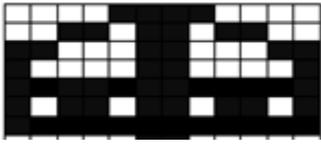


# GRAPHICS REVISION SHEET

**BIT-MAPPED (BMP):** Grid of pixels, with each represented by at least one bit. (See bit depth). Can be edited at pixel level and looks pixelated when re-sized.



0	0	0	0	1	1	1	1	0	0	0	0
0	0	1	1	0	1	1	0	1	1	0	0
1	1	0	0	0	1	1	0	0	0	1	1
1	0	0	0	0	1	1	0	0	0	0	1
1	1	1	1	1	1	1	1	1	1	1	1
1	0	1	1	0	1	1	0	1	1	0	1
1	1	1	1	1	1	1	1	1	1	1	1

**VECTOR:** Stored as objects with attributes. Cannot be edited at pixel level, only object level. Resolution independent so still retain sharpness when re-sized.

<rect:length=100:width=50:line=2:fill=rgb(0F0F0F)>

<sq:length=100:line=5:fill=rgb(00FF00)>

## GRAPHICS FILE FORMATS:

**PNG** – Portable Network Graphics:uses lossless compression supports transparent backgrounds.

**JPEG** – Joint Photographic Experts Group:uses lossy compression, commonly used for photos on Internet.

**GIF** – Graphics Interchange Format: uses lossless compression, commonly used for animations.

## STORING GRAPHICS:

Like all data (text,numbers,video,sound), graphics are stored as **binary digits (BITS)**. In bitmapped graphics, each pixel is stored as bits while the attributes in vector graphics are stored as bits. Graphics files are normally compressed to make them smaller. Two types - **LOSSY** and **LOSSLESS**.

## STORAGE CAPACITY:

Described as bits, bytes, KB, etc..

1 bit	0 or 1	
8 bits	1 byte	<b>1 GB = 1024 x</b>
1024 bytes	1 KB (kilobyte)	x 1024
1024 KB	1 MB (megabyte)	x 1024
1024 MB	1 GB (gigabyte)	x 8
1024 GB	1 TB (terabyte)	<b>8,589,934,592 bits!</b>
1024 TB	1 PB (petabyte)	

## CALCULATING STORAGE REQUIREMENTS: GRAPHICS

Bit-mapped shown at top of page has 12 x 7 pixels. Since it is black and white, its bit depth is 1. It needs 12 x 7 x 1 bits OR 84 bits OR 10.5 bytes

The following photograph has been saved as a True colour (24 bits) graphic:

(500 x 500 pixels)

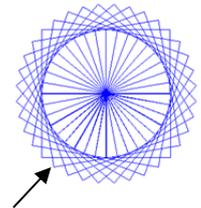


500 x 500 = 250,000 pixels  
 250,000 x 24 = 6,000,000 bits  
 6,000,000 / 8 = 750,000 bytes  
 750,000 / 1024 = 732.43 KB

## SCRATCH Graphics



Two events happening: creation of a square & creation of a triangle, both with sides of 100 units and positioned 150 units apart.



How was this shape created?

**Resolution** determines the sharpness of an image. The higher the resolution, the sharper, more detailed the image. Measured in **DPI** (dots per inch).

**Bit depth** determines the number of colours a graphic can contain. The higher the bit depth, the more colours:

<b>Bit depth</b>	1	4	8	24
<b>Colours</b>	2	16	256	16,777,216

**FPS** - frames per second: used to determine speed of animation. Low fps gives 'slow motion' effect in animation.

## CALCULATING STORAGE REQUIREMENTS:

**ANIMATIONS** – worked out in the same way as graphics.

However, the fps and duration need to be considered. eg 20 second grayscale(8 bits) animation with 16fps. Each frame is 200x200 pixels.

200x200pixels x 8bits x 16fps x 20seconds =102,400,000bits  
 102,400,000 / 8 = 12,800,000 bytes  
 12,800,000 / 1024 = 12,500 KB  
 12,500 / 1024 = 12.21 MB

**STORING NUMBERS:** stored as patterns of BITS

**Integers:** the number **254** would be stored as

1 1 1 1 1 1 0 → 128 + 64 + 32 + 16 + 8 + 4 + 2

**Real Numbers:** the number 314.233 would be stored as

**Mantissa** → .314233 (in binary) 0.314233 x 10<sup>3</sup>

**Exponent** → 3 (in binary) = 314.233

**STORING TEXT:** stored as patterns of BITS.

**ASCII** – American Standard Code for Information Interchange. Each keyboard character is represented as a unique pattern of 8 bits. Up to 256 different characters can be represented (2<sup>8</sup>)

**UNICODE** – global method using 16 bits. Up to 65,536 different characters can be represented (2<sup>16</sup>) so all worlds languages can be incorporated.