

CSCU9N5 - Graphics Tutorial

Question 1

You've already been introduced to GIMP in previous classes. The aim here is to give you a specific task for the graphics tutorial, and a bit more experience of the features of GIMP.

Photo Editing

Open a photo. Use one of your own, find one on the web, or there are suitable photos accessible via <http://www.cs.stir.ac.uk/courses/CSCU9N5/practicals/GIMP>

- ⇒ **Crop your picture. Save the image with a suitable name.**
- ⇒ **Adjust the colour balance, brightness and contrast of your image to improve it. Save a copy of this image with a suitable name.**
- ⇒ **Open the original cropped picture, and follow the Contrast Mask tutorial to make your picture pop. <http://www.gimp.org/tutorials/ContrastMask/>**

You should notice a significant difference in what you managed with the standard dialogues. Save this as a separate file.

- ⇒ **Play around with some of the filters: B&W, sepia-toned, Van Gogh style, Cubist ...**

Filters apply various mathematical transformations to the pixels in a layer. This can take quite a long time, so do not be surprised if you have to wait to see the results.

Saving your File and Graphics File Formats

For the graphics tutorial you need to save the file in a variety of formats so they can be compared.

- ⇒ **Select File:Save and save the file in GIMP's own file format, which uses the .xcf extension.**
- ⇒ **Now, using File→Export As save the file as Bitmap (BMP), GIF, PNG and JPEG formats. Accept any default values that appear, including flattening the image. However, you can save a couple of different JPEG versions with different quality settings if you like.**
- ⇒ **Now use File→Open to open the files that you have saved.**

In the table below, under **Image Quality**, list any visible differences you can see between the images, including if you cannot see any difference at all. Exit *GIMP* and investigate the sizes of these files using Windows Explorer, recording the results below. We will talk about what you have discovered in the graphics file formats tutorial later in the course.

FILE	SIZE (kbytes)	Image Quality
GIMP (.xcf)		
Bitmap (.bmp)		
GIF (.gif)		
PNG (.png)		
JPEG (.jpg)		

Question 2

The basic Lempel-Ziv-Welch (LZW) lossless compression algorithm is specified as:

```
set w = "";
read a character c;
while (not EOF)
    if w+c exists in the dictionary
    {
        w = w+c;
    }
    else
    {
        output the code for w;
        add w+c to the dictionary;
        w = c;
    }
    read a character c;
endwhile
output code for w;
```

1. The following sequence of characters is to be compressed using LZW compression. Write down the dictionary entries added during the compression (entries 256 and above) and the final compressed sequence.

AAAAbbbAAA

2. The following sequence of data has already been compressed using LZW. What is the original sequence (of characters)?

A , z , #256 , z , #257 , #257

Question 3

Consider these images:

A. Greyscale image
(Cartoon reprinted with permission).



B. High resolution colour photograph
(reproduced here at reduced size).



C. An annotated image, where the image was originally taken with a digital camera, then annotated using a program, such as Photoshop.



For each image, which file format (or type of file format) would you recommend to use to save it? Give answers for each of the following use cases:

- Quality of the picture (as seen by human eyes)
- Smallest size of file
- Use over a network (such as on a web page)
- For sending the image to someone else for post-processing?