

## 5.2 Pictures and Graphics

### 5.2.1 Graphic Programs and Their Uses

#### Vector and Pixel Programs

What follows are modified files from the (abandoned) HTML Hypertext

We have learned how to [embed an image](#) into a file, but in many cases you must first produce the image or change what you have.

- **Producing** means either to "paint" or "draw" it with some program, or to scan a real picture to convert it to an electronic format.
- **Changing** means that your electronic image is too small, too large, too dark, too bright, ....., or that you want to include some lettering, or that you want to combine two independent images into one, or - you get the idea.
- Most student presentations and many Internet documents do not fully exploit the potential of images (they have not enough contrast and so on), use unsuitable sizes (too small, can't see a thing on the picture) or include unreadable text (especially the lettering of axis).
- This does not have to be and we will devote some time to demonstrate how to make and to optimize images.

In any case, you first must use some graphics program to generate the image that you finally will use in your document and there are two very different kinds of such programs

- **Pixel programs** simply assign a fixed number of pixels to the image size (many pixels = high resolution; few pixels = low resolution) and simply store what's inside a pixel. For black and white images this simply is the brightness of a pixel (= grey scale); for color images it is the brightness for the three primary colors (often coded in a hexadecimal code; e.g. in **HTML**).
- This is simple and straightforward, but has two major shortcomings: 1. It is hard to change anything after it was stored and 2. if you change the size of the image (but not of the pixels) you must somehow combine pixels and this leads quickly to distortions, especially for text.
- **Vector programs** store geometric figures (lines, circles, rectangles, letters, ..) together with their attributes (location, size, color, ...).
- This is not simple and straightforward, but allows to change all elements of an image at will and to change its size without loss of information. However, while well suited to graphical images ("**drawings**"); "**vector graphics**" cannot possibly encode a photography, a painting, or even a computer "painting".

So both kinds of programs are necessary to cover all aspects of images. And often the result of neither one can be directly incorporated into a Word or HTML document because they need specific file formats (ways the image is stored).

#### Some Programs

Typical **vector graphics** programs are

- The graphic program of **Word** (but forget the versions in Word 6 and older). It is stored in the **.wmf** format (Windows meta file), but you may not have direct access to this.
- **Designer**, or **Corel Draw** with **.dsf** and **.cdr** formats

Typical **pixel programs** are

- **Paint Shop Pro** or **Photo Shop**

There is a simple rule you **must** follow for everything you write not for your own amusement only, ie for publications (including your theses and so on):

- All "graphics" are **always** kept as vector files, i.e. as **.dsf** or **.cdr** and never as **TIF**, **GIF**, **JPEG**, **BMP** and so on.
- Why? Because that's what **all** (respectable) Journals demand and because it makes a lot of sense! Try to change the size of a pixel format that contains writing and you know why vectors formats are absolutely superior in this case.