

BCA III YEAR

GIMP NOTES

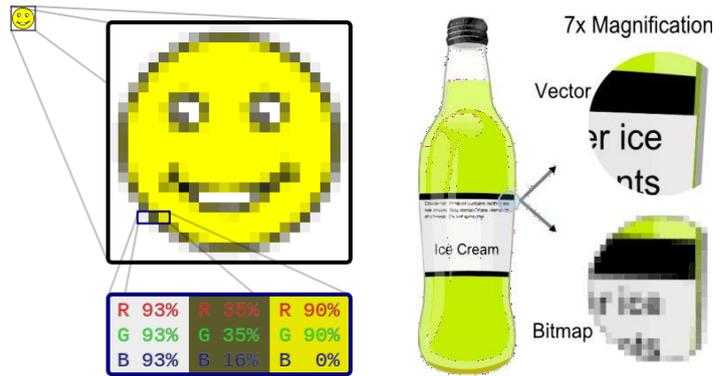
UNIT-IV

1. Image Processing Basics

There are two main kinds of graphics: **raster** graphics and **vector** graphics.

Raster (or **bitmap**) graphics is to represent graphics into small rectangular points called **pixels**.

Raster graphics is suitable to store digital photos.



In contrast, **vector** graphics is to represent graphics into geometric objects like lines, curves, polygon, etc. These objects can be enlarged without any loss of quality and is therefore useful in visual designs.

1.2. Raster Image Formats

Common raster image formats are listed below:

Extension	Name	Properties
BMP	Windows Bitmap	Accepted in most image processing programs.
JPG (or JPEG)	Joint Photographic Expert Group	Saves storage space using lossy compression. Most commonly used with digital photos.
GIF	Graphics Interchange Format	Can only store image in 256 colours. Renowned for its ability to store animations.
PNG	Portable Network Graphics	Provides better lossless compression than BMP and GIF.
TIF (or TIFF)	Tagged Image File Format	Store one or multiple images in the same file. Have an extensive set of options (which are outside the scope of this book).
RAW, CR2, etc...	Raw image formats. (They are referred as RAW despite having other file extensions.)	A good digital camera can store files in raw image formats, having minimal processing. They can be processed later with the highest quality.

Raster image formats used by image editing software

Image processing software can store extra information, such as text and layers, in its own file format. If you save the image in these formats, you can open your image later and continue processing.

Extension	Software
XCF	GIMP
PSD	Adobe PhotoShop
UFO	PhotoImpact (Corel / Ulead)
PNG	Fireworks (Adobe / Marcomedia)

It is possible to open these files with other programs. However, the image may have subtle differences if other programs are used.

1.3. Basic Properties of Raster Images

The **dimensions** of images can be described in its **width** and **height**. For example, an 800×600 image means it has a width of 800 pixels, and a height of 600 pixels.

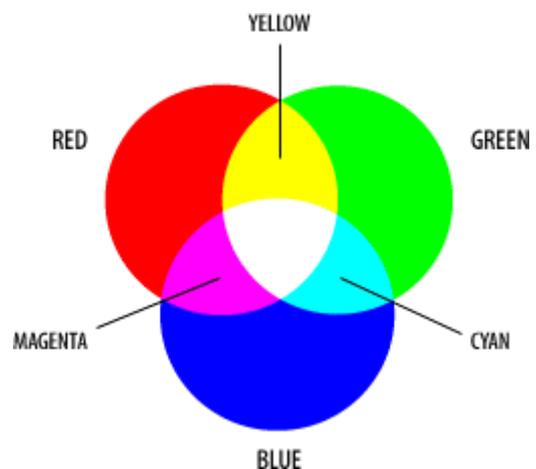
To convert the number of pixels into physical units, the **dots per inch** (DPI) can be specified for individual images.

The ratio of the width and the height is called the **aspect ratio**. For example a 800×600 photo has an aspect ratio of 4 : 3. *If the ASPECT RATIO of A photo is chANGED in enLArgement or reduction, the imAge APPEARS deformed And looks ugly.*

In colour images, such as digital photos, the colour of each pixel is stored in three numbers. The most common combination is **red, green and blue**, which are the three **additive primary colours**.

This is known as the **RGB Colour Space**.

In an image editing software, red, green and blue are referred as **channels** of the image. In addition to the colour channels, the **alpha channel** is used to store the opacity of the pixels. (Opacity ranges from fully transparent to fully opaque.)



The **colour depth**, or **bit depth**, is the number of data bits used to represent a pixel. The colour depth of a digital photo is usually 24 bits, which is having 8 bits in each channel. Some image formats, such as BMP and PNG, allow the use an additional 8 bits to store the **alpha channel**.

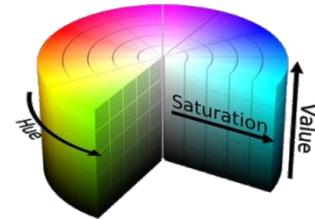
Grayscale images, having only one channel, usually have a colour depth of 8 bit. Also,

Black and white images have a colour depth of 1 bit.

It is very difficult to select a colour in the RGB Colour Space. Therefore, GIMP also uses the **HSV Colour Space** to represent colours. H stands for **hue**, S stands for **saturation** and V stands for **value**.

Hue ranges from 0 to 360 (degrees). 0° stands for red, 120° stands for green and 240° stands for blue.

High saturation means that the pixel is coloured, while pixels with zero saturation are black, grey or white pixels. Finally, high value means that the pixel is bright while low value means a dark colour.



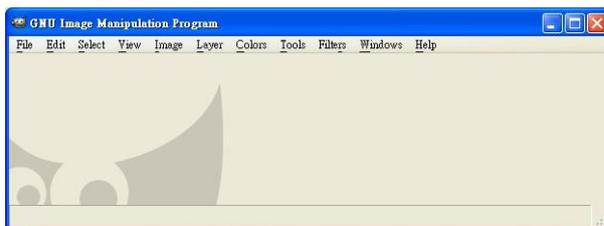
Other common colour spaces includes HSL, CMYK, Lab and YCbCr.

What is GIMP?

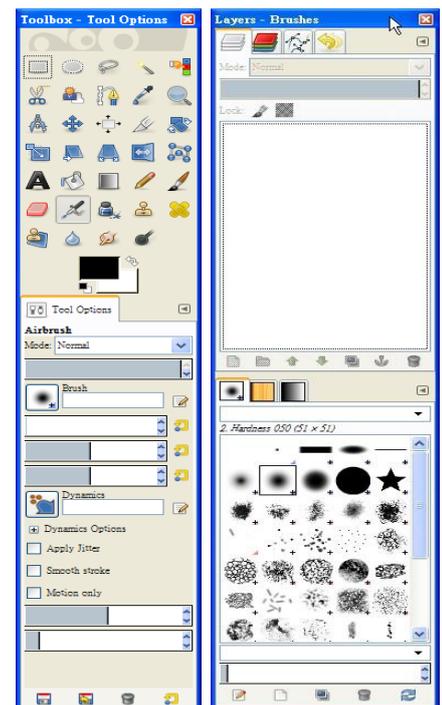
- GIMP stands for GNU Image Manipulation Program.
- It is Open Source.
- It is Cross Platform.
- It is Bitmap Graphics Editor, not for Vector editing.

GIMP Interface

When you start GIMP⁷, you will see the following:

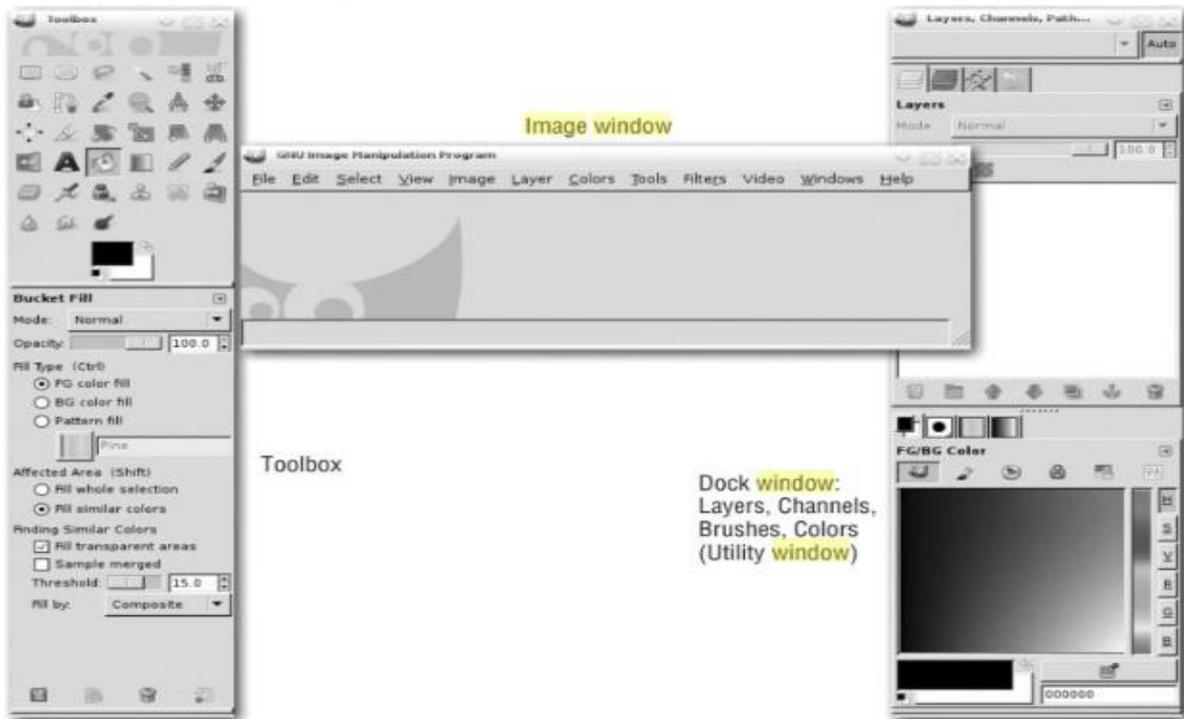


- A window called “GNU Image



Manipulation Program” which contains the menu bar.

- The Toolbox. Put your mouse over a tool/icon to see its description. Below the tools there are the options for the selected tool.
- The “Layers, Channel, Paths, Undo” window. These are the features that make GIMP and other image editing software more powerful than Paint.



GIMP Toolbox

Here are the icons in the toolbox and their functions:

Icon	Name	Shortcut	Description
Brush tools			
	Bucket Fill	Shift + B	Fills an area with a colour or pattern.
	Blend (Gradient)	L	Fills an area with a gradient.
	Pencil	N	Paints hard-edged lines; that is, the pixels are not anti-aliased.

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	Paintbrush	P	Paints soft- or fuzzy-edged lines; that is, the pixels are anti-aliased and/or feathered.
	Eraser	Shift + E	Erases pixels from a layer.
	Airbrush	A	Paint tool with variable pressure.
	Ink	K	Paints anti-aliased lines with a simulation of a nib.
	Clone	C	Copies pixels from one part of an image to another.
	Heal	H	Heals image irregularities.
	Perspective Clone	(none)	Clone from an image source after applying perspective transformation.
	Convolve (Blur/Sharpen)	Shift + U	Blurs or sharpens an image.
	Smudge	S	Spreads pixels in the direction of a "push".
	Dodge/Burn	Shift + D	Lightens or darkens an image's shadows, mid tones, or highlights.
Selection tools			
	Rectangle	R	Selects square or rectangular regions.
	Ellipse	E	Selects circular or elliptical regions.
	Free (Lasso)	F	Draw free-form selections.
	Fuzzy (Magic Wand)	U	Select continuous regions of colour.
	By Colour	Shift + O	Select all instances of a colour in an image.
	Scissors	I	Create paths to select shapes.
	Foreground	(none)	Select a region containing foreground objects.
Transform tools			
	Move	M	Moves layers and selections.
	Align	Q	Align or arrange layers and/or other objects.
	Crop	Shift + C	Crops or clips the image.
	Rotate	Shift + R	Rotates the active layer, selection or path.
	Scale	Shift + T	Scales the active layer, selection or path.

	Shear	Shift + S	Shifts part of the image to some direction.
	Perspective	Shift + P	Changes the perspective of the active layer, selection or path.
	Flip	Shift + F	Flips layers and selections.
	Cage Transform	Shift + G	Deform the selection with a cage.
Other tools			
	Path	B	Allows selecting and modifying paths.
	Colour Picker	O	Selects the colour of any image opened on your screen.
	Magnify (Zoom)	Z	Alters the zoom level of the image.
	Measure	Shift + M	Shows distances and angles.
	Text	M	Places text into your image.

Image Window

A screenshot of the image window illustrating the important components

The image window



In GIMP, each image that you have open is displayed in its own separate window. We will begin with a brief description of the components that are present by default in an ordinary image window.

Title Bar: At the top of the image window you will probably see a emphasis bar, showing the name of the image and some basic information about it. The emphasis bar is actually provided by the windowing system, not by GIMP itself, so its appearance may vary with different operating systems, window managers, and/or themes.

Image Menu: Directly below the emphasis bar appears the Image Menu (unless it has been suppressed). This menu gives you access to nearly every operation you can perform on an image. (There are some “global” actions that can only be accessed via the Toolbox menu.) You can also get the Image Menu by right-clicking inside the image , or by left-clicking on the little “arrow” symbol in the upper left corner, if for some reason you find one of these more convenient. More: most menu operations can also be activated from the keyboard, using Alt plus an “accelerator” key underlined in the menu emphasis.

Menu Button: Clicking on this little button gives you the Image Menu, except in a column instead of a row. Mnemonics users who don't want the menu bar visible can access to this menu by pressing the **Shift-F10** key.

Ruler: In the default layout, rulers are shown above and to the left of the image, indicating coordinates within the image. You can control what type of coordinates are shown if you want to. By default, pixels are used, but you can change to other units, using the Units setting described below. One of the most important uses of rulers is to create *guides*. If you click on a ruler and drag into the image display, a guideline will be created, which you can use to help you position things accurately. Guides can be moved by clicking on them and dragging, or deleted by dragging them out of the image display.

Pointer Coordinates: In the lower left corner of the window is a rectangular area used to show the current pointer coordinates (that is, the mouse location, if you are using a mouse), whenever the pointer is within the image boundaries. The units are the same as for the rulers.

Units menu: (This feature is new in GIMP 2.2; it does not appear in GIMP 2.0). By default, the units used for the rulers and several other purposes are pixels. You can change to inches, cm, or several other possibilities using this menu.

Zoom button: (This feature is new in GIMP 2.2; it does not appear in GIMP 2.0). There are a number of ways to zoom the image in or out, but this menu is perhaps the simplest.

Status Area: The Status Area appears below the image display. Most of the time, by default, it shows which part of the image is currently active, and the amount of system memory that the image is consuming. You can customize the information that appears here, by changing your Preferences. When you perform time-consuming operations, the status area changes temporarily to show what operation is being performed, and its state of progress.

Cancel Button: At the lower right corner of the window appears the Cancel button. If you start a complex, time-consuming operation (most commonly a plug-in), and then decide, while it is being computed, that you didn't really want to do it after all, this button will cancel it immediately.

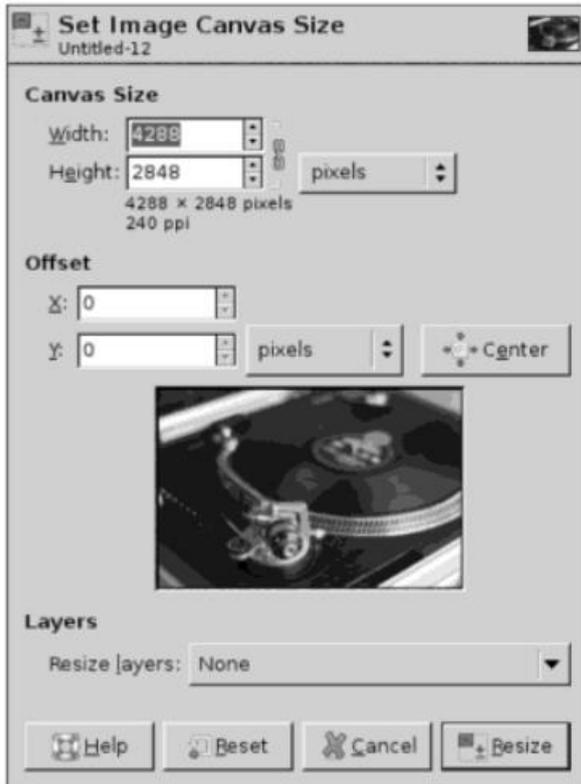
Image Display: The most important part of the image window is, of course, the image display or canvas. It occupies the central area of the window, surrounded by a yellow dotted line showing the image boundary, against a neutral gray background. You can change the zoom level of the image display in a variety of ways, including the Zoom setting described below.

Image Window Resize Toggle: If this button is pressed, the image itself will be resized if the image window is resized.

The Concept of a “Canvas”

Like many other image editing programs, GIMP makes use of a *canvas* in the image window. Think of the canvas as your working area; the “drawing surface” that you’re working on. The image, in contrast, is the final graphic that you’re creating. It’s the canvas plus the image data. This means that modifications to the canvas won’t stretch, distort, or scale your final output, but that same kind of modification to the image will cause those distortions. To adjust the size of your canvas, click Image ⇨ Canvas Size from the image window’s menu and you’ll get a dialog

The Set Image Canvas Size dialog

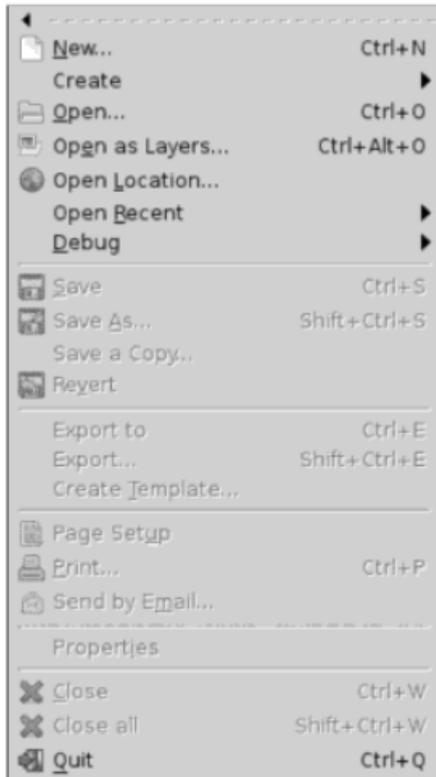


As Figure shows, the Set Image Canvas Size dialog allows you to enter values for the new width and height of your canvas in any of the units available in GIMP. Take special notice of the chain-link icon that's to the right of the Width and Height values. This constrains, or links, the Width and Height values so adjusting one causes the other to automatically change its value to make the canvas maintain the same proportions. If you would rather explicitly enter your own values for Width and Height, simply left-click this chain-link icon and GIMP breaks the link so the values are no longer constrained to one another. If you're used to Photoshop, this is the same as enabling and disabling the Constrain Proportions check box.

Beneath the Width and Height values for the canvas is a set of offset values. Adjusting these numbers shifts your image data on the canvas in the X and Y directions. Rather than typing in numbers here, though, you may find it easier to simply left-click and drag the preview image below these values. If you need to center the image data on the canvas, there's a convenient Center button to the right that automatically adjusts the X and Y offset to ensure that everything is centered up.

The Layers portion of the Set Image Canvas Size dialog enables you to automatically resize the layers of your image to match your new canvas size. Unlike many other programs, layers in GIMP have their own explicit sizes that you can adjust independently of the image or the canvas.

GIMP's File menu and all of the available options therein

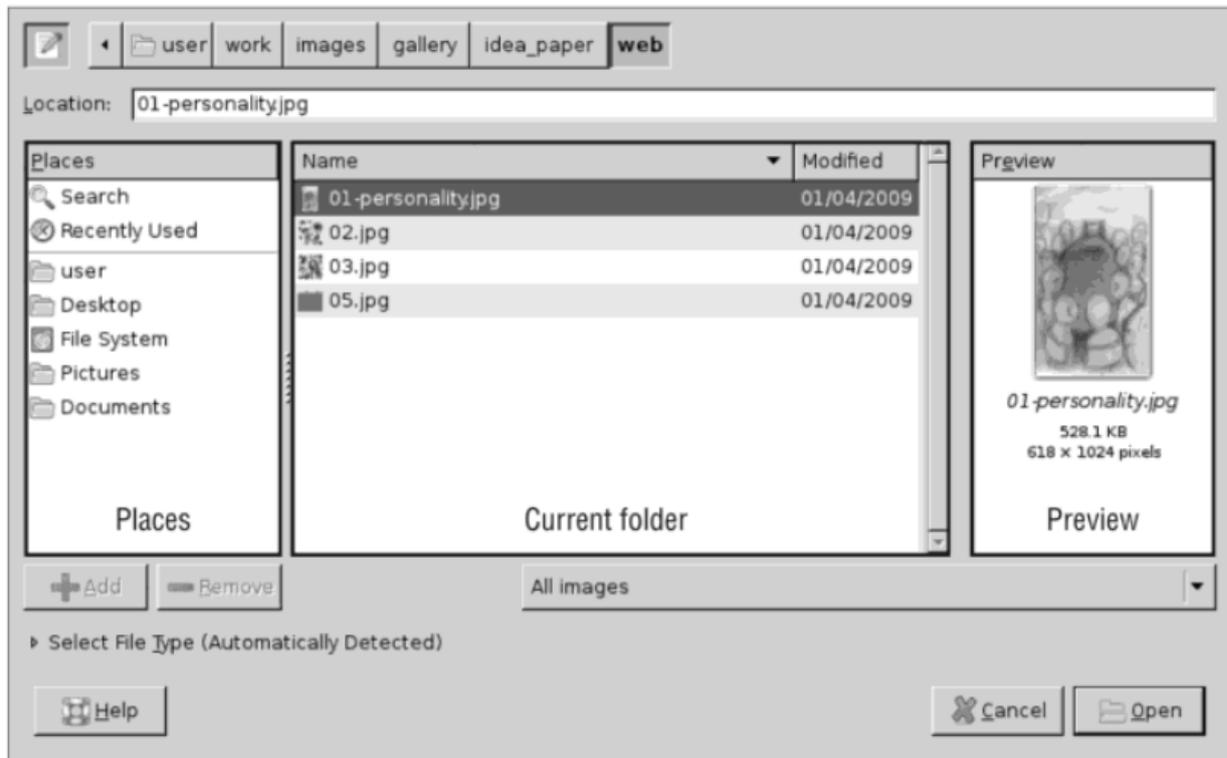


Opening Images

The quickest and easiest way to get an image into GIMP is to open one that already exists. The fastest way to do this is to use drag and drop. If you already have GIMP open, you can select an image's icon from your operating system's file management tool (Explorer in Windows, Finder in Mac, and usually Nautilus or Dolphin in Linux) and drag it into a GIMP image window. If there's no image in the window, GIMP opens the specific image file that you dragged in. If you drag the image icon into an image window that is already populated with an image, GIMP adds your dragged-in image as a new layer. This also works if you have an image available in a web browser like Mozilla Firefox. Just left-click the image and drag it to an available GIMP image window.

Of course, if you want more options or flexibility, you need to use the Open Image dialog for opening an image file. Do this by clicking File ➤ Open or pressing Ctrl+O. This brings up GIMP's file chooser, the Open Image dialog

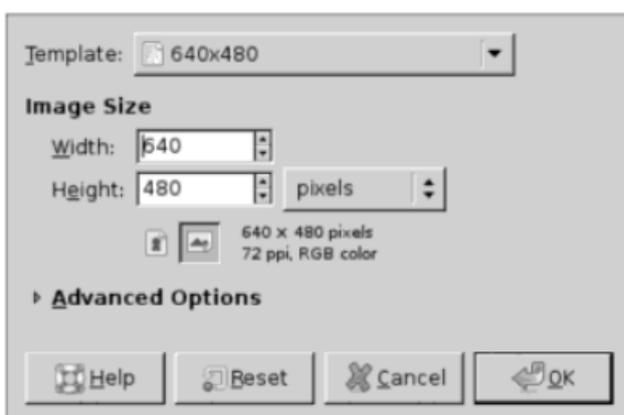
The Open Image dialog



Creating a Blank New Image

Another way to get an image in GIMP is to create that image yourself. You can provide yourself with a blank canvas and either paint or paste whatever your creative mind can muster. Fortunately, this is a fairly painless endeavor. Click File > New or press Ctrl+N

GIMP's New Image dialog



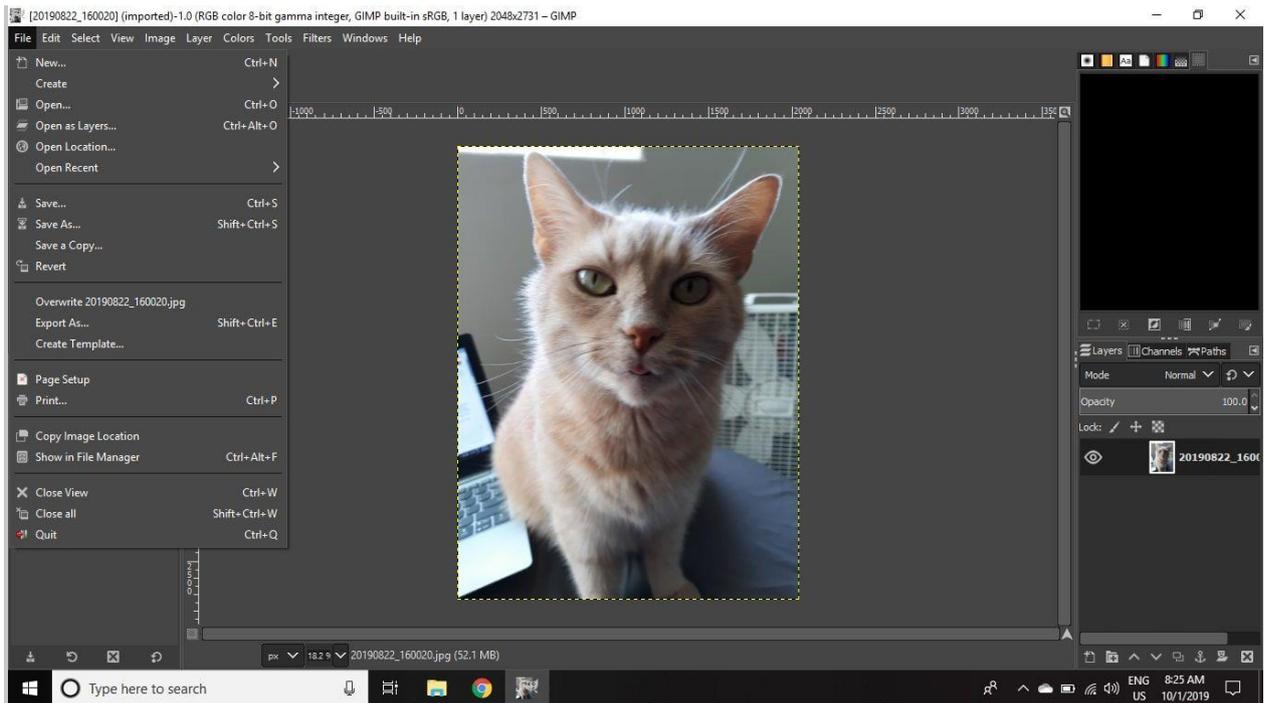
SAVING FILES

The cross-platform image editor can save files in many formats.

The native file format in GIMP is XCF, but it is only used for editing images within GIMP. When you finish working on your image, you must convert it to a suitable standard format for use elsewhere. For example, you can export a file as a JPEG in GIMP.

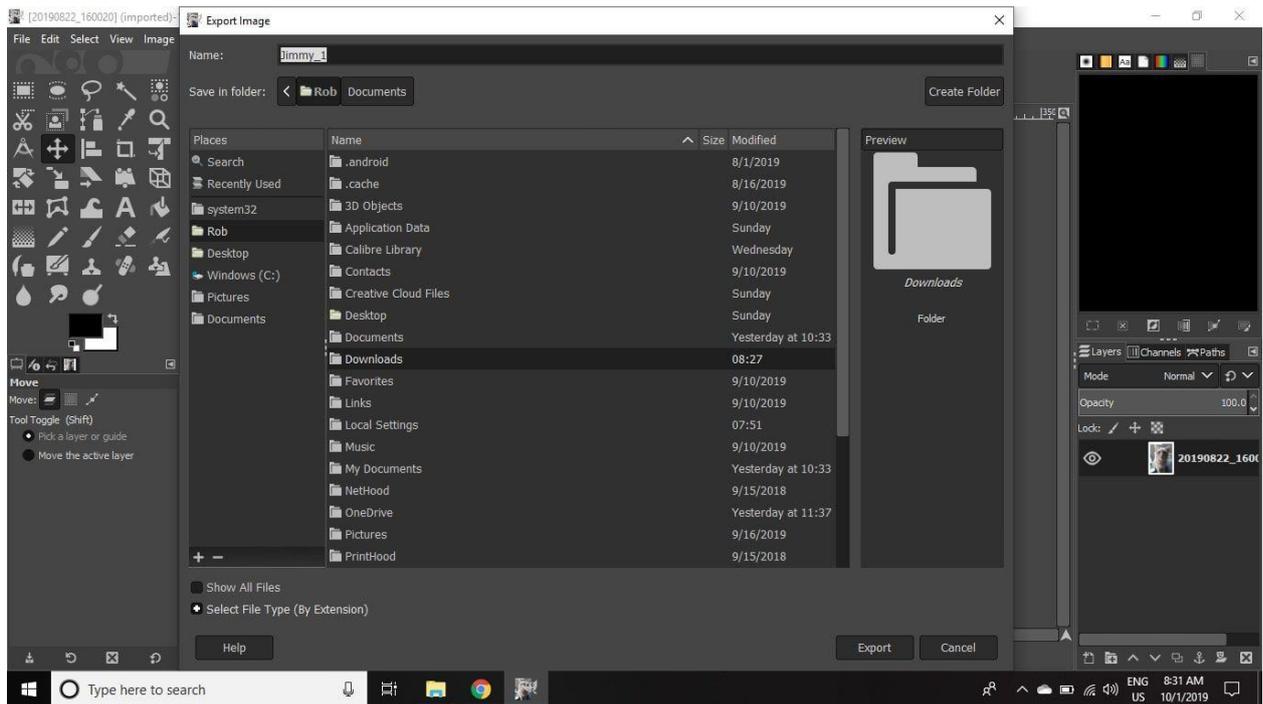
To save an image in the JPEG format using GIMP:

1. Select **File > Export As**.

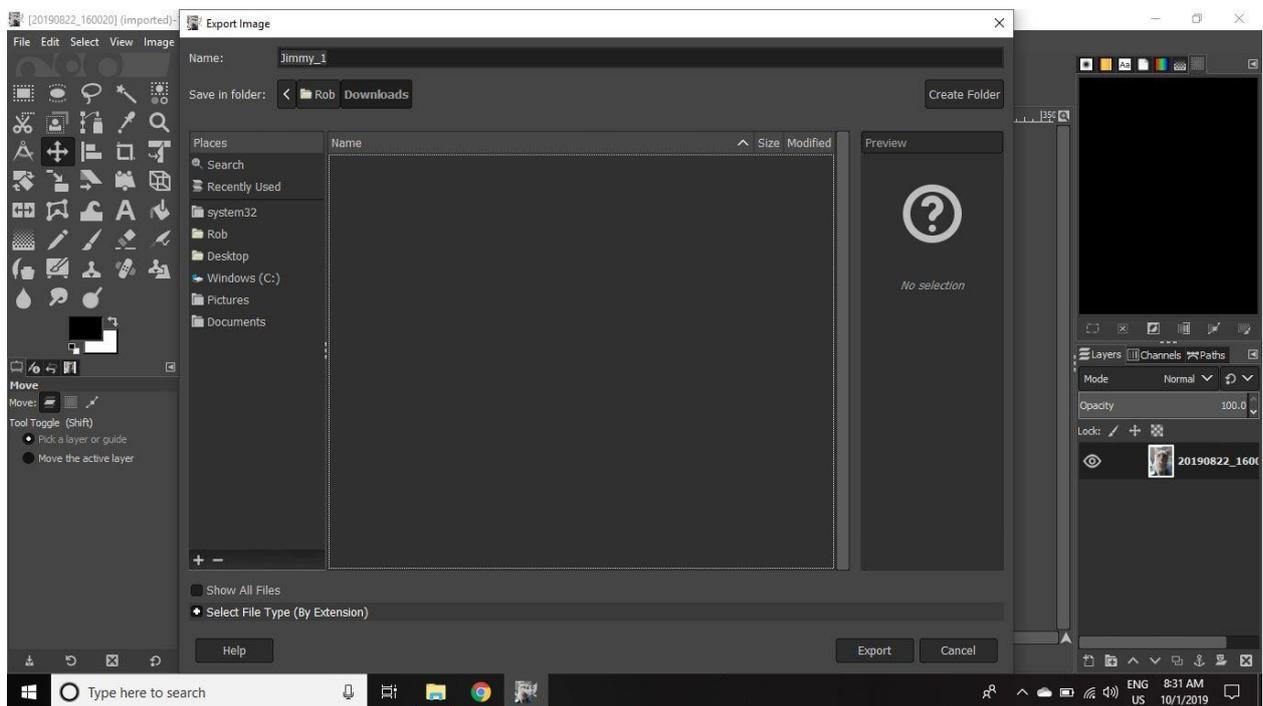


2. Enter a name for the file in the **Name** field, then navigate to where you want to save the image.

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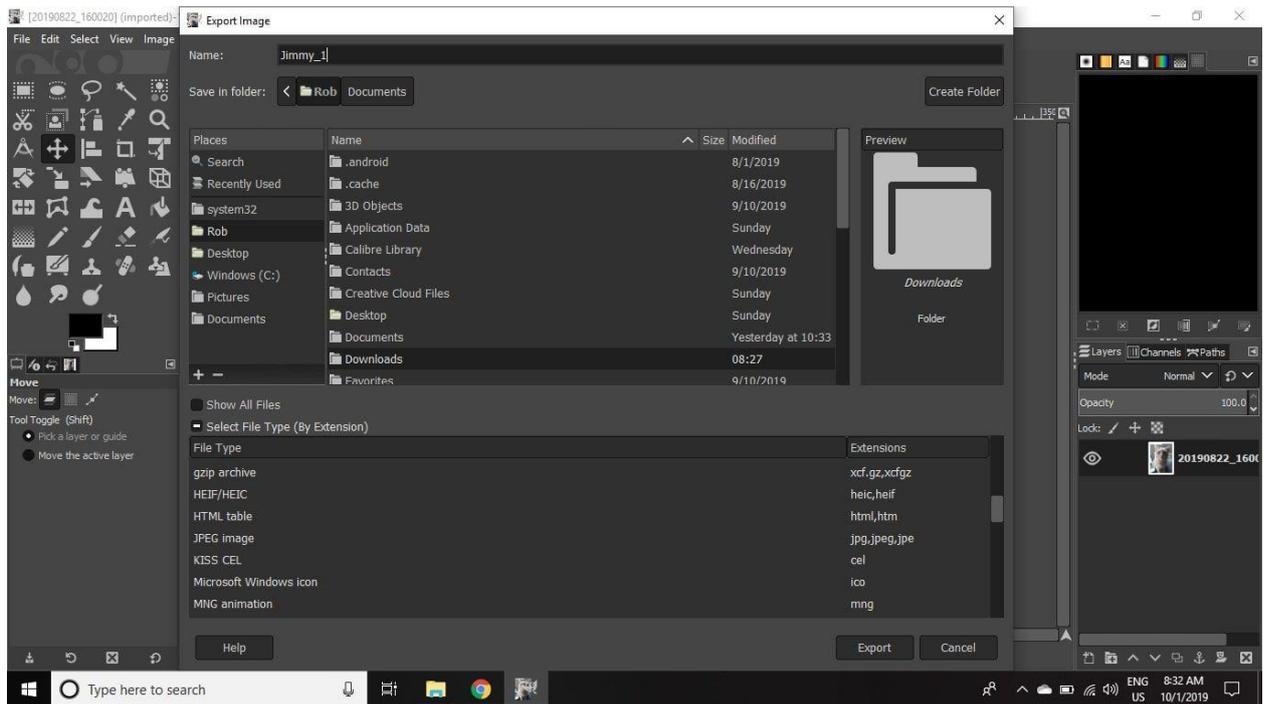


Click on **Select File Type** to open the list of available file types.

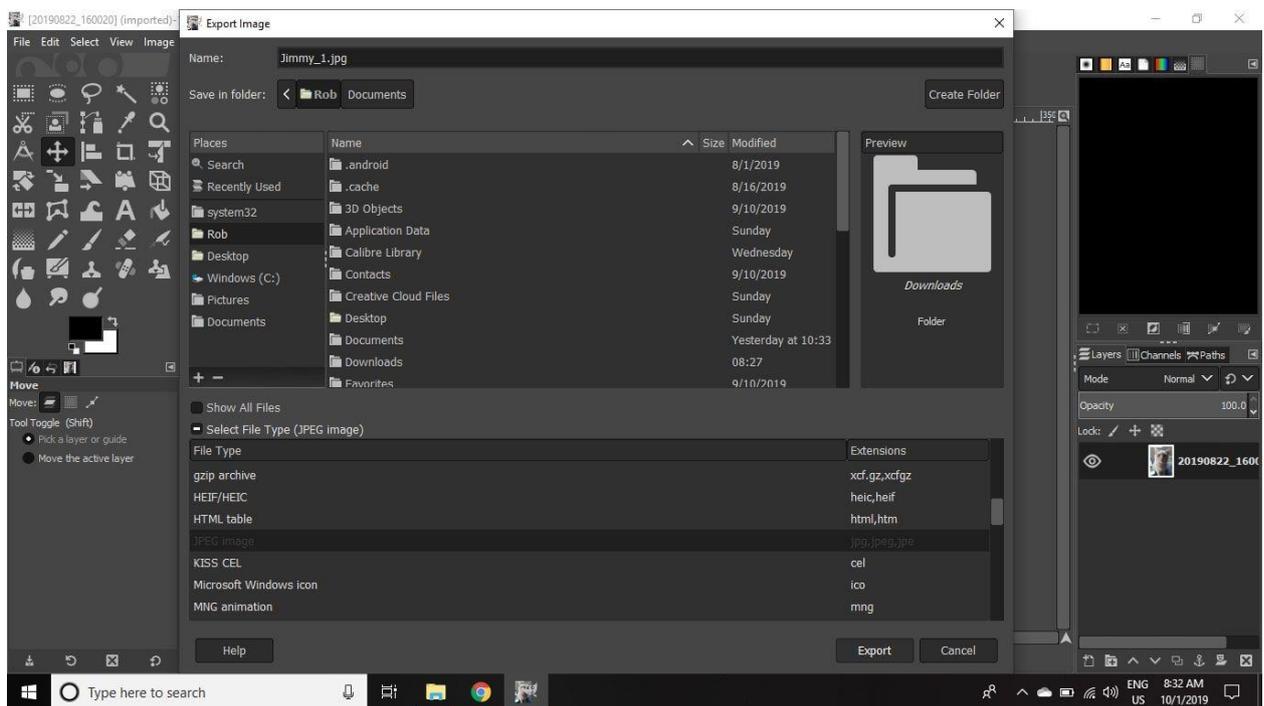


Scroll down the list and select **JPEG Image**.

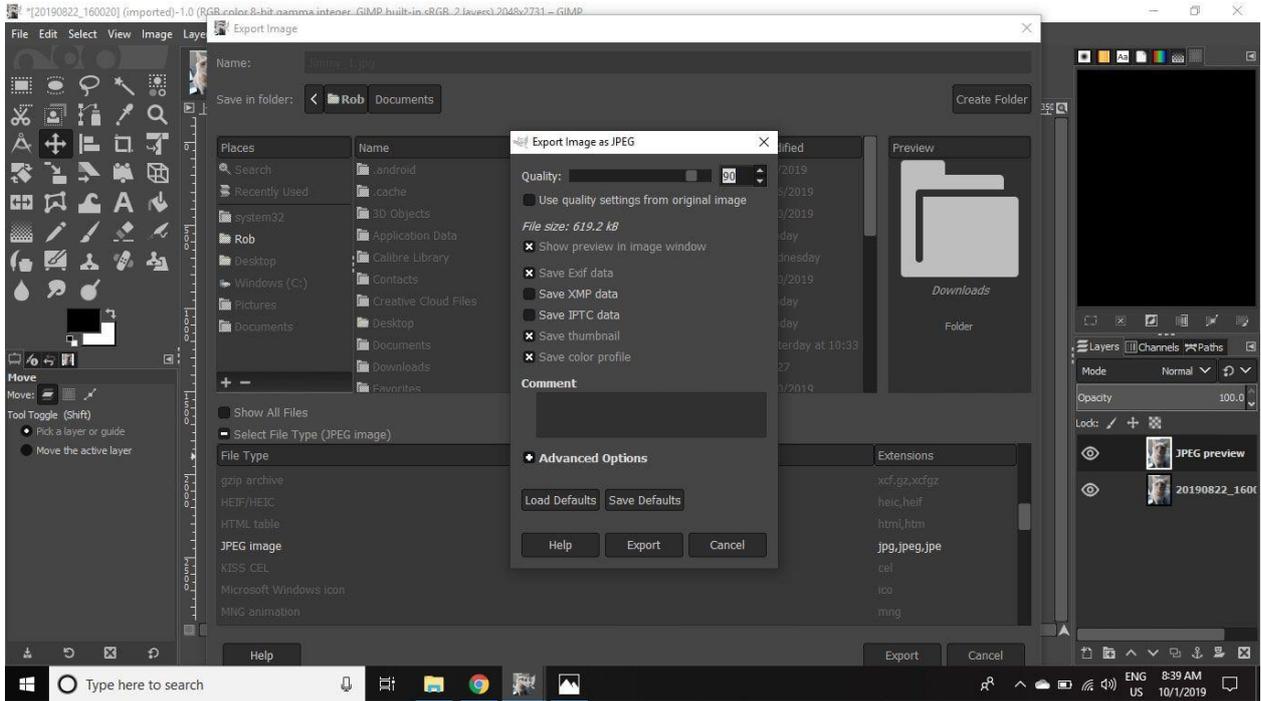
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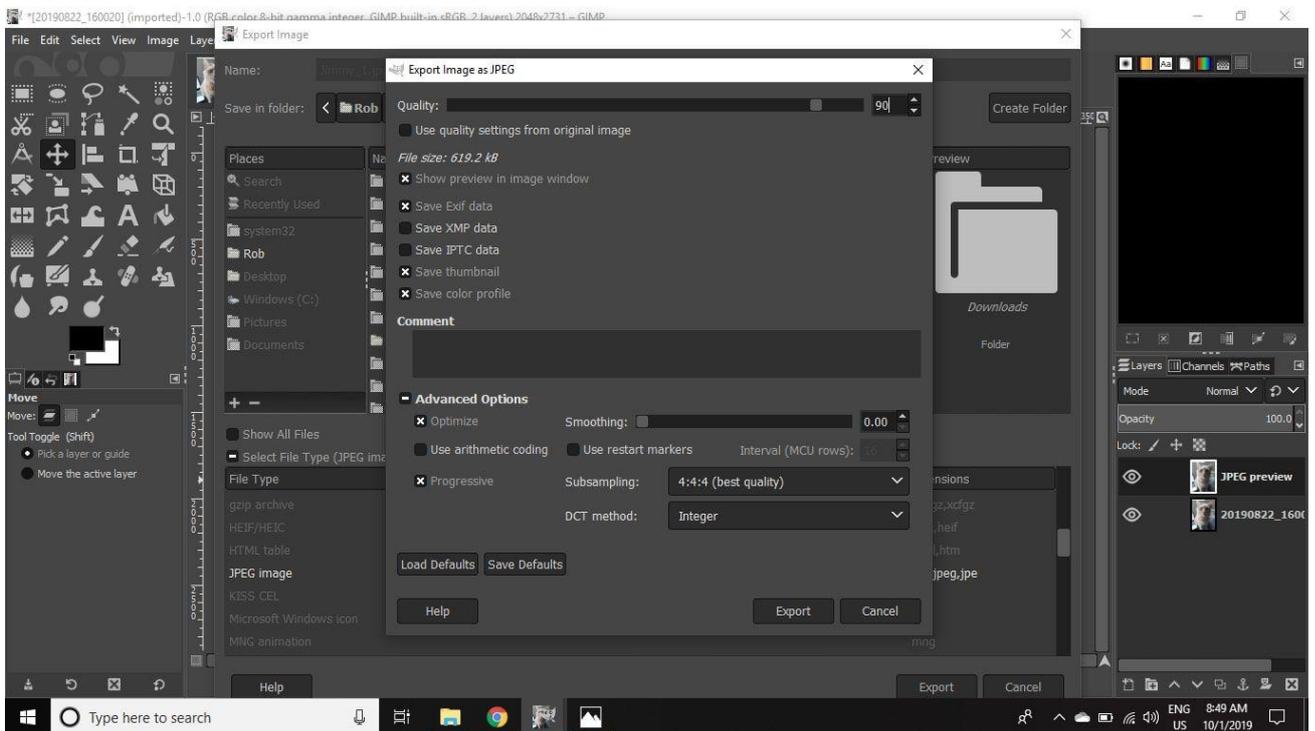
Select **Export** to open the **Export Image as JPEG** dialog box.



Set the compression quality. The **Quality** slider defaults to **90**, but you can adjust it up or down to reduce or increase compression.



Select **Advanced Options** if you wish to further customize the file then select **Export** to save your image as a JPEG.



You can use the same method to export images in dozens of other formats including GIF, PNG, and BMP.

Copy and Paste

Use **File** → **Create** → **From Clipboard** to create a new image from the clipboard; alternatively, you can use **Edit** → **Paste as** → **New Image**. Many applications support copying an image to the clipboard that can then be pasted into GIMP. Many operating systems support copying screens to the clipboard. **Print Screen** typically copies the screen to the clipboard, and **Alt + Print Screen** copies only the active window. Print screen is not universally supported, and just because your operating system can copy an image to the clipboard, does not mean that GIMP can use the image from the clipboard. Your best bet is to try it and see if it works.

How to Copy and Paste Pictures / Image

How to copy and paste pictures / images into layers in GIMP?

Explanation

This explains you how to copy and paste an image or pictures into multiple layers in GIMP.

Steps to Follow:

- Launch GIMP.
 - Click File -> Open or else press Ctrl+O to open a file, then choose a file and now click Ok button.
 - In case you want the entire image to get copied, click Select->All or else simply press Ctrl+A.
 - Suppose you want to select a certain portion of an image, use the "Rectangle Selection Tool or Ellipse Selection Tool or Free Selection Tool" of the Selection Tools from the toolbox.
- 
- The Paste Into option pastes the image over the existing image. In this option, the pasted image can be moved to view the existing image. However the "Paste" option simply pastes the image and it cannot be moved.
 - Another option named Paste as facilitates four more options which allows the user to paste the image in various styles like "New Image, New Layer, New Brush, New Pattern".
 - Select any one of the options - for e.g. New Image. This automatically pastes the image in a new window and you can view it.



- The New Image and New Layer option do not require any additional process. Just click it and the image gets pasted.
- The New Brush and New Pattern demand an extra action i.e. you need to set the brush/pattern name and file name then click "Ok" button to see the image.

