Year 9 Data Representation – Part 2 Knowledge Organiser

Bitmap graphics

Bitmap graphics made with painting packages consist of many tiny dots called pixels. It is possible to edit each individual pixel.

Since the computer has to store information about every single **pixel** (the colour for example) in the image, the file size of a **bitmap** graphic is often quite large. **Bitmap** graphics lose quality when they are resized.

Representing Bitmaps

Images are made up of pixels (Picture Elements). Each **pixel** is set to one colour. Together they look like an image. Individual **pixels** are unidentifiable.

Creating a Bitmap

Each pixel is given a binary value. Each value represents a different colour. Using one bit per **pixel** allows only 2 values, 0 and 1.
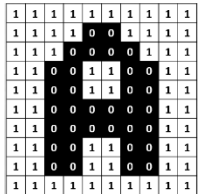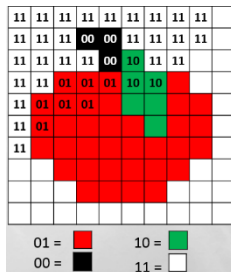
| 1 | = | White |
| 0 | = | Black |

More bits per **pixel** = more colour combinations.
- 1 bit = 2 Colours
- 2 bits = 4 Colours
- 3 bits = 8 Colours
- 4 bits = 16 Colours
How many bits per **pixel** required for 256 colours?

01 =   (red)   10 =   (green)
00 =   (black) 11 =   (white)

Graphics Package

A graphics package is an application that can be used to create and manipulate images on a computer.

Common features of graphics packages:

• Drawing straight lines and 'freehand' lines;
• Drawing regular pre-defined shapes like squares, rectangles and circles using a special 'tool';
• Building up images using **'layers'**;
• Entering text and changing the style and size of font;
• Attaching text to objects;
• Changing the size of an object, or scaling;
• Rotating objects in either clockwise or anticlockwise by specifying the direction and angle of rotation;
• Stretching objects either horizontally or vertically. 'Flipping' an object either horizontally or vertically.
• A paint palette from which different colours and patterns can be chosen.

• A fill option for colouring in a shape or area on the screen with a colour or pattern from the paint palette.
• Most graphics packages have a built-in library of clipart pictures.
• Zoom or magnify is a feature that allows an area of the screen to be seen close up for detailed work.
• Special brushes such as an airbrush can be used to achieve different paint effects on the screen.
• In most graphics these features are chosen from a toolbar or tool palette where they are displayed as icons.
• Exporting is a special way of saving a file produced using a graphics package so that it can be used in another application package (**.PNG, .JPG, .BMP**)

Vector Graphics

Vector images comprise geometric shapes. The properties of each shape are recorded:
- Shape type (e.g. Circle)
- Radius
- Centre point **(x,y)**
- Fill Colour
- Line Colour
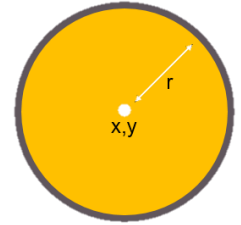
Vector graphics consist of shapes called objects. You can edit each object separately to change the shape, colour, size, and position.

Recording the properties of vector shapes does not take up much memory. This usually makes the file size of a **vector** graphic very small

Vector graphics are scalable – you can change their size without any loss of quality.
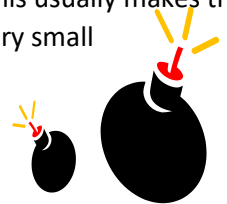
	Bitmap graphics	Vector graphics
Made up of	Coloured pixels	Objects
File size	Large	Small
Resizing	Lose quality	No loss of quality
Appearance	Real	Cartoon-like
File formats	.bmp .jpg .gif	.svg .wmf

Bitmap or Vector image?
- Will the image need to be resized?
- Will the image need to be drawn to scale?
- Will the image need to be realistic?
- Are there any restrictions on file size?