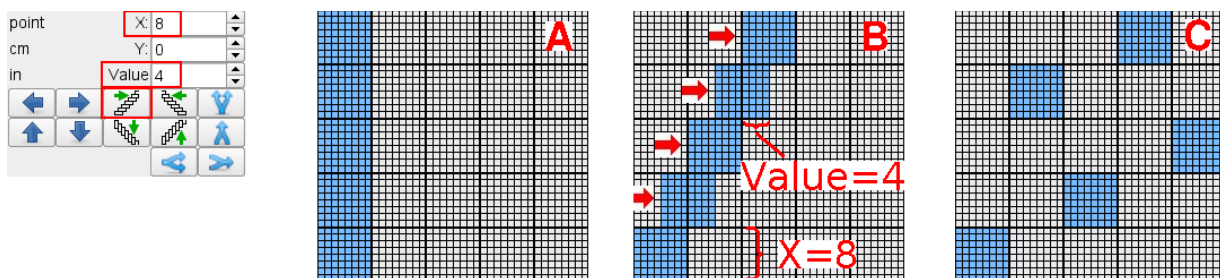



Figure 150: First image shows the settings: $x=8$, $\text{Value}=4$; A is the initial image, B is the image after clicking once the tilt left icon, C is the image after clicking four times ($4 \times 4 = 16$).

9.12 SPLITTING THE IMAGE

To access the *Split* tool, click the *Measurement tool* icon . The split image tool lets you split the image by divisor, that you enter in the **X** field for vertical splitting, or in the **Y** field for horizontal splitting. The image size does not change with this operation. If the divisor is set to two, then the odd line of pixels are in the first half of the image, and the even lines are in the second part of the image.






To split the image in the vertical direction click icon , to split in the horizontal direction click icon . The opposite operation of splitting is merging. Normally, when we split the image and do some operation on the split image, we merge the image back to its original appearance. To do this, click the icon  for vertical merging, and icon  for horizontal merging.

Figure 151 shows the use of the split tool. The task is to draw stitching points with the Stitch tool  on every fourth line in vertical (Y) direction. The fastest way is to use the Split tool. In the Y field, enter the divisor number (4), and click the split vertical icon. The image is divided into four parts. Use the stitch tool on the fourth part, and then merge the image to its original form.

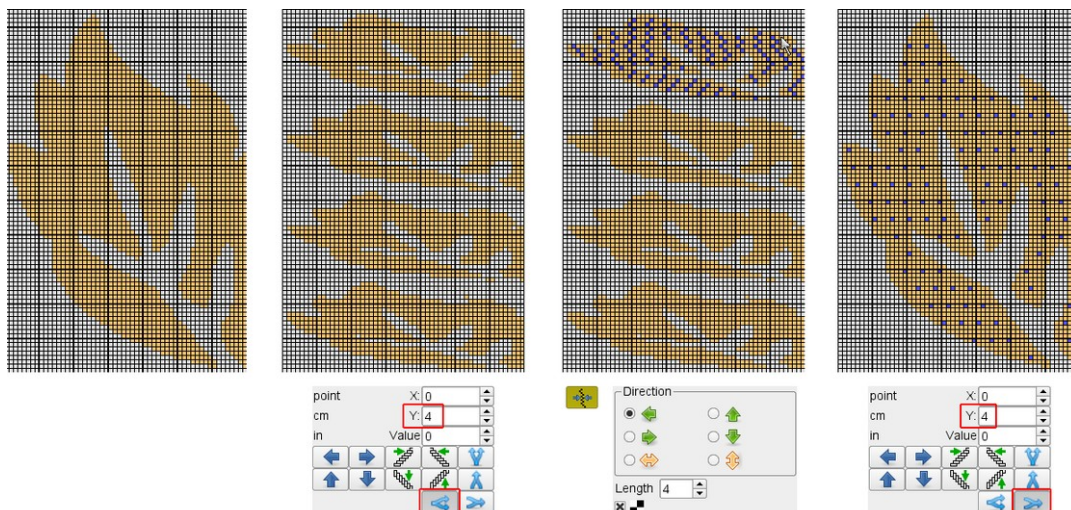


Figure 151: The use of the split tool: the initial image is on the left, image after splitting, image after applying stitching, image after applying merging is on the right

9.13 FINDING A REPEAT IN AN IMAGE

As the name suggests, the Find repeat function helps you to find repeat, if there is any, in an image. It is very useful on scanned designs from books, or on images you get from other sources.

There are two variants of the function: **Find repeat** and **Find exact repeat**. The former is used to find a repeat in scanned images, usually in jpeg format, where repeats have similar appearance, but pixels are not necessarily exactly of same color. The latter is used to extract the repeat from Jacquard cards or images that were already prepared for weaving, but for some reason contains more than one repeat. Program finds the repeat only if all pixels of each repeat are exactly the same.

Figure 152 shows a design we got from a design book, which consists of more than one repeat.



Figure 152: Four repetition of design show that it doesn't repeat

To reduce a design to only one repeat, choose **Tools > Find repeat**. If the program finds a repeat, it will draw a selection line around it.




Figure 153: A selection line around the repeat

After cropping to selection, use **View > Repeat** to check if a design repeats correctly.



Figure 154: Viewing at four repetitions shows that design repeats correctly.

10 BRUSHES

A drawing tool with an enabled brush option tool lets you paint with a pattern. You can load the brush or create new brushes, when you need, and you can use a part of an image to create a custom brush. To draw with a brush, choose it from the pen mode selector – click the icon below the line-width field, and choose the stamp icon , which represents the brush mode (we use a brush as a stamp a lot in ArahPaint, thus the stamp icon for the brush mode).

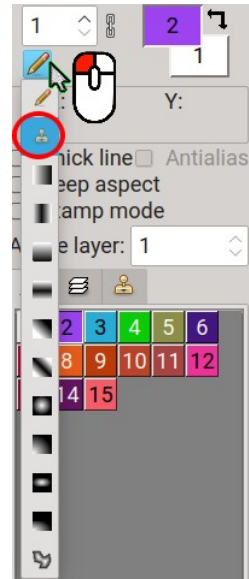





Figure 155: Choosing the drawing-with-a-brush mode.

10.1 BRUSHES PANEL


A brushes panel displays all stored, loaded or created brushes. Once you have created a brush or loaded it into a palette, it will be stored and available for other *ArahPaint* programs, until you delete it from the palette.

You can use it also as a temporary storage of picture motifs, copying them from one image to the other, without the need to name them and save them as a file.

To get a brush into the program, click the **Brushes** panel tab . There are two ways to place a brush into the palette:


- Open the Browse brushes window  from the **Brushes** panel toolbar, and load a brush (image) by double-clicking (any image may become a brush).
- Create a layer, and send it to the brushes panel by using **Tools > Layer to brush**, or Keyboard shortcut **>**, or by clicking  in the Brushes panel toolbar.

If you need to change the brush, send it to the main working space either by:

- **Tools > Brush to layer**
- Keyboard shortcut **<**
- Clicking  in the **Brushes** panel toolbar.

A brush will become a layer. When you finish with editing, send it back to the Brushes panel.

If the **Keep** checkbox is checked, then the previous version of the brush will remain in the palette.

You can also edit a brush in a new ArahPaint window; select a brush in the palette, and click the **Open with ArahPaint** icon  in the Brushes panel toolbar. It does exactly what it says on the icon tool-tip—a new ArahPaint window will

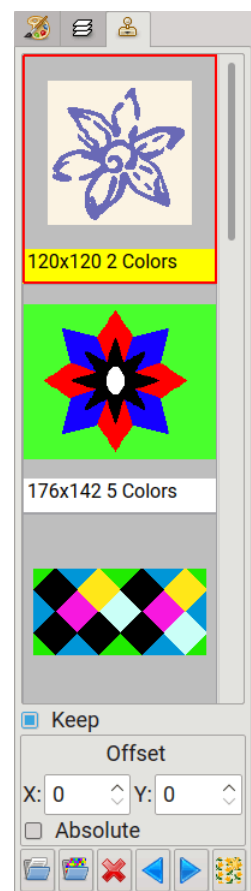



Figure 156: Brushes panel

appear with the selected brush loaded. Now you can edit it, save it, and load again in the previous program.

To delete a brush from the panel, click its icon to select it, and then click the delete icon  in the Brushes panel toolbar, or press **Delete** on the keyboard.

10.2 DRAWING OPERATIONS WITH BRUSHES

You can use the selected brush to modify the behavior of drawing operations. By combining them you can achieve interesting effects. You can also use transparent colors on the brush, and protected colors in the drawing area.

10.2.1 FREEHAND DRAWING

A freehand-draw tool with a brush will fill the drawn area with a brush instead of the foreground color. The figure 157 shows a line drawn with a brush from the **Brushes** panel displayed in Figure 156; a line width is set to 5.

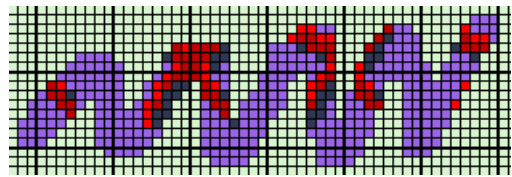


Figure 157: Freehand drawing with brush

10.2.2 STAMP MODE

The freehand draw has the **Stamp** option. If you click in the image, the program will draw the brush at that position. The program also moves the brush along with your mouse, so you will know precisely where it will be drawn, even before you click to draw it in the image.

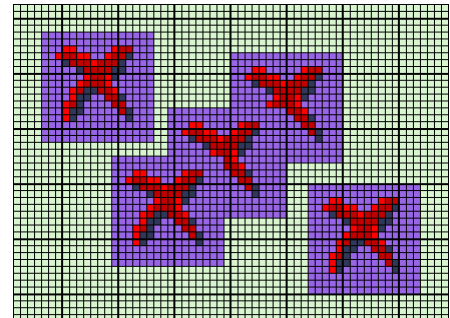


Figure 158: Drawing in stamp mode

10.2.3 DRAWING FILLED SHAPES

You can easily draw motifs in repeat using a brush.

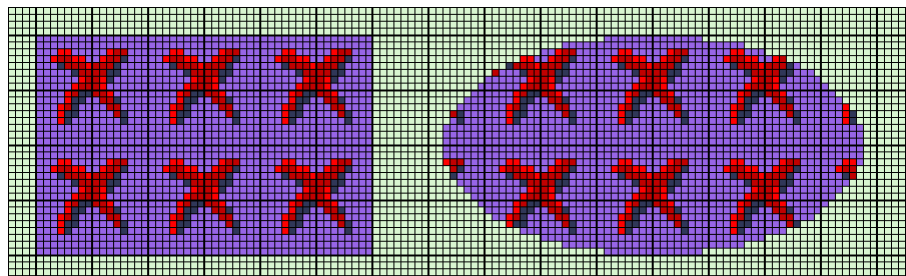


Figure 159: Rectangle and ellipse drawn with a brush

10.2.4 SPRAY

Spray can also be used with a brush.

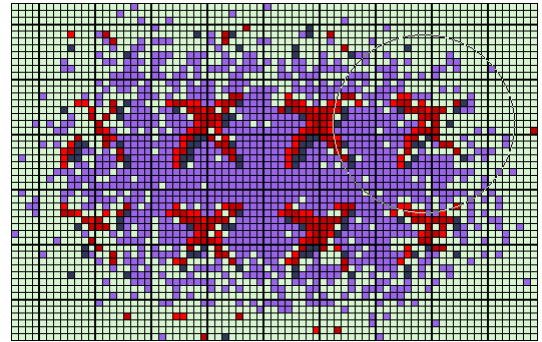


Figure 160: Brush used with spray

10.2.5 FILL WITH BRUSH

You can use the Fill tool to cover the area of particular color with a selected brush. By default, the starting point of the brush mapping is where you click the area (if the image size is divisible by the brush size. Otherwise the starting point is shifted for the reminder of that division). You can modify the starting point by adjusting the Offset coordinates.

More controllable brush-mapping is possible in the Absolute mode which is achieved by selecting the **Absolute** checkbox. The brush mapping then starts from the lower left corner of the image. You can modify the coordinates of the starting point by setting the Offset numbers.

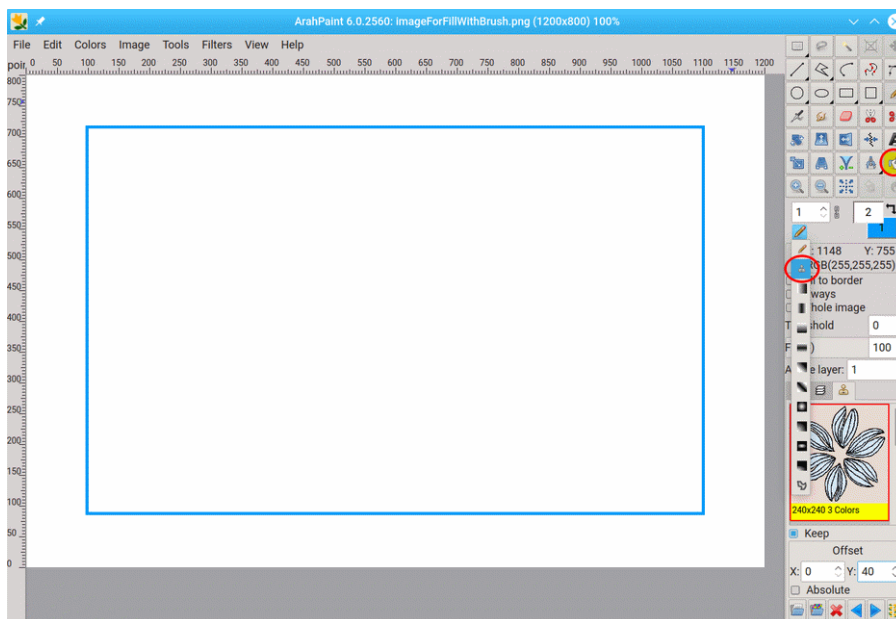


Figure 161: Selecting the fill tool and choosing a brush

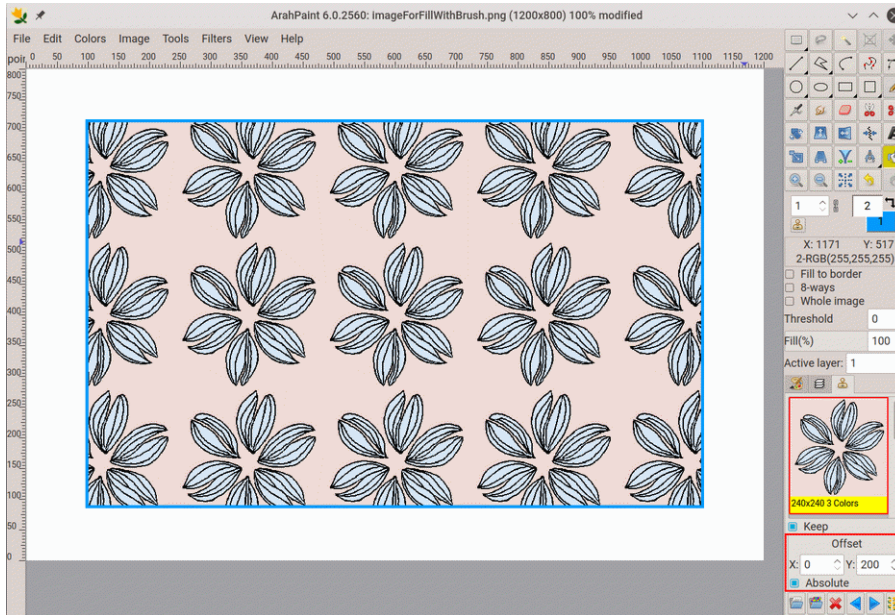


Figure 162: Filling the area with the selected brush

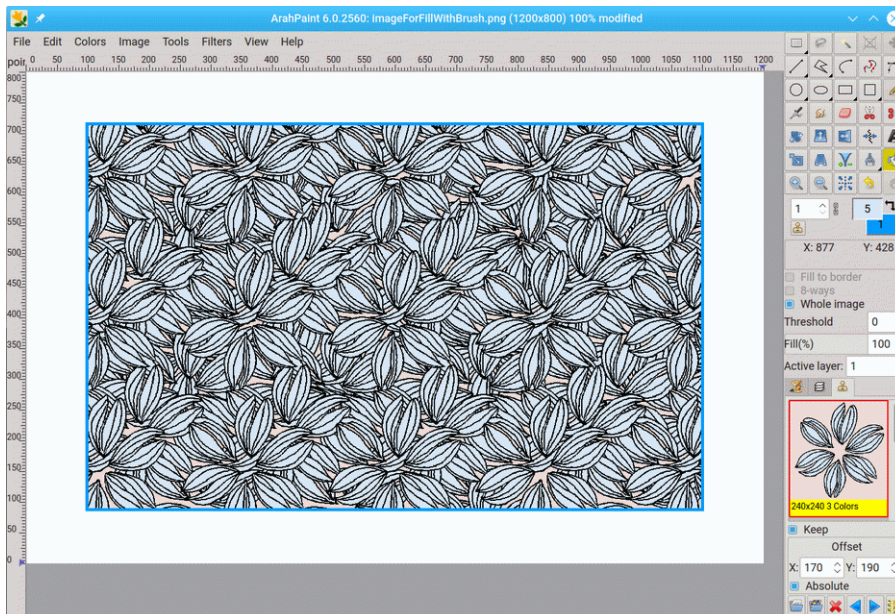



Figure 163: Repeat the Fill with brush with different offset settings

11 INSERTING TEXT

To insert text into the image, click the text icon button  (keyboard shortcut **T**), and you will get the font selection dialog.

The procedure consists of four steps:

1. Enter the text you want to use in the image.
2. Choose a font from the **Font** scrolled list.
3. Choose a style from the **Style** scrolled list
4. Choose a size from the **Size** scrolled list.

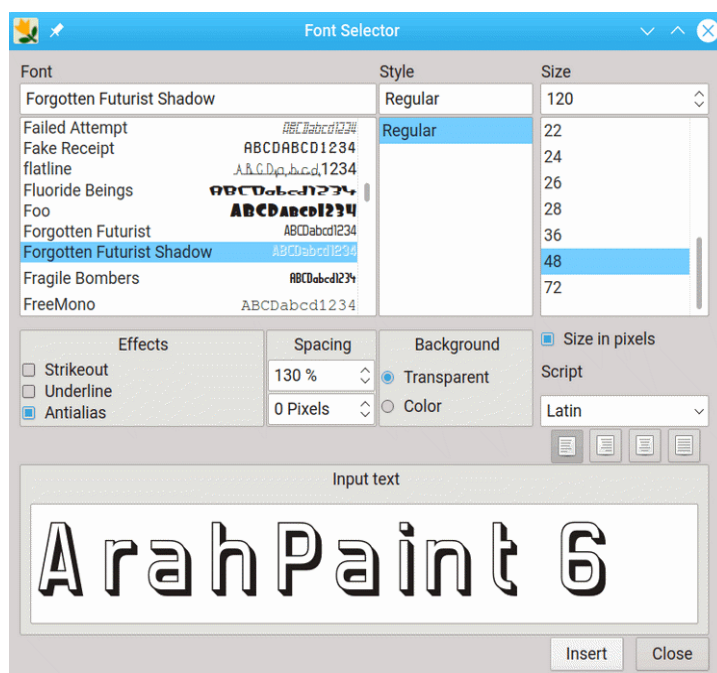


Figure 164: Inserting text

When you click the **Insert** button, the program will display the desired text on the screen as a layer. Text will be drawn in the foreground color, and the background will be in the background color. You may set the background color to **Transparent** if you wish, and choose the **Antialias** option. If you have more lines, you can set the alignment. By changing the **Spacing** setting you can decrease or increase the space between characters. You can still change all these settings after you have placed a text layer into a picture, because if you click the **Insert** button again, the new layer will replace the previous one. The number of different fonts, styles and sizes depends on the operating system you are using.

12 REPEATING PATTERNS

The picture often consists of one or more building blocks, which are placed in columns or rows, and some of them can be mirrored (horizontally or vertically). Of course, the user may draw one layer and then place it several times with the pasting functions described in Chapter 8.8. However, when layers are regularly placed, it is easier to set the repeat pattern first, then draw/edit one layer, while the program will repeat the operations for all the other layers. The advantage of this method is that you can interactively modify the building block and immediately see how every drawing operation will affect the whole repeated image.






The proper sequence of steps is the following:

1. Setting the repeat parameters: building block size, repeat type and mirroring information about each element.
2. Drawing/editing the picture.
3. Converting an image of several repeats into a single image.

12.1 SETTING THE PARAMETERS OF REPETITION

First use the **Drawing in repeat** command (**Ctrl+D**) in the **Image** menu and the following window will appear.

Its content is similar to the multiple paste window (the repeat layer tool), with some modifications.

- On the top is a graphical configuration of the repeat pattern; each repeat is displayed as an arrow. It can assume four different positions, which decide the mirroring of the repeat:
-  no mirroring of the repeat
-  horizontally mirrored repeat
-  vertically mirrored repeat
-  horizontally and vertically mirrored repeat
-  empty space (using it makes sense only if you create a new image from multiple repeats and empty spaces)

To change the mirroring type, place a mouse pointer over the arrow that you want to change, and press the left mouse button. The arrow will jump to the next mirror type. Since there are only 5 mirror types, you will get what you want in a maximum of 4 clicks. If you press the right mouse button, it will put the arrow to the default orientation.

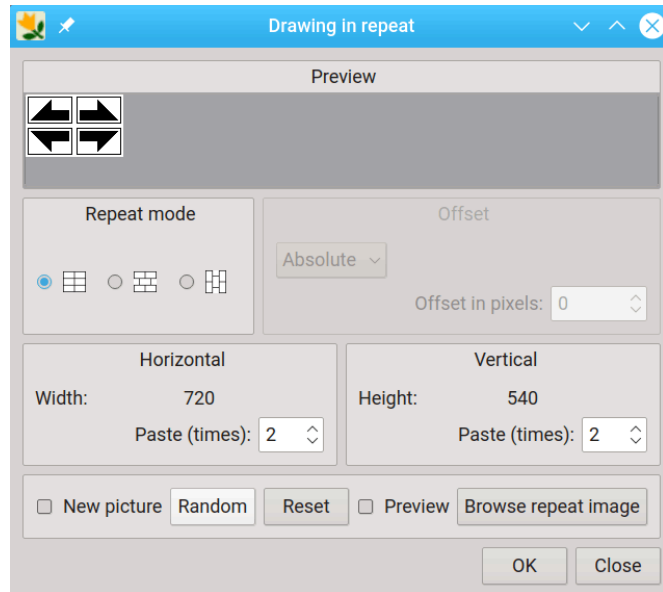


Figure 165: Drawing in repeat window




- **Repeat mode** allows three different types of repeat alignment: block , brick  and pillar .
- **Offset** is active only when brick or pillar mode is selected. It can be either fixed (fraction of width/height of the repeat—like half drop) or absolute, where you input the offset in pixels.
- **Paste (times)**: Number of repeats in a row/column.
- **Distance**: Distance between two subsequent repeats in a row/column.
- The number below **Horizontal** and **Vertical** displays the total size of the picture. Two exclamation signs (!!) beside the number denotes picture size mismatch due to the wrong offset.
- **New picture**: Program will create a new picture made of repeats according to parameters set in this window. This is usually the last step in the process of creation of a compound image.

Figure 166 shows a design, created with the **Drawing in repeat** tool, starting with a blank image, then setting a half drop repeat, and loading and pasting a motif into the image. Program draws the delimiter lines between individual repeats if you enable **View > Draw delimiter lines (Alt+G)**.

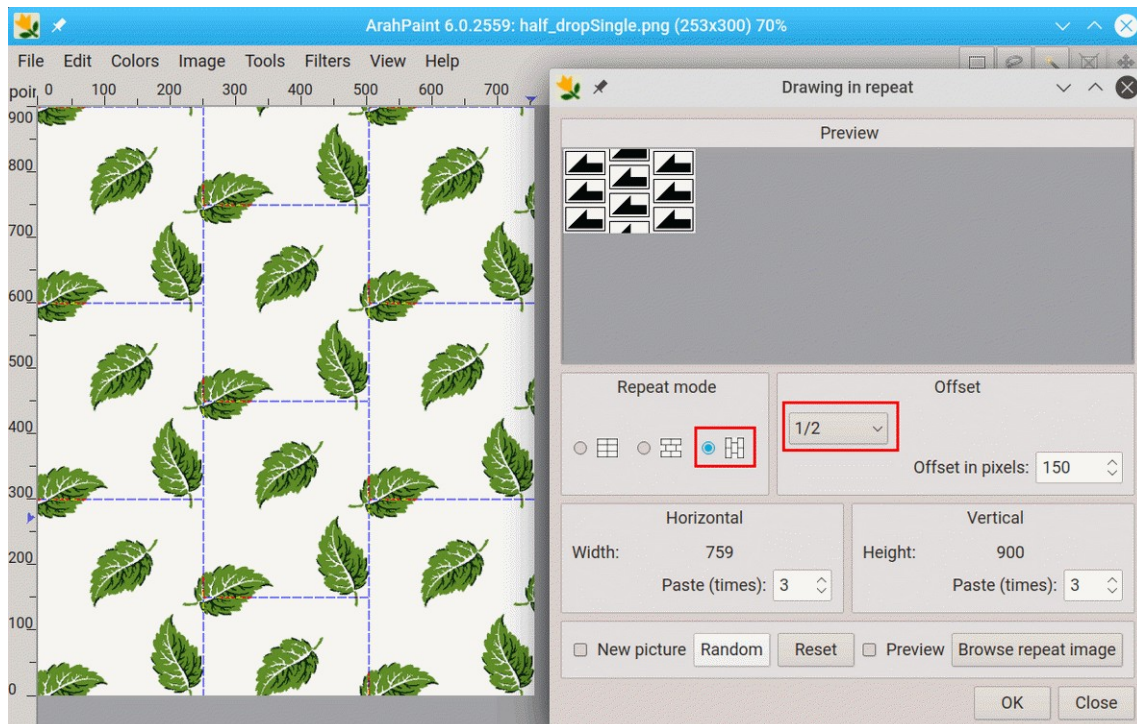


Figure 166: Example of a half-drop design

12.2 DRAWING/EDITING THE PICTURE IN THE REPEAT MODE

First change the view type with the command **Repeat (R)** from the **View** menu. Perform drawing operations. Every operation is repeated on every repeat, which forms the image. You can draw over the border of repeat. Some contour operations require the **Repeat view** in order to be correctly applied across the border.

The most common usage of drawing over the borders of repeat is when you correct the transition between right and left, or top and bottom of the repeated image.

Figure 167 shows design, repeated two times. Red circles mark mistakes at the junction of the repeat.

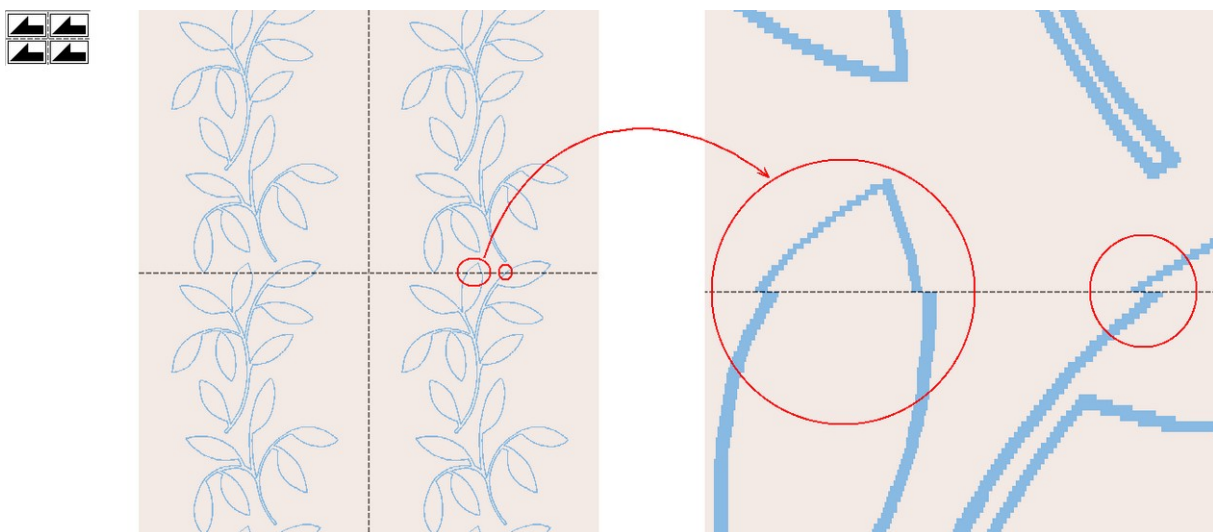


Figure 167: After scanning, usually there are mistakes on the repeat borders

You can simply draw across the repeat and correct mistakes.

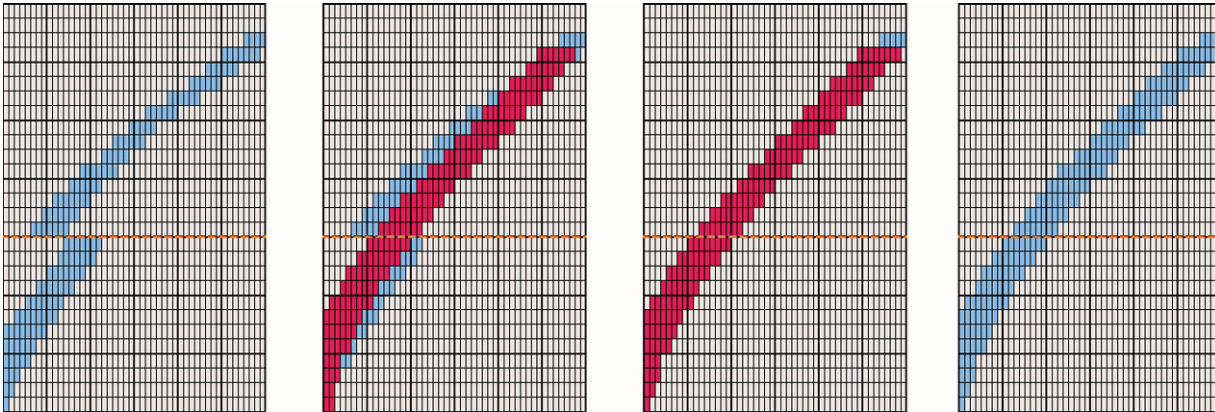



Figure 168: Drawing across the borders of repeat

12.3 CONVERTING IMAGE OF SEVERAL REPEATS INTO A SINGLE IMAGE

After the individual repeat is drawn to a level where it perfectly joins with the others, check the **New picture** checkbox in the **Drawing in repeat** window. After confirmation, the new picture will be formed of all repeats according to current settings. From this point on, the whole picture is treated as one big repeat, and drawing operations will no longer be repeated.

13 USING FILTERS

A filter is a special kind of tool designed to take an input layer or image, apply a mathematical algorithm to it, and return the input layer or image in a modified format. *The filter functions in ArahPaint keep the repeat and respect protected colors.*

Except for the top two items of the **Filters** menu (**Averaging**, **Despeckle**), all the **Filter** menu entries use the Measure tool options  to change the **Filter** properties. The Filter properties are set in three fields: **Value**, **X**, **Y**. Depending on the type of filter, one, two, or all three values control the filter behavior.

There are also three additional options (not all three are applicable for all filters):

- use all colors from the palette  (normally only the foreground color is used)
- use variable size of effect 
- use a filter as a gradient .

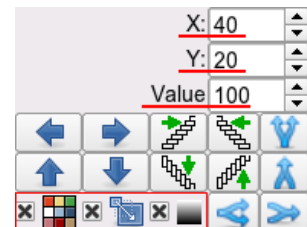


Figure 169: The filter options

With some filter operations you get a satisfactory result only, if you repeat them several times. To do this, use **Filters > Repeat last operation** or use keyboard shortcut **Ctrl + F**.


Usually a filter function is just a first step in the design preparation. Combined with other functions, like protected colors function, a contour tool and other filter tools, you can achieve interesting effects in a matter of seconds.


13.1 NOISE

The noise filters add noise to the image or to the active layer. The image noise is the random variation of color information in images. It is generally regarded as undesirable, but sometimes it produces interesting effects in the fabrics.

To access function, choose **Filters > Noise**, and then you have three different options (directions):

- **Horizontal and Vertical**
- **Horizontal**
- **Vertical**

To change the **Noise** parameters, click the **Measure** tool icon . The noise related parameters are **X** and **Y**. There are several ways of using it.

Noise with parameters $x = 0$, $y = 0$ (default values; ) makes a single pixel noise, using all unprotected colors from the Color palette. If you use it in the vertical or horizontal direction, you get 1 pixel wide color stripes. Since the stripe distribution is completely random, sometimes there are 2 or more pixels wide stripes. But, if you change either x or y to 1, then *ArahPaint* takes care about the repetitions, so that line width remains 1 all the time, while the colors are always alternating.

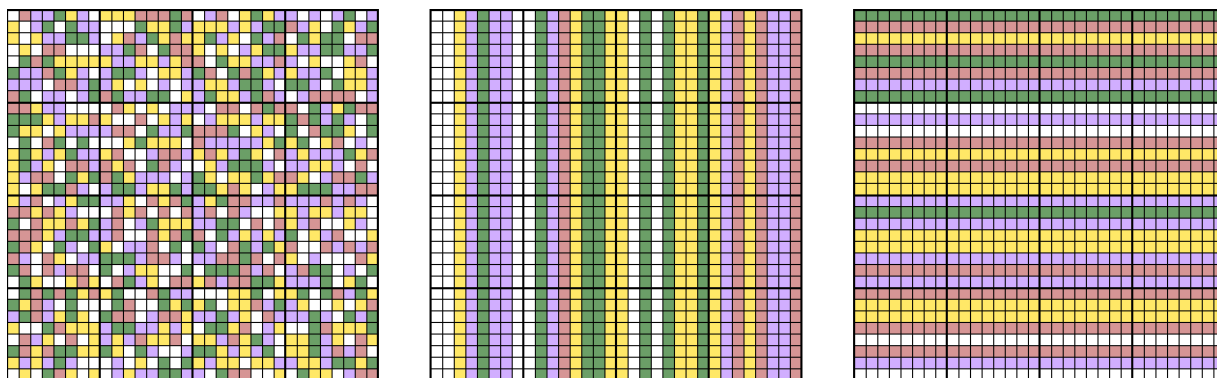


Figure 170: Horizontal -vertical, vertical, and horizontal noise at $x = 0$, $y = 0$

If you change x and y values to anything different from 0 or 1, and use Horizontal and vertical noise, you get rectangles of different colors with preset x and y dimensions (Figure 171). If you use only Vertical or Horizontal Noise, you get lines with length between x and y value.

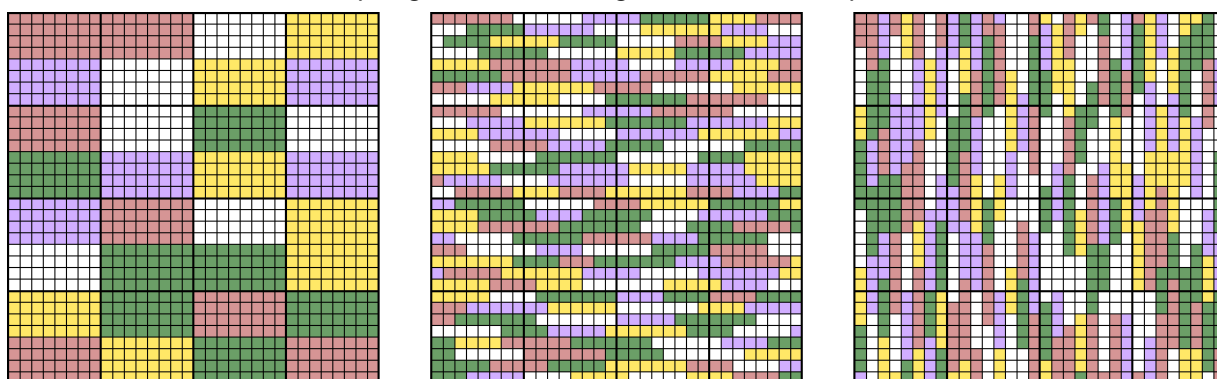



Figure 171: Horizontal-vertical, vertical, and horizontal noise at $x = 8$, $y = 4$, value=1

13.2 SELF AVOIDING MOTIFS

This function adds color motifs which avoid each other in the image for the maximum possible distance. To use it, choose **Filters > Self avoiding motifs**, and select a motif shape from a menu. You can select the square (rectangle), diamond, circle (ellipse), triangle, line, cross, and the diagonal cross.



To set the amount and size of added motifs, click the Measure tool icon  to access the option fields. In the **X** field, enter the size of shape in pixels in horizontal direction, in the **Y** field, enter the size of shape in pixels in vertical direction, and enter the number of motifs in the **Value** field. If the both **X** and **Y** fields are set to **0**, the program adds single pixels to the image.

X:	8
Y:	16
Value	25

Figure 172: Self avoiding motifs options

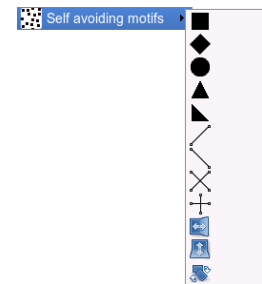


Figure 173: The self avoiding motifs shapes

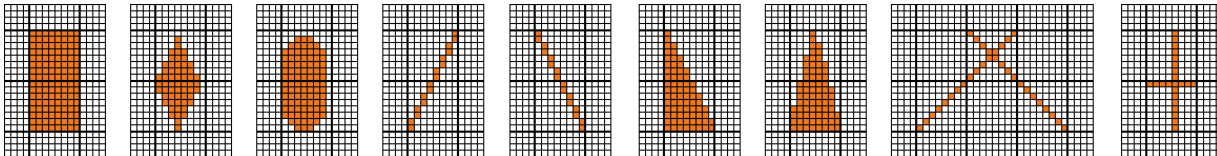


Figure 174: Motifs at same values ($X=8$, $Y=16$), but different shapes

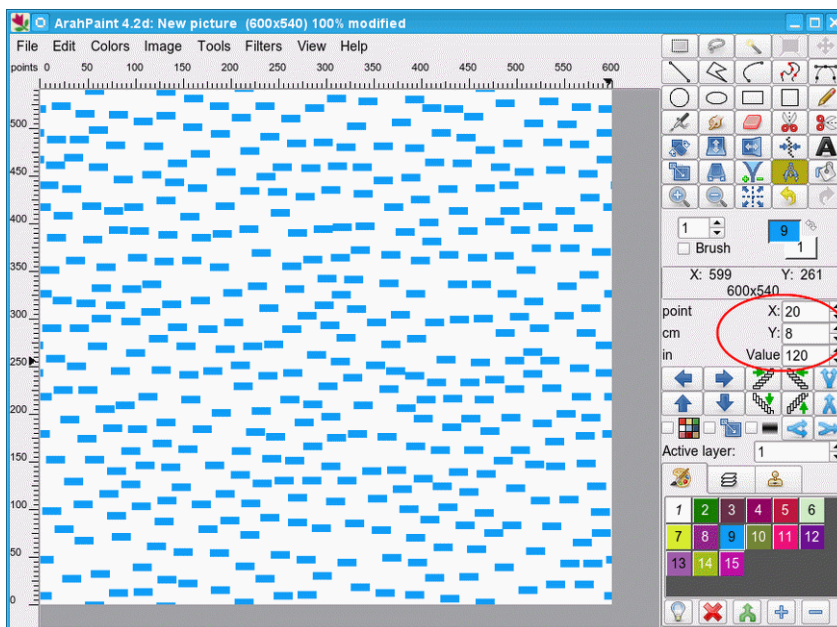





Figure 175: Rectangular self avoiding motifs

13.2.1 MIRRORING AND FLIPPING IN THE MOTIFS FILTERS

The last three tools in the **Self avoiding motifs** menu - horizontal mirror , vertical mirror , and flip  work in different way then ordinary motifs - when you choose a motif (shape), the program draws shapes in the image, but when you choose one of the mirror operations, it applies mirroring on the randomly selected image parts of the image. The size of parts is determined with **X** and **Y** parameters in the filter options, and the number of parts is defined in the **Value** field. In order to work, the image must have some pattern already, because if you apply mirror operations to a single-color rectangle you always get the same single color rectangle.

13.3 RANDOM MOTIFS

This filter uses the same interface (shapes and values) as self avoiding motifs. As the name indicates, instead of a self avoiding algorithm it uses random placement of motifs.

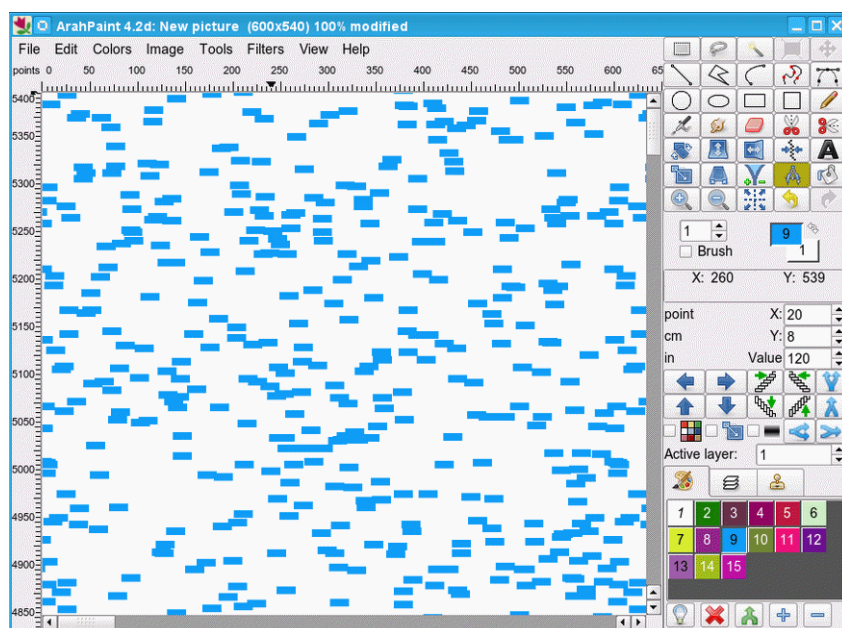


Figure 176: Random placement of motifs

13.4 PLACE MOTIFS

The **Place motifs** filter fills a color surface with a selected motif in such a way that one motif never touches another motif. If you repeat the operation, and at some point fill all available space, filter stops to work. It is not limited just to the surface of one particular color – you can use protected colors to control where the filter will operate.

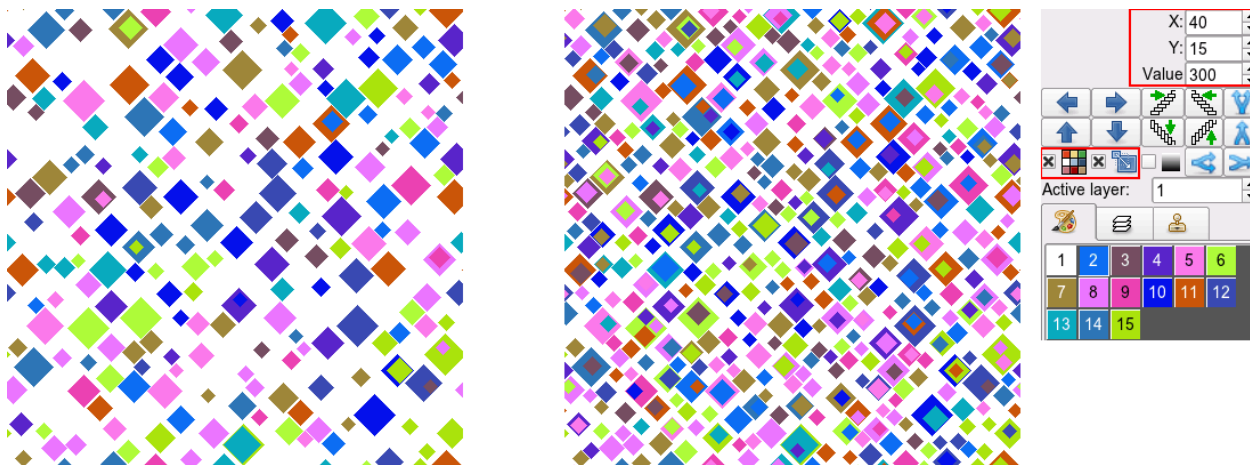


Figure 177: Placing the motifs, using the diamond shape, variation in size from 15 to 40 pixels, using all colors from the palette; image at left shows result after applying the filter ones at value 300; image on right shows result after repeating operation until the all space was filled.

Variable effects can be achieved by using protected colors. Figure 178 shows placing circles into APAINT caption. First, you have to protect the background color (white), and place circles into the caption. Then protect the color of the caption and the color of circles, add a new color to the palette, and place a motif of that color into the background. At the end, change the color of the caption into the background color.

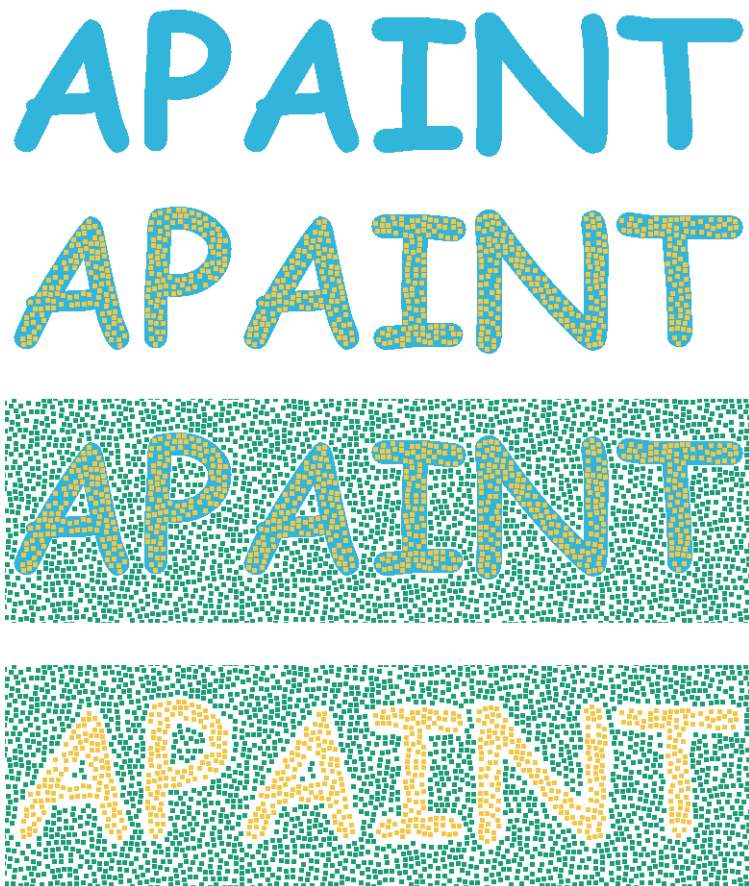



Figure 178: Placing motifs using protected colors

13.5 IKAT

Ikat is a type of weaving where the warp, weft or both are tie-dyed before weaving to create designs on the finished fabric. If you want to get a similar look on an ordinary jacquard fabric, you have to draw a distorted image. To use the automatic ikat function, which will randomly move lines or columns of an image for the determined value, press the measure tool icon , set the offset in the **Value** field in pixels of the **Measure** tool, and use **Filters > Ikat** from the menu. You can choose between **Horizontal**, **Vertical** and **Horizontal and vertical** direction. You can repeat the operation as many times as you want.

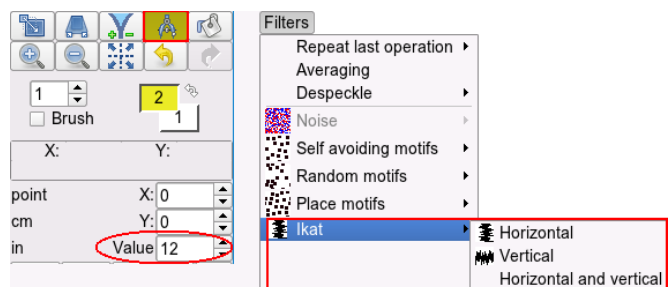


Figure 179: Setting the value and choosing the ikat direction

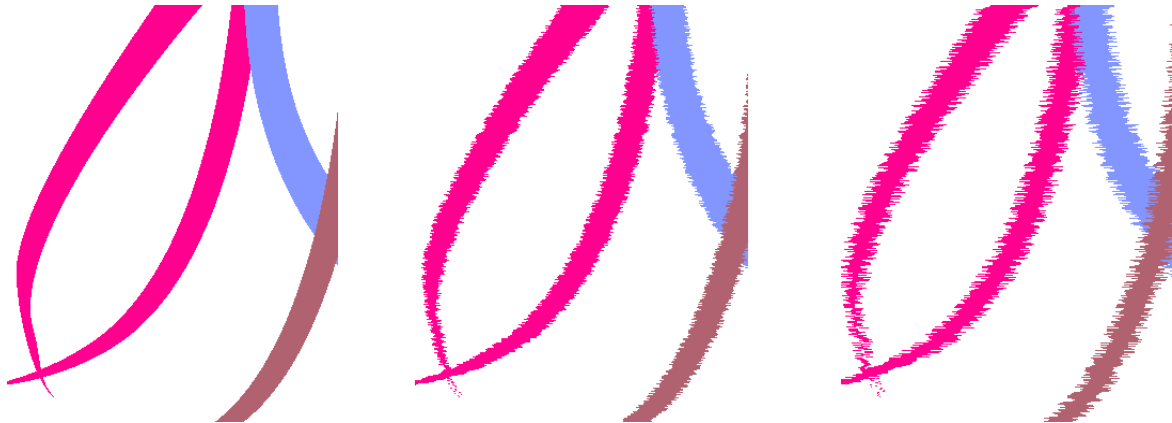


Figure 180: Before and after applying the Ikat effect – the image in the middle with the value of 5, and image in the right hand side with the value of 12.

If you have protected colors in the image, the program will not create the effect on that color. The Ikat filter supports usage of protection on the colors.

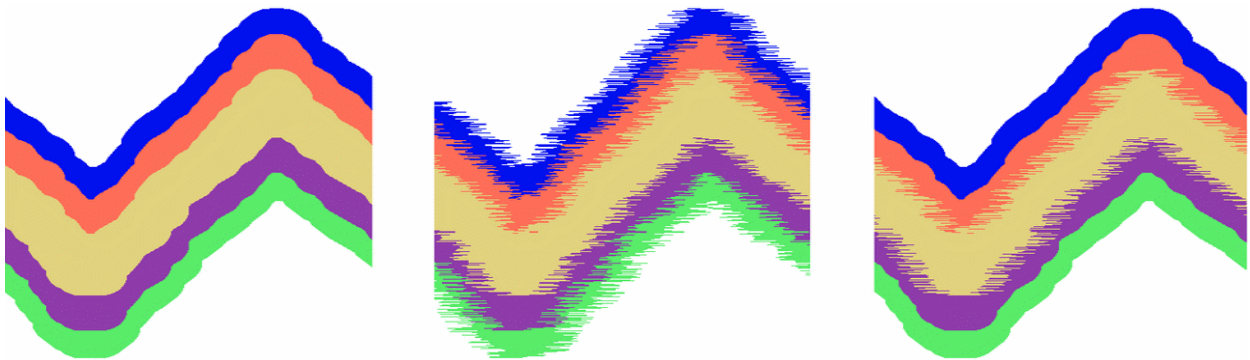


Figure 181: Before, and after applying the Ikat effect – blue and green are protected on the far right image .

13.6 MARBLE

The marble effect is similar to Ikat. The difference is that the shifting of lines (or columns) is correlated – every next line jumps just for one pixel to the left or right – so direction is random, but the move is just one pixel. Beside value, there is another parameter you can change to get different effects – X for vertical filter, and Y for horizontal filter. With this setting, the direction of shifting is not random anymore, it will have the same direction till it reaches the Y (or X) number. Then it will change the direction (the right side image in Figure 182).

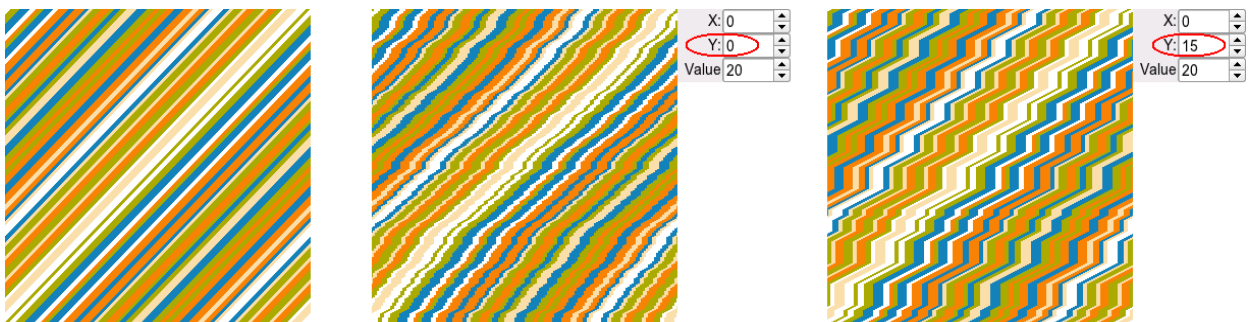


Figure 182: The original image, the same image after applying the marble filter with Value=20 Y=0, and the same image after applying the marble filter with Value=20 Y=15.

13.7 ZIGZAG

The **Zigzag** filter creates a zigzag pattern from the image. The number and height of zigzags depends on the settings of filter options (**X**, **Y**, and **Value**) and the direction (**Horizontal**, **Vertical**, **Horizontal and Vertical**).

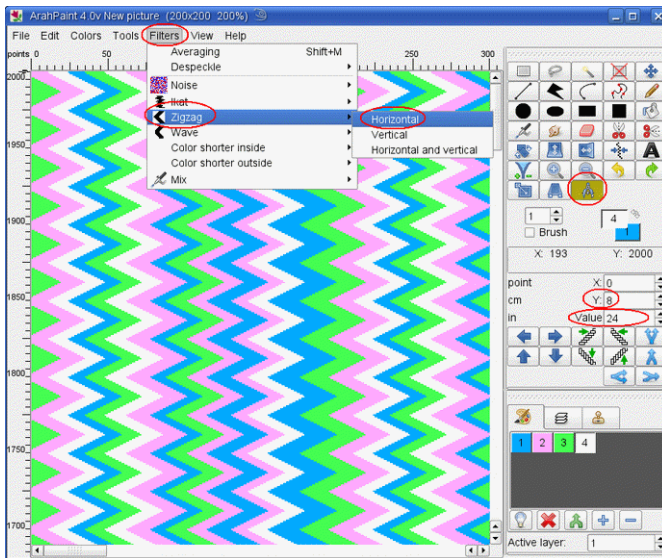


Figure 183: Using the Zigzag filter

- **X**: determines number of zigzags, that filter creates in the image in horizontal direction (actually up or down; to get zigzag up and down, you need to set the number to 2, or it should be the even number). Images in Figure 184 were made with value 8 (it creates 4 peaks).
- **Y**: determines the number of zigzags, that filter creates in the image in the vertical direction (left or right)
- **Value** is the peak-to-peak amplitude in pixels. If the value is set to 0, the program takes the whole image height as the amplitude value.

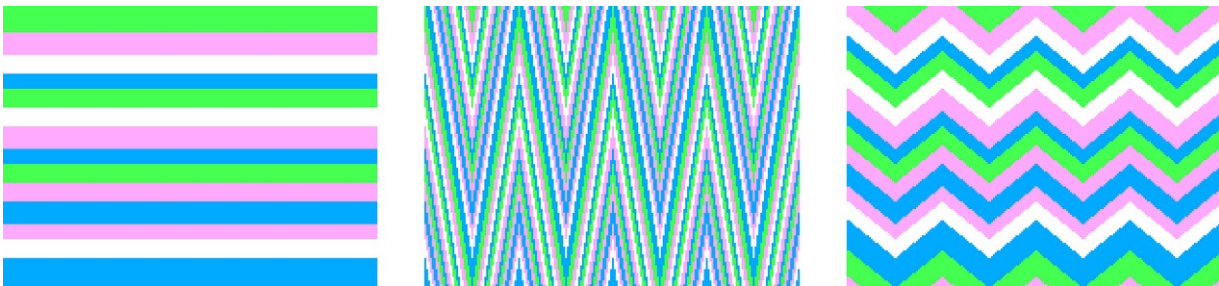



Figure 184: Initial image, image filtered with value of 0, image filtered with value of 20

13.8 WAVE

The wave filter is similar to zigzag; it creates waves in the image. As with the zigzag filter, click the Measure tool icon  to access the option fields.

- **X**: determines the number of waves that filter creates in the image in the horizontal direction (actually up and down). Images in Figure 184 were made with value 4.
- **Y**: determines the number of waves, that filter creates in the image in the vertical direction (left and right)
- **Value** is the peak-to-peak amplitude in pixels. If the value is set to 0, the program takes the whole image height (width) as the amplitude value.

Figure 185 shows the wave filter effect: the second and the third image were made by using the value of amplitude 8, and x and y value 12. The last image is just a repeat view of the third one, showing that the filter doesn't break the repeat, if the x or y values are divisible by 4.

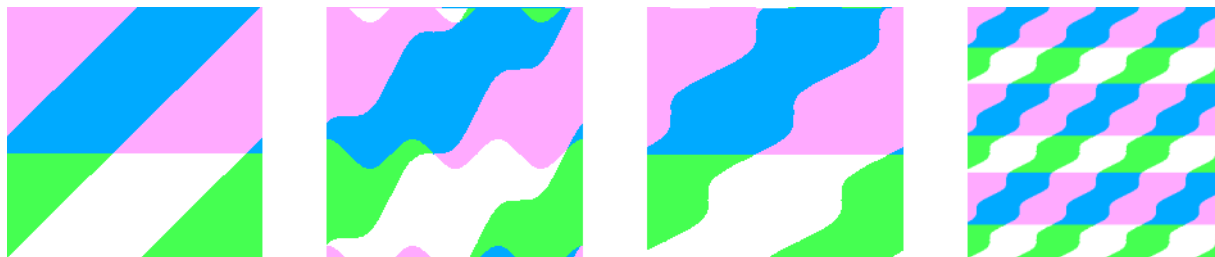



Figure 185: Initial image, wave filter applied in vertical direction, wave filter applied in horizontal direction, and the repeat view of former image

13.9 MIX

It mixes color between two (or more) adjacent color surfaces. You can select the horizontal or vertical mix, or both. Works similar to spray across the whole image. Protected colors are also kept intact.

As with other filters, click the Measure tool icon  to access the option fields:

- **X:** determines the width in pixels of the area between colors, where the program creates the "mix" effect. The horizontal mix filter uses the X value.
- **Y:** determines the height in pixels of the area between colors, where the program creates the "mix" effect. The vertical mix filter uses the Y value.



Figure 186: Initial image


horizontal mix

vertical mix

horizontal-vertical mix

13.10 THE CORALS FILTER

This filter tool emulates the coral growth. You need to have some starting pixels or objects in the image, from which the corals will grow. You get nice results, if you start with the **Self avoiding motifs** filter (Chapter 13.2) and use these motifs (pixels) as the coral growing area.

Corals grow from the objects colored in the background color, and are drawn in the current foreground color. As with other filters, click the Measure tool icon  to access the option fields, and set the value to something like 500 or more. Select **Filters > Corals**, and from the menu choose the coral type. Each type uses different criteria to attach the points. Normally you would need to repeat the operation a few times (**Filters > Repeat last operation**; keyboard shortcut **Ctrl+F**).

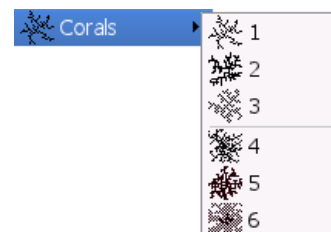


Figure 187: The corals menu

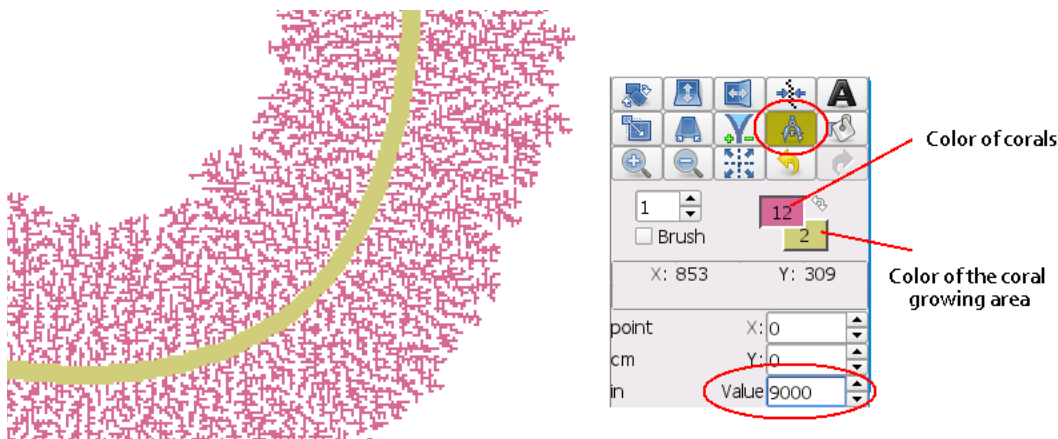


Figure 188: Corals drawn with foreground color around background color; value set to 9000

Figure 189 explains the six types of corals in ArahPaint. All corals in the image grow from the center point, and were drawn at the same value settings.

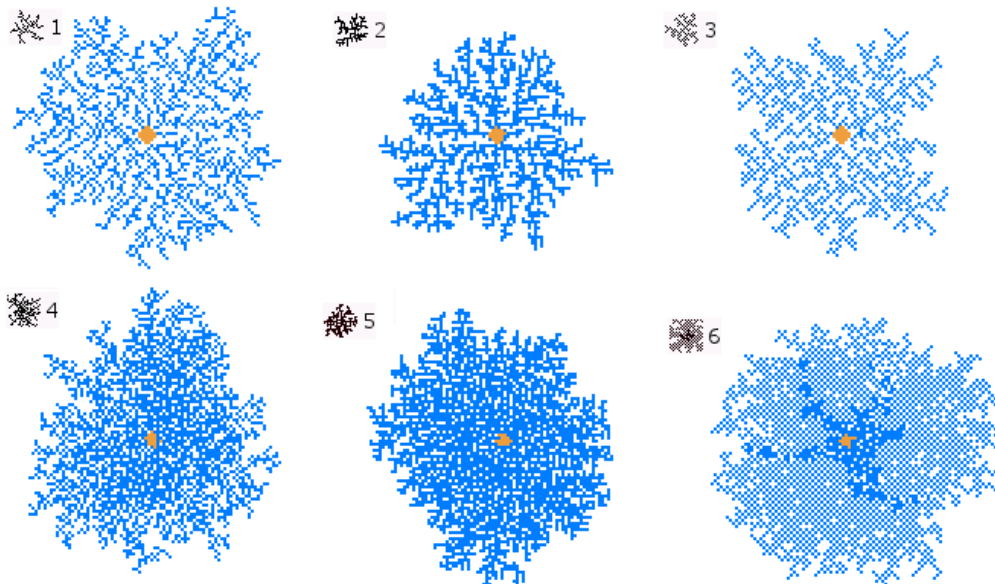


Figure 189: Six types of corals

13.11 GRADIENT

This filter tool fills the selected area with a gradient blend of the foreground and background color. In the menu, you can choose the direction, either vertical, or horizontal.

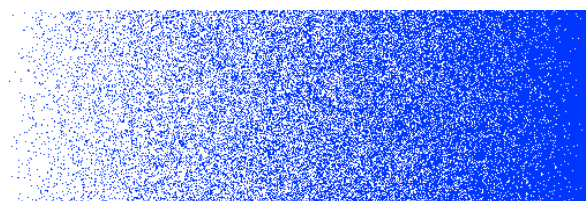



Figure 190: The color gradient between foreground (white) and background color (blue)

Figure 191 shows the result of the gradient filter, using the same settings as in the previous image, except that we have used the bidirectional mode (). In one repeat, gradient goes from foreground color to background color and back. We get a seamless repeating image.

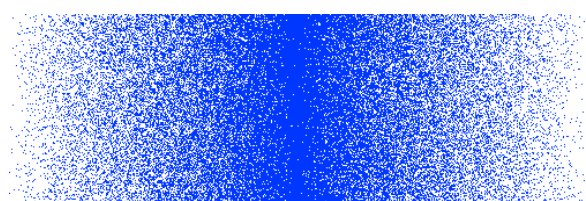



Figure 191: The color gradient, bidirectional mode

If you enable the All colors option  then the gradient uses all colors, which lie between foreground color and background color in the current color palette.

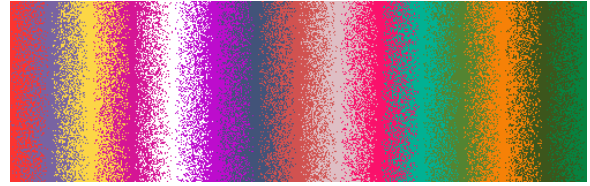


Figure 192: The color gradient, which uses all colors between foreground color and background color

The gradient filter also works on images in true color mode.



Figure 193: Gradient in true color mode


You can modify the angle of the gradient effect by entering the parameter in the **Value** field in the Filter options. For instance, if you enter 45, you will get the gradient line from the lower left corner to top right corner of the image.



Figure 194: Gradient at value 20, 45 and 90

13.12 THE CONTOUR FILTER

This filter allows you to create contours around color areas. Every time you repeat the operation, a new contour is added to the previous one. Protected colors are kept intact.

As with other filters, click the Measure tool icon  to access the option fields:



- **X and Y:** determines the width in pixels of the whole contour area (marked as A in Figure 195). If you want that the width remains the same after every step, then set both X and Y to that same number; if X and Y are different, the width varies between value X and value Y.
- **Value:** determines the width of the contour (marked as B in Figure 195). If the variable size option is disabled () , then the width of the contour is the same all the time; otherwise it varies from 1 to the number set in the **Value** field.
-  If checked, all colors from the palette are used for drawing contours.

Figure 195 shows the basic usage of the contour filter. Contours are drawn in the foreground color (cyan) – the width (**Value**) is set to 6, the rest of the contour area is drawn in the background color (white) – both X and Y are set to 16 pixels, which means that the whole “contour area” will have a width of 16 pixels.

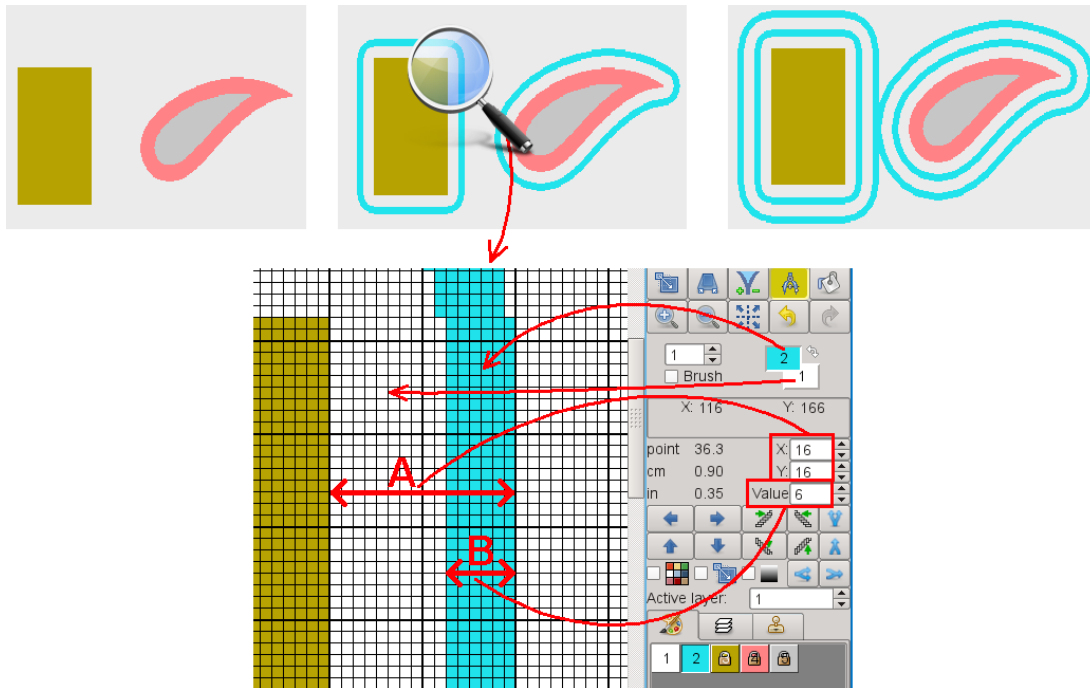


Figure 195: Top figure shows the original image; the contour filter applied once; the contour filter applied twice. Main image shows the filter setting and the magnified area from the upper image.

14 CLEANING UP THE PICTURE

Like other input methods, scanning produces some noise, which is present in the digitized image. Noise is usually visible as single dots or groups of dots mainly on the border between two colors.

14.1 AVERAGING

To reduce noise on the whole image, choose **Filters > Averaging**. If you have an image with layers it will work just on the active layer.

The **Averaging** tool works in the following way: it searches through the image for dots (a dot may be formed from more than one pixel) that differ from the ones in its neighborhood, and change them to predominant color in the surrounding. It can be applied several times to achieve the desired result. Some information will be inevitably lost in this process.

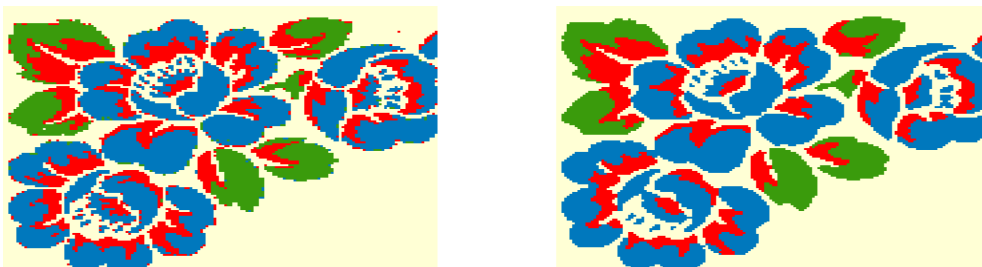


Figure 196: Before and after averaging

14.2 AVERAGING WITH PARAMETER

Sometimes, the color surfaces get jagged edges after image resizing or color reduction. To make edges regular, set the parameter of averaging from 2 to 7 (higher number means a stronger degree of

averaging). Set the parameter in the **Line width** field. If the image consists only of lines and edges, you have to color the surfaces, since the algorithm distorts or even removes single pixel wide lines.

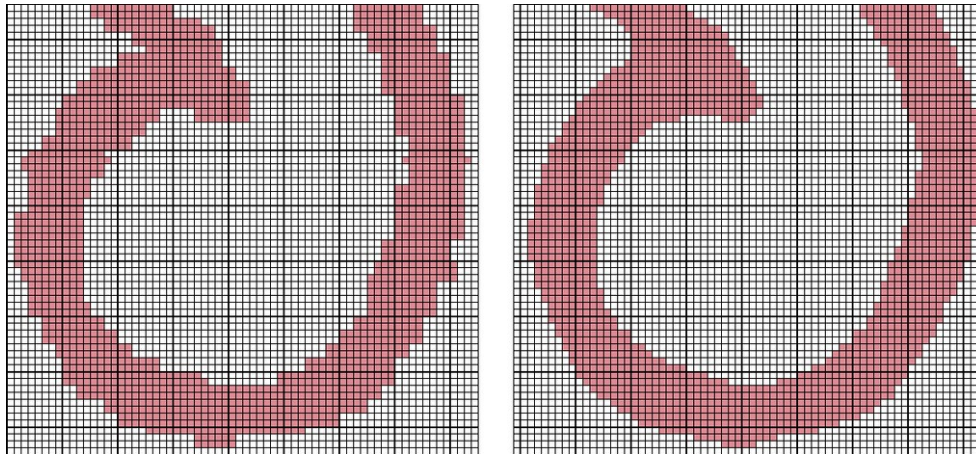


Figure 197: Before and after averaging with parameter 4

14.3 DESPECKLE

The despeckle option works in a similar way as averaging, but you can set the “neighbor” parameter, and have control over the pixel removal. You set the neighbor parameter in the **line width** field.

The parameter value of the isolated pixels (they don't have any neighbor) is 1. For every neighbor, which touches the pixel in the diagonal direction, the parameter increases for 1, and for every neighbor, which touches the pixel on the straight edge, the parameter increases for 2. The program removes all pixels whose neighbor value is less than the parameter setting.

You can apply the despeckle function to all colors in the image (**Filters > Despeckle > All**), or only on the foreground color (**Filters > Despeckle > Selected**).

Figure 198 explains the “neighbor” parameter value. If you set the line width to 1, then the program removes isolated pixels, which don't have any neighbor pixels of the same color. Higher the value, bigger is the removed area of connected pixels of the same color.

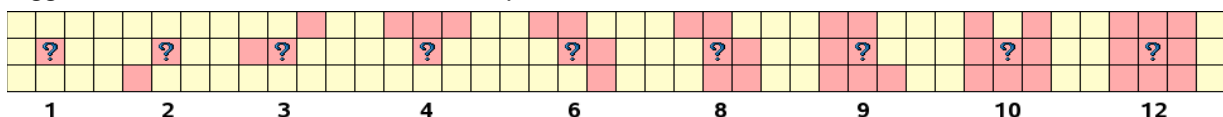


Figure 198: Examples of neighbor value

Figures from 199 to 201 show the despeckle function in practice.

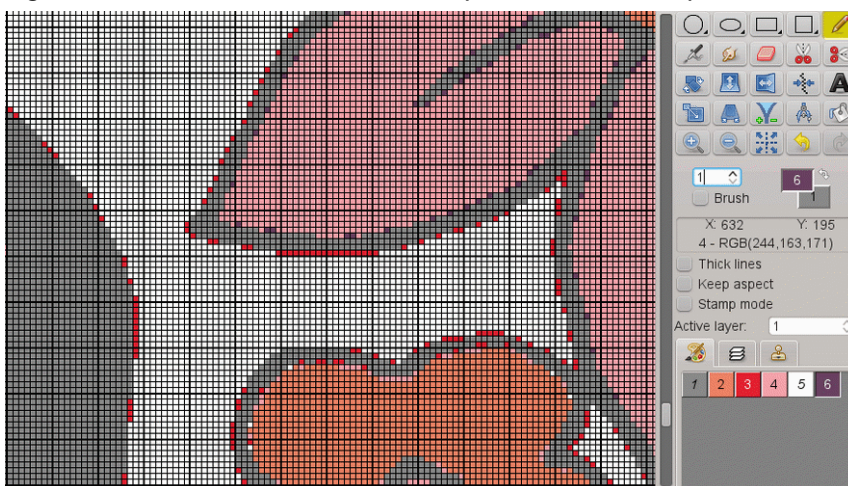


Figure 199: Image after color reduction

Despeckling with parameter set to 1 (Figure 200) removes only isolated points; there are still some mistakes on the borders between colors.

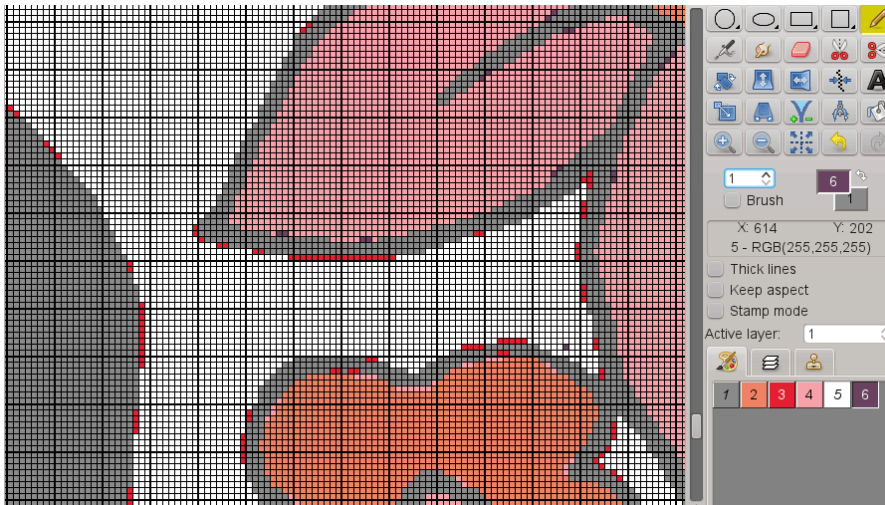


Figure 200: After despeckling with parameter set to 1

Increasing the parameter to 5 and applying the function again removes the rest of the border pixels.

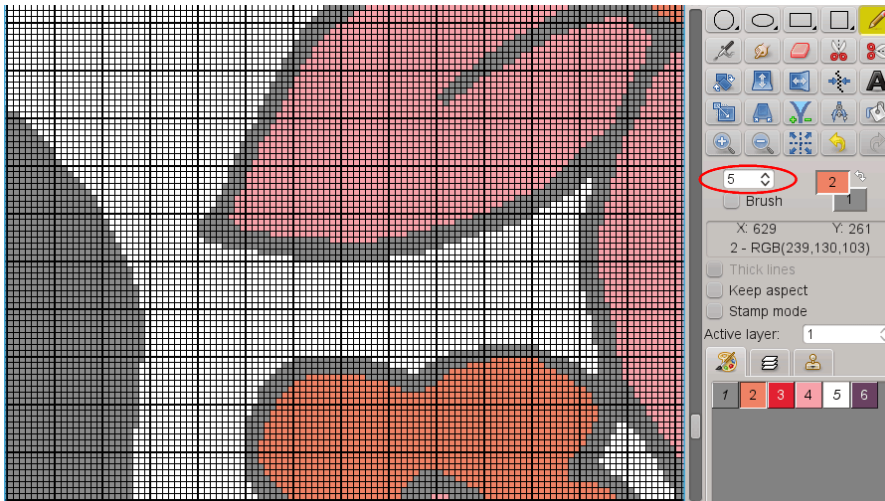



Figure 201: After despeckling with parameter set to 5

14.4 RUBBER

ArahPaint's rubber tool  is a variant of averaging. It works on the user defined circle area. It takes pixels from a wider circle (Average diameter in tool's options), calculates the most popular color and draws that color into smaller circle's pixels.

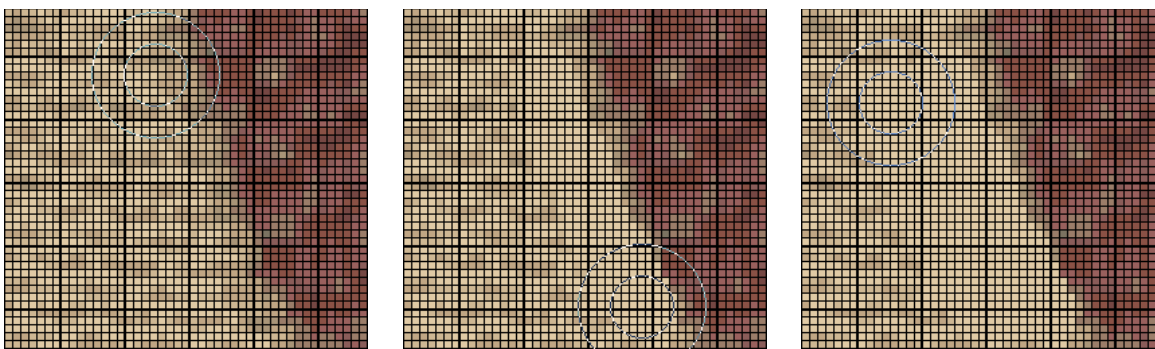


Figure 202: Rubber tool in 8 bits per pixel color mode

In true color mode it works in a slightly different way. It takes pixels from a wider circle, calculates the average color, and draws that color into smaller circle's pixels.

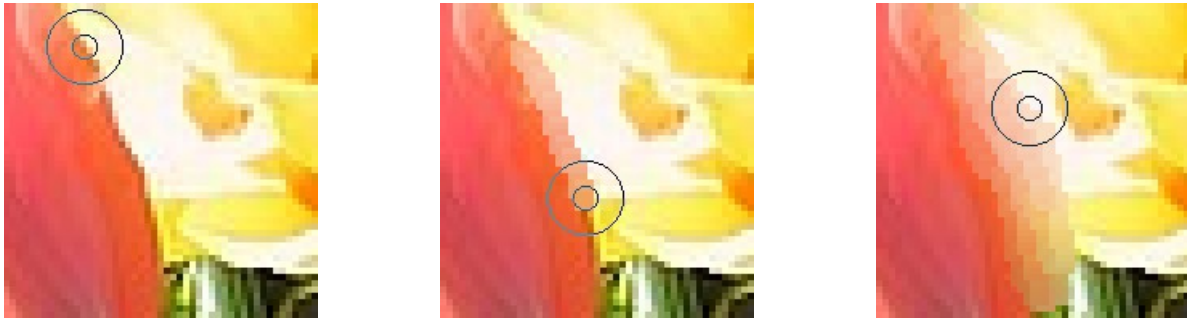


Figure 203: Rubber tool in true color mode

14.4.1 BORDER CLEANUP

Border cleanup changes various color pixels into one of two adjacent colors. If the smooth option is on, it will also make the border regular.

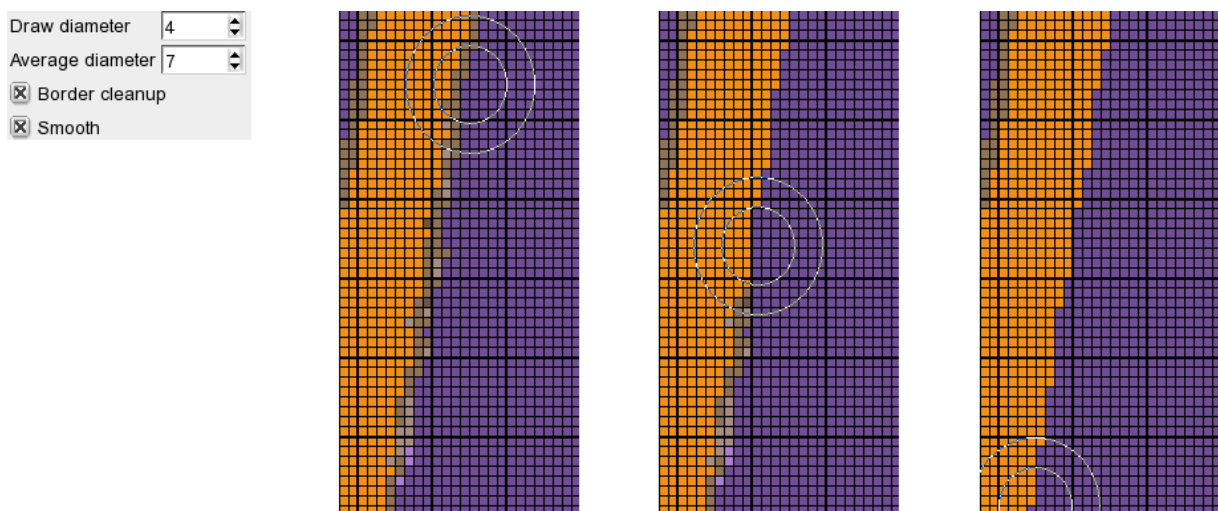


Figure 204: Rubber options, with border cleanup and smooth options on

15 PRINTING A PICTURE

Select the **Print picture** command from the **File** menu to open the **Print picture** dialog. A repeat of the image starts from the bottom of the printout area / drawing area in the window. Top of the window displays the currently selected printer, printer mode and density (see Chapter 15.1 how to change them). If you have several printers connected to the computer, you can change the print queue using the cascade menu on the top right (the menu in Figure 205 is colored blue). **Left**, **Upper border**, **Print width**, and **Print height** parameters need no special explanation. Their values are in millimeters. If the **Setup** in *ArahWeave* is set to the imperial measurement system, then the sizes will be displayed in inches.

Repeats in width and **Repeats in height** show how many repeats of the picture fit into the print width and height respectively. *ArahPaint* calculates these values on the basis of picture sizes in pixels and repeat size in mm.

Fit to page toggle button will modify the magnification factor to a value, which will fit at least one repeat on the print width and height.

One repeat toggle button enables you to print just one repeat of the image.

Title enables printing of title (file name) on the top of the image.

Landscape enables changing from default portrait to landscape printing.

It is easy to see if the print settings are correct by using **Preview**.

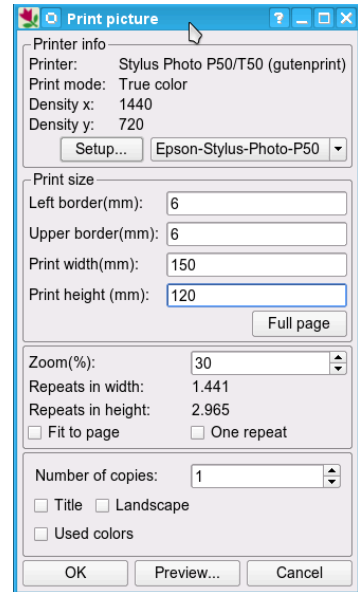


Figure 205: Print picture window

15.1 CHANGING PRINTER SETTINGS

To change the printer and its settings, press the **Setup** button to open the **Setup** dialog (Figure 206).

You can change the following parameters:

- Printer type
- Printer mode
- Printout quality
- Printing to file

Their values are shown in the boxes below respective scrolled lists.

First select a printer by clicking its name on the list. Then select the print mode, which depends on the selected printer. There are at most three different printing modes:

- True color
- Color dithered
- Black & white

Please note that color pictures cannot be printed with black and white mode selected. In such cases *ArahPaint* will issue an error message. The quality of the printout is defined by dot density (dpi – dots per inch). The higher the density the better the quality of the printout. High values may slow down printing.

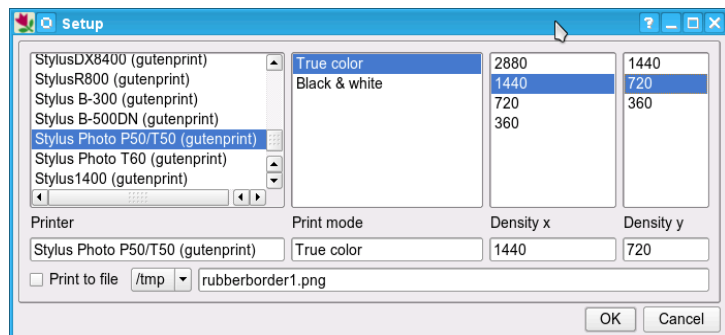


Figure 206: Printer setup window

The printing can be redirected to a file when the printer is not available on the computer or on the network. In this case, check a toggle button labeled **Print to file** and enter a printout filename in the box below the scrolled lists.

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F. Scanzio, U. Pedrazzo: Intrecci e Strutture dei Tessuti, Biella, 1988: Figure 129

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