

# Exercise 7: Graphics and drawings in Linux

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August 11, 2004

In this exercise, we will learn the basic use of two image manipulation programs: "The GIMP" and "Image Magick" and two vector based drawing programs in Linux: "Dia" and "Xfig". We will save the output in a file suited for the web, or for importing into a  $\text{\LaTeX}$  document.

## 1 Important file formats

**GIF** (Graphical Interchange Format)

The GIF format is often used for displaying images on a web site, though it is being replaced many places by PNG, because GIF contains a patent that the owner suddenly started charging money for. All common browsers supports GIF.

**JPEG (or JPG)** (Joint Photographic Experts Group)

JPEG is also very much used on web pages, and is supported by all major browsers.

**PNG** (Portable Network Graphics)

PNG is replacing GIF on many web sites. PNG is supported in most newer browsers.

**EPS** (Encapsulated PostScript)

EPS is the format you have to use to include graphics in a  $\text{\LaTeX}$  document. It is vector based (scalable).

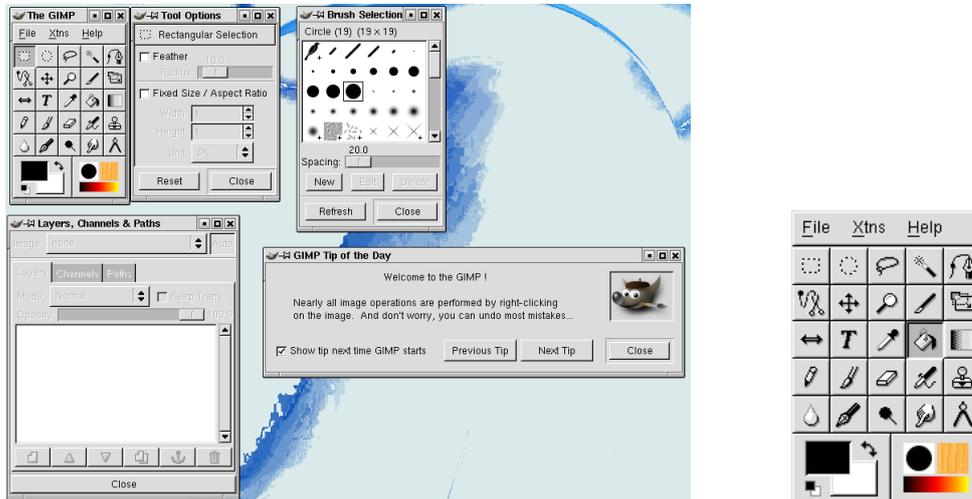
## 2 The GIMP - The Gnu Image Manipulation Program

The GIMP is a extensive image manipulation tool, which has sometimes been compared to Adobe Photoshop. It is easy to learn to use the GIMP for some simple operations, but it takes a lot of work to learn to use all the possibilities it offers.

### 2.1 Starting the GIMP

- Select "The GIMP" from the KDE-menu (KDE-menu  $\rightarrow$  Graphics  $\rightarrow$  The Gimp), or the Window Maker menu (Applications  $\rightarrow$  Graphics  $\rightarrow$  GIMP). You can also start it by typing "gimp" at the command prompt.

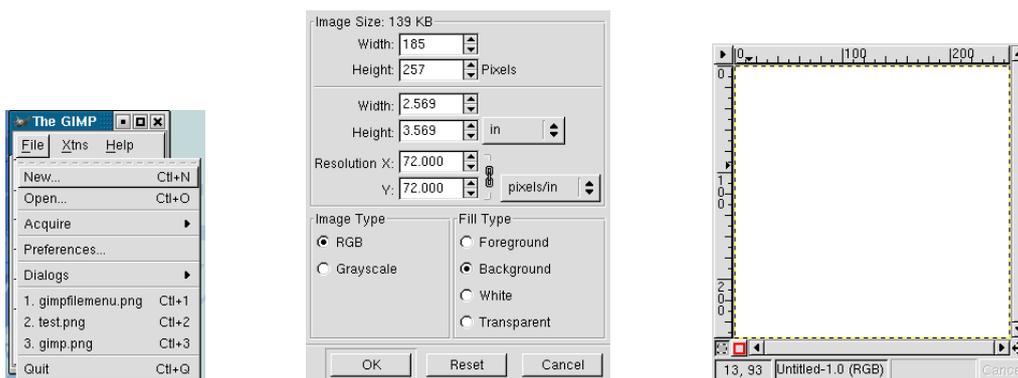
- The first time you start "the GIMP", it will run a short "User Installation" to install some local files in your home directory. Just click "Continue" in all the dialogs.
- When "the GIMP" is started, it looks like this:



As you can see, it does not consist of one large window covering the whole screen, but of several small ones. The main window is the one titled "The Gimp". The others are some tool bars you don't need right now. Close all the other "Gimp" windows, so you only have the main window left.

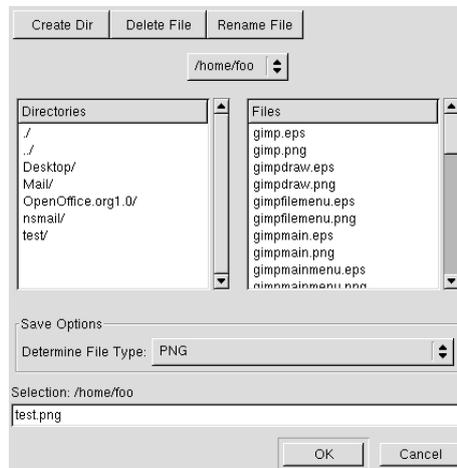
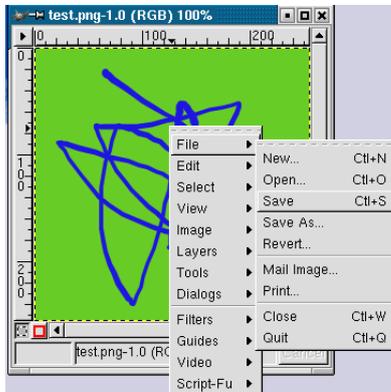
## 2.2 Using the GIMP

- Click the "File" menu in the main window of "The GIMP", and select "new". The Gimp suggests the default size and type of your new image, just click "OK". Now you get an empty surface to draw on.

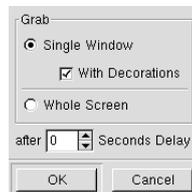
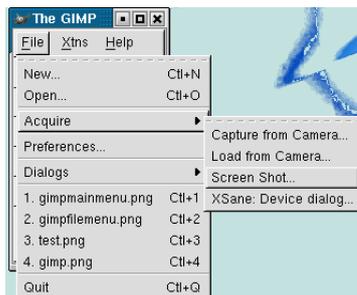


- Draw something. Now save the file. This is done by right clicking on the window with the drawing. This brings up a menu. Select "File → Save", and save the file in

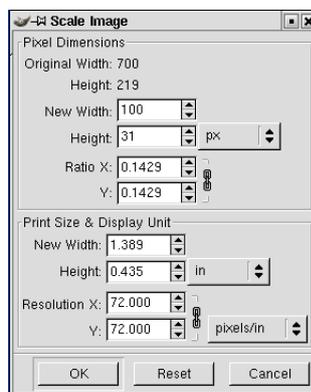
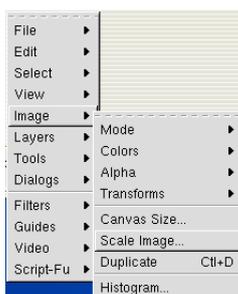
PNG format.



- Close the file, and open it again, from the "File" menu in the main window of the GIMP.
- Now, make a screen shot: Select "File → Acquire → Screen Shot" in the menu in the main window of the GIMP.



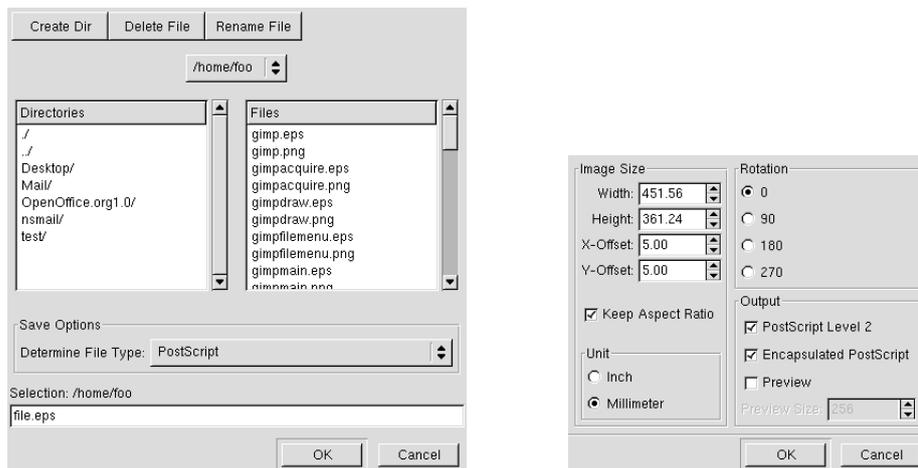
- Take a screen shot of the whole screen, or a window, or whatever you like.
- Select an area of your screen shot with the mouse, and copy it into a new surface (Right click to get menu - File → Edit → Copy , File → Edit → Paste as New).
- Resize the new image to a width of 100 pixels (File → Image → Scale Image), and save it in JPG format.



- Now save the image in EPS format. In the "Save as" dialog, select "PostScript" in the "Determine File Type" field. Make the file extension EPS. In the "Save

as PostScript” dialog that pops up next, make sure the ”Encapsulated PostScript” check box is checked.

*TIP: If PostScript is greyed, you have a layered image and will have to flatten it before it can be saved as PostScript (Layers → Flatten Image).*



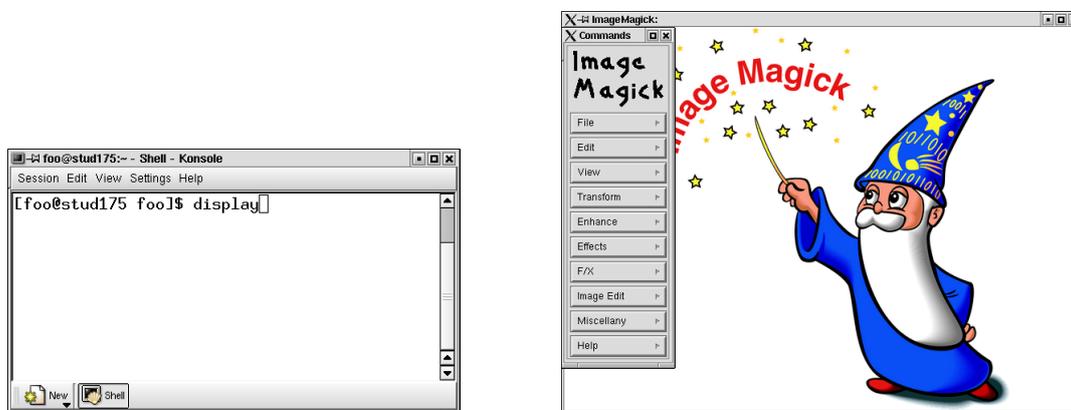
That was a brief introduction the ”The GIMP”, using some basic functions you might need making web pages or writing reports and documentation. The GIMP can do much more than that. See [1] and [2] for more info.

### 3 Image Magick (display)

”Image Magick” is smaller and simpler than ”The GIMP”. It does not have many drawing facilities, and is mainly for manipulating an existing image.

#### 3.1 Starting Image Magick

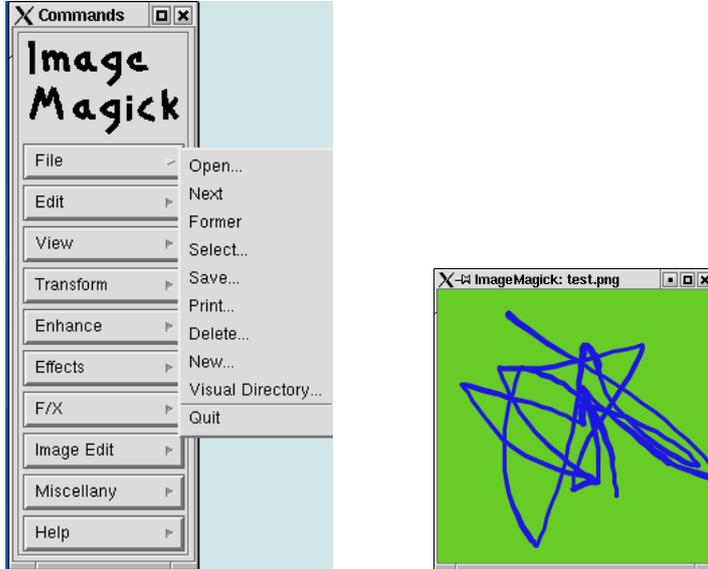
- Start it by typing ”display” at the command prompt.



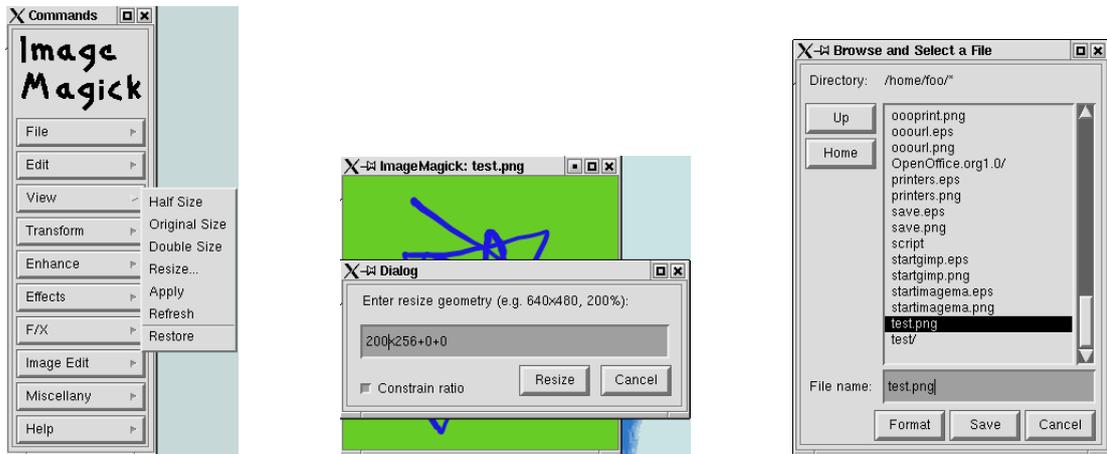
- The menu is toggled visible and invisible by left clicking on the image window. So if there is no menu, left click in the window and it will appear. When Image Magick is started with no image opened, the image window contains Image Magick’s logo, as displayed above.

## 3.2 Using Image Magick

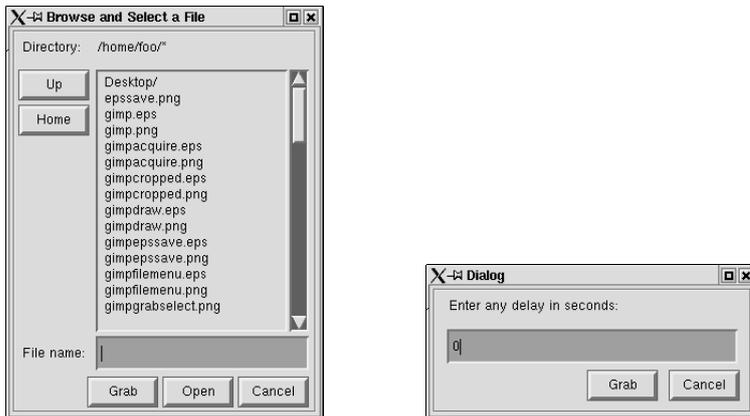
- Open one of the files you saved earlier in "The GIMP" (File → Open).



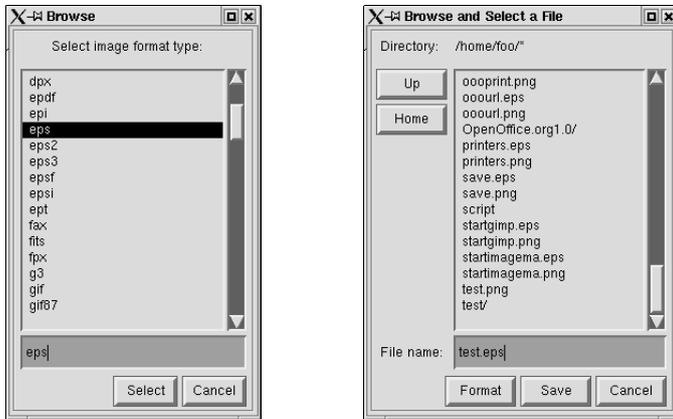
- Resize it to 200 pixels width (View → Resize), and save it as PNG format.



- Now, make a screen shot of either the whole screen or a window: File → Open → Grab



- Save in EPS format. This is either done by clicking "Format" in the "Save" dialog, selecting "eps" in the selection box. Or by simply giving the file "eps" as it's extension.



- You can make minor changes and annotations to an image in Image Magick from the "Image Edit" menu.

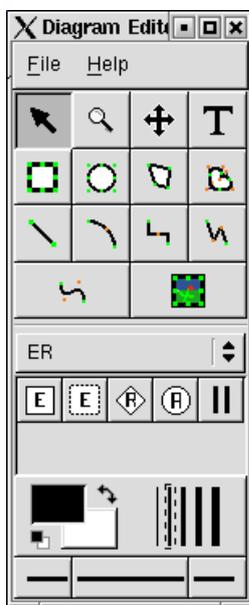
More information about Image Magick: [3]

## 4 Dia

Dia is a small and simple "Diagram Editor". As a vector based drawing program, useful for making small illustrations for reports, etc. It also includes standard symbols for different types of diagrams.

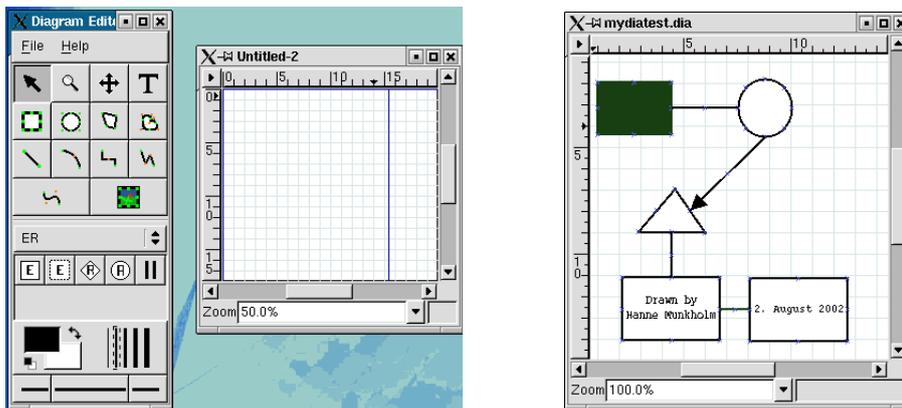
### 4.1 Starting Dia

You can start Dia from the Window Maker menu → Applications → Graphics → Dia, or you can start it from the command line with the command "dia".



## 4.2 Using Dia

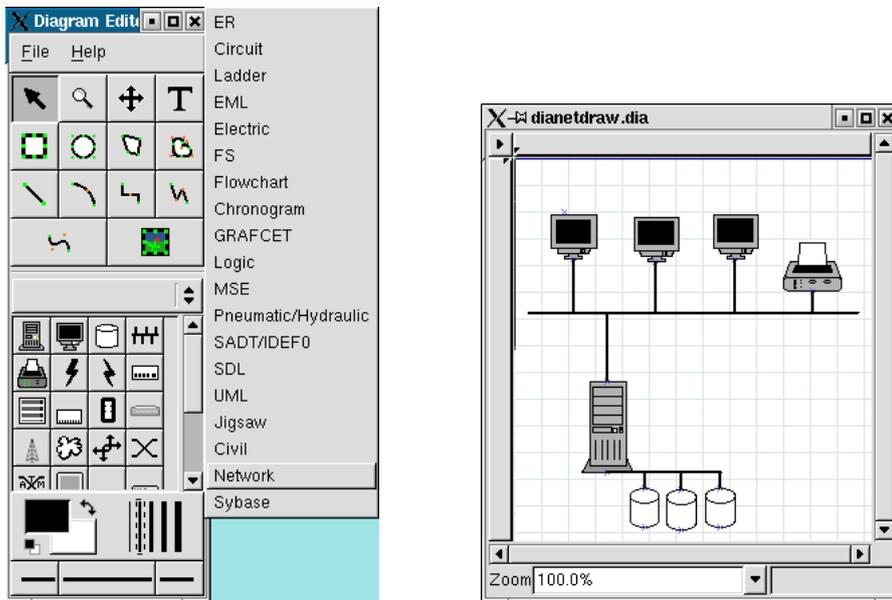
- Make an empty drawing surface (File → New Diagram). Draw some boxes, circles and polygons and connect them with lines. Also type some text. Change the fill color of one of your boxes (you can edit the properties of an object by double clicking on it).



To delete an object, select it, right click and select "Edit → Delete" in the menu.

*TIP: The connection lines are supposed to follow the object if you move it. When the line is selected, the end points are red if they are connected to the object, and green if they are not.*

- You have now used the upper tool window of Dia. Lets have a look at the lower window. Select the symbols for network diagrams, and draw a simple network.



## 4.3 Saving files in Dia

- To save a file in Dia, right click on the drawing surface and select "File → Save". The file will be saved in Dia native format. You should use the file name extension ".dia". When you save in this format, you can open the file later in Dia and edit it - all information about objects is conserved.

- To save in a different format, you must select "File → Export". You can save in EPS format, if you want to import it into a L<sup>A</sup>T<sub>E</sub>X document later. Or you can save it in PNG format if you want to use it on a web site. You can also save in Xfig format, if you want to edit the file in Xfig later.

**NB.** You can not save as GIF or JPG. If you want those formats, save as PNG and use another program (e.g. Image Magick) to convert to the desired format.

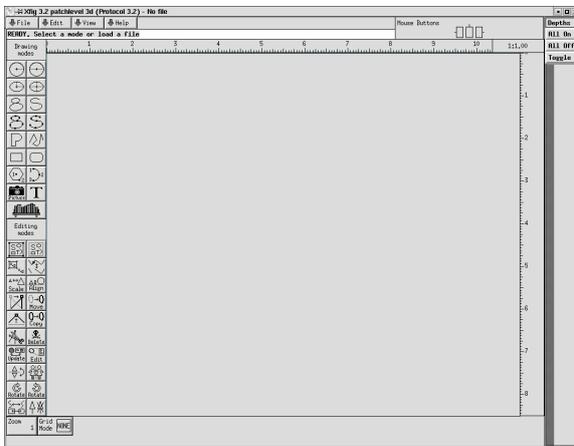
See [4] and [5] for more info.

## 5 Xfig

Xfig is a extensive and complex vector based drawing program. For most people it takes a little time to learn. This is because Xfig is an old UNIX program, and the user interface is not Windows-like. However, with a little practice Xfig becomes a very useful tool.

### 5.1 Starting Xfig

You can start Xfig from the KDE-menu → Graphics → More Graphics Applications → Xfig, from the Window Maker menu → Applications → Graphics → Xfig, or by typing "xfig" at the command prompt.

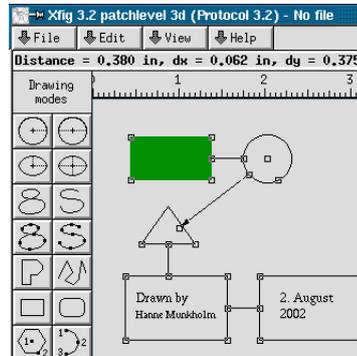
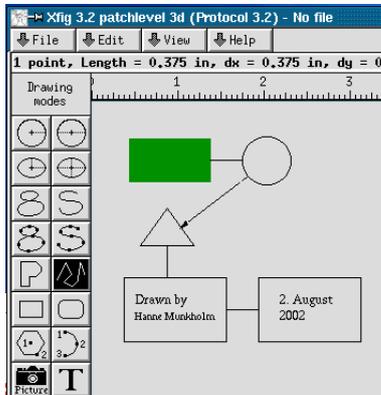


### 5.2 Using Xfig

Make a drawing like the one you made in Dia, containing boxes, circles and polygons connected with lines. Also insert some text, and change the fill color of one of your boxes.

- To make the geometric shapes, just click on the shape in the "Drawing modes" tool bar, then draw it (like in Dia).
- To draw the lines, click on the "POLYLINE drawing"  in the "Drawing modes" tool bar, then left click where you want to start the line, left click where you want it to end, and *middle click* to fix the line.

- To edit some object's properties, select "Edit"  in the "Editing Modes" tool bar, and then click on one of the little squares marking the object you want to edit.



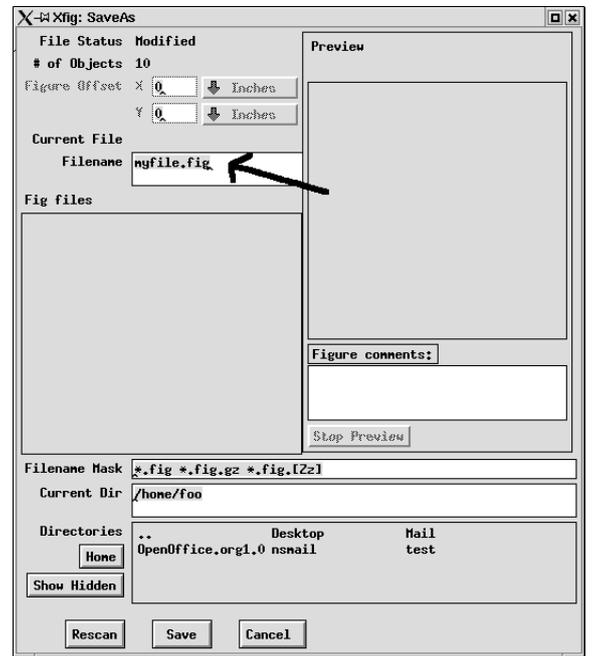
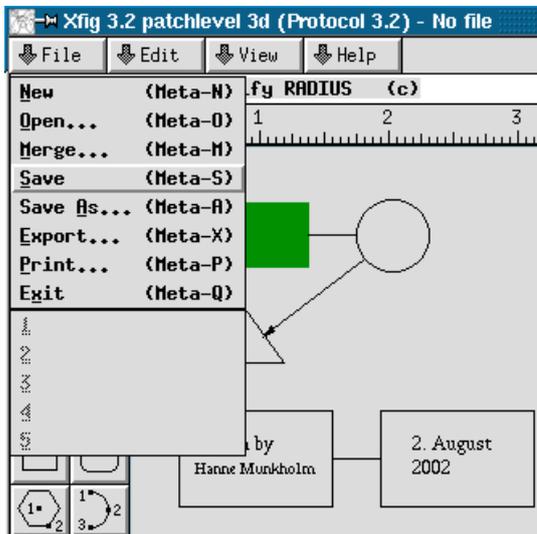
- To move an object, select "Move"  in the "Editing Modes" tool bar. Click on the little squares marking the object, and move it. Left click to fix it to the surface again.
- To copy an object, select "Copy"  in the "Editing Modes" tool bar. Click on the little squares marking the object, and move the mouse - the copy will follow your mouse. Fix it to the surface by left clicking.
- To delete an object, select "Delete"  in the "Editing Modes" tool bar. Click on the little squares marking the object you want to delete.

*TIP: If you can't move the mouse with sufficient precision when drawing, then press "ctrl+shift+numlock". Now you can move the mouse using the arrow keys on the numerical section of the keyboard. To disable this feature, press "ctrl+shift+numlock" again. This is a feature in the X Window System, and is not limited to Xfig.*

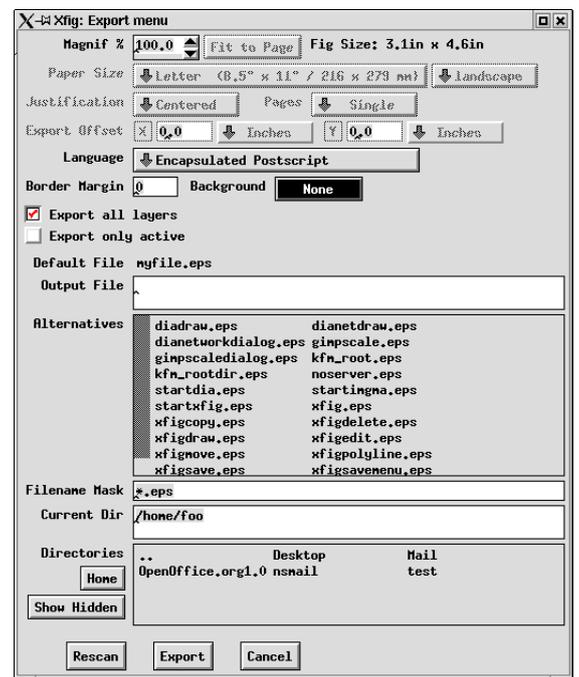
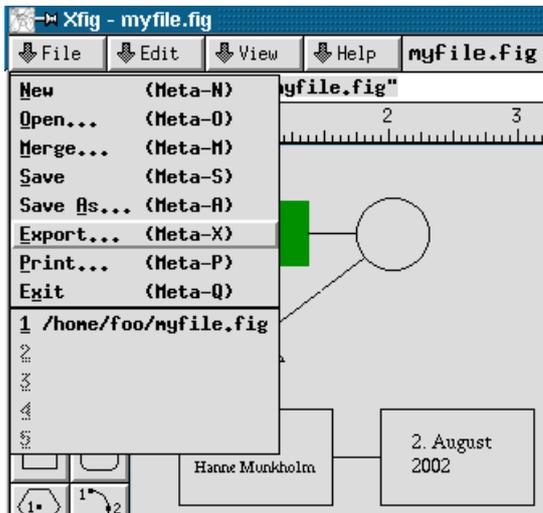
### 5.3 Saving files in Xfig

- To save a file in Xfig, select "File → Save" from the menu. Then a dialog pops up, where you can type the file name you want. Xfig's native file format is vector based, and all information about the objects are saved, so you can open the file later

and edit it.

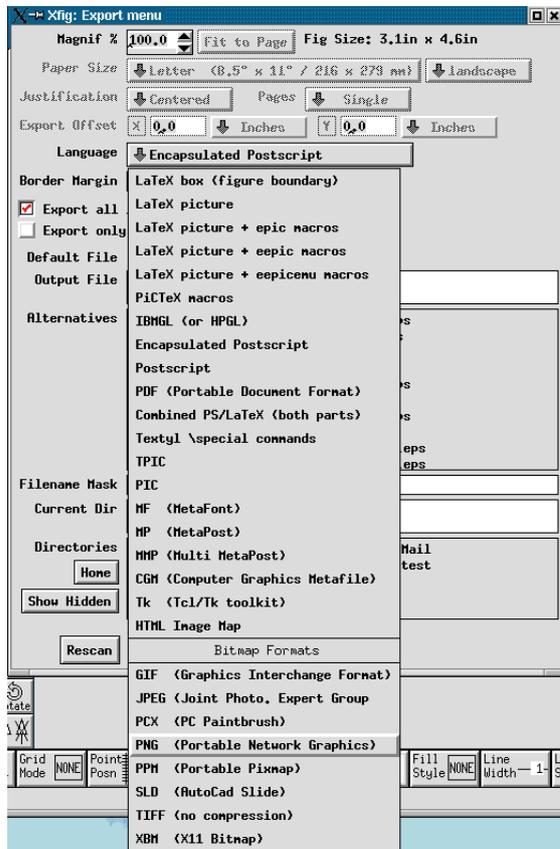


- To save in another format, select "File → Export":



The default is Encapsulated Postscript (EPS). You can also select GIF, JPEG, PNG

and other file formats.



See [6] for more info.

## References

- [1] *The GIMP Manual*. <http://wiki.gimp.org/gimp/GimpDocs>
- [2] Peter Toft m.fl. *Linux - Friheden til at vælge programmer: The GIMP*. <http://www.linuxbog.dk/applikationer/bog/billedredigering.html#gimp>
- [3] *Image Magick Manual* <http://www.imagemagick.org/www/display.html>
- [4] *Dia Tutorial* <http://www.gnome.org/projects/dia/>
- [5] Peter Toft m.fl. *Linux - Friheden til at vælge programmer: Diagrammer* <http://www.linuxbog.dk/applikationer/bog/tegnegrafik.html#diagrammer>
- [6] T. Sato and Brian V. Smith *Xfig User Manual* <http://epb.lbl.gov/xfig/>