Chapter 3 Notes: Image Files

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Learning Outcomes:

- Convey the difference between painting and drawing programs.
- Demonstrate an understanding of file Extensions and file types.
- Recognize the role that compression and Resolution play in file sizes.

Define Key Terms:

- **Paint Program:** Genral term for graphics software that uses pixels to create an image.
- **Drawing Program:** Genaral term for graphics software that uses mathematically defined lines to create an image.
- **Pixels:** Specific color at a specific location in a matrix or grid.
- **Gui:** Graphical user interface, makes it possible to use a device such as a mouse to interact with the computer.
- **Bandwidth:** The speed at which a computer can transfer information along a network.
- **Compression:** The process of reducing the size of an image
- **Pixel Dimension:** The number of pixels in a row and column of a raster grid.
- **Resolution:** The density of pixels in an image.
- **Resampling:** Adding or removing pixels during the process of resizing.
- **Aspect Ratio:** The ratio of the width to the height of an image.

Key Concepts:

1. Image programs can be categorized into two groups: paint programs and drawing programs.
2. Paint programs produce images using pixels. Each pixel consists of a spe-cific color. Images produced by paint programs are called raster images or bitmapped images.
3. Drawing programs use vectors or lines to produce an image. The vectors are created using a series of mathematical points. Images produced by drawing programs are called vector images.
4. Extensions for the most common raster file types are .bmp, .tif, .gif, .jpg,and .png.
5. Extensions for the file formats that are typically used for the Web are .gif, .jpg, and .png.
6. Extensions for the most common vector file formats are .svg and .eps.
7. Different file formats are appropriate for different situations.
8. JPG image file sizes are reduced using a lossy compression algorithm that removes unnecessary pixels. GIF, PNG, and TIF use a lossless compression.
9. Resolution and pixel density help determine the size of a file.
10. Resizing is best done maintaining the aspect ratio.

Distinguish between Graphic Programs:

There are two types of Graphic Programs: **drawing** and **painting**. **Paint Programs** create images by using pixels. **drawing programs** use vectors or lines to produce an image. These lines are created using a series of mathematical points that can be changes without distorting the image.

Raster-Based Paint Programs:

Paint Programs create images by assigning each pixel to a point on a grid of x and y coordinates. This grid is called a **raster.** Images that are created using this grid of pixels are called **raster images** or **bitmaps**.

Photographs use raster graphics because of the wide range of colors that are available for the pixels. However because of the nature of pixels, enlarging these raster images can cause pixelation within the image. Making raster images smaller can cause a loss of sharpness.

Note:-

Adobe Photoshop is a popular software that is used to manage raster images.

Determinig Image file formats:

A file extension is the 3 or 4 letters that follow the dot at the end of the file name. This extension indicates the file format, and which programs can open the file.

Types of file Extensions:

- **BMP:** Bitmaps, One of the earliest file types. these files are usually placed in word processing documents. Bitmap file sizes are usually quite large even though they are limited to 256 colors because they are created without any kind of compression.
- **JPG:** Joint Photographic Experts Group, These files use up to 16 million colors. JPG images reproduce the quality, color, and detail found in photographs or graphics that use blends and gradients. Most cameras save images as JPG to conserve memory space on the cameras storage. JPG in the most common nonnative raster file format in use today.
- **GIF:** Graphics Interchange Format, GIFs are compressed and only use 256 colors. The file sizes for GIFs are usually quite small. Much of the quality is lost if files are saved as GIFs. However, they are suitable for line drawings, images with transparent backgrounds, and animated figures. GIFs are commonly used in web page design.
- **TIF:** Tagged Image Format. These files work well in all enviornments. Like Bitmaps, these files are quite large. TIF files can support up to 16 million colors and are often used in print documents. Some cameras save photos as TIF aswell as the standard JPG
- **PNG:** Portable Network Graphics. PNGs are a popular choice for use on the internet. They retain 16 million colors and supports transparency. Often used to replace GIFs because they are quite small and support a large ammount of colors.
- **EPS:** Encapsulated Postscript. This is a general purpose vector file format that has both the vector image data and a screen preview in the same file. It is most commonly used for printing purposes.
- **SVG:** Scaleable Vector Graphics. This is a vector format designed for use on the web. SVG images are created using HTML code. Software such as Adobe Illustrator can be used to create an image and covert it to SVG. These files are a popular choice for mobile devices because of its small file size.

Managing Image Sizes:

There are two ways to look at image sizes. The first is the ammount of space the image takes up on disk. The other is the visual image size. Raster images that are visually large take up more space on disk than smaller ones. Vector images do not change their storage requirements based upon size.

It is important to keep file size in mind. Some websites and email services restrict the size of image files that can be uploaded. At a minimum, huge attached images can slow email delivery.

File size is a consideration when adding images to a website. The time it takes to download a graphic and display it in a browser depends on both the size of the file and thetype of internet connection. Dial up connections that require a modem and telephone recieve data over a narrow Bandwidth. Broadband connections using DSL, cable, or wireless connections are much faster because they have a larger Bandwidth.

Compression:

To reduce image file sizes, several algorithms have been written to reduce, or compress the size of an image file.

There are **Two** types of compression

- Lossless
- Lossy

Lossless compression reduces the file size without losing any pixels. Files saved as .png, .gif, and .tif use lossless compression

Lossy compression deletes or changes some pixels when saving. The .jpg file format uses lossy compression. It is important to know that each time you change a lossy image and then save it, the file is compressed again. If you save several times in this way, you will see that image has begun to degrade. If you make all your changes in a native format, and then save the last copy as a jpg, you will not encounter this problem.

Resolution, Resizing, and Resampling

Bitmaps have visual sizes measured in two ways:

- physical size.
- number of pixels in one inch.

Physical sizes are measured in pixel Dimension.

The Resolution of an image is measured in pixel density, or pixels per inch (ppi). Images with a higher ppi will produce a greater quality image. If you are sending an image using email, you will want to use a lower resolution. If you are printing an image, you will want the highest resolution possible.

Resampling