

2. Multimedia

1.2 Multimedia

Graphics

Candidates should be able to:

Show understanding of how data for a bitmapped image are encoded

Perform calculations to estimate the file size for a bitmap image

Show understanding of the effects of changing elements of a bitmap image on the image quality and file size

Show understanding of how data for a vector graphic are encoded

Justify the use of a bitmap image or a vector graphic for a given task

Notes and guidance

Use and understand the terms: *pixel*, *file header*, *image resolution*, *screen resolution*, *colour depth*, *bit depth*

Use the terms: *image resolution*, *colour depth*

Use the terms: *drawing object*, *property*, *drawing list*

Sound

Candidates should be able to:

Show understanding of how sound is represented and encoded

Show understanding of the impact of changing the *sampling rate and resolution*

Notes and guidance

Use the terms: *sampling*, *sampling rate*, *sampling resolution*, *analogue and digital data*

Impact on *file size and accuracy*

Graphics

	Bitmap	Vector graphic
Definitions	<ul style="list-style-type: none">· Made up of pixels (picture elements)· Stored in a two-dimensional matrix of pixels· Each pixel has a colour· Stored as binary number· The number of bits used to represent a pixel is called colour depth	<ul style="list-style-type: none">· A series of geometric shapes· Drawing object· Exact dimension is not storedStored coordinates· Contains a drawing list· Commands/formulae for creating each individual object· Property for that object Eg: colour, thickness
Properties	<ul style="list-style-type: none">· Takes up more memory· Enlarging the bitmap can mean that the image is pixelated	<ul style="list-style-type: none">· Made up of geometric shapes which require definition/attributes· Stores a set of instructions

	Bitmap	Vector graphic
	<ul style="list-style-type: none"> · Can be compressed with significant reduction in file size · Suitable for photographs/scanned image · Uses less processing power · Individual elements of a bitmap cannot be grouped · It is possible to change/edit each pixel to change the design 	about how to draw the shape <ul style="list-style-type: none"> · Takes up less memory · Vector graphic image can be enlarged without being pixelated · Do not compress well · Suitable for geometric shape · Individual elements of a vector graphic can be grouped · Vector graphics need to be 'rasterised' in order to display or print. · Image is redrawn with small adjustment · It is necessary to change each of the geometric shape to alter the design
Available formats	.jpeg , .bmp , .png	.svg , .cgm , .odg
		Defined in XML text files which, therefore, allows them to be compressed.

Pixel: smallest picture element which can be drawn

Screen resolution: the number of pixels which can be view horizontally and vertically

Image resolution: the number of pixels that make up an image

Resolution: the number of pixels per column and per row

Pixel density: number of pixels per square centimetre.

Sound

Sampling analogue sound:

- Amplitude measured
- At regular time interval
- The value of sample is recorded as binary number.

Increasing sampling resolution:

- More bits used to represent one sample
- Larger file size
 - Takes longer to transmit/download the file
 - Requires greater processing power
- More accurate representation of sound
 - Less sound distortion
 - Larger dynamic range
 - Better sound quality

Decrease sample rate:

- Fewer samples per unit time
- File size will reduce
- Larger gaps/ space between samples // greater quantization errors
- Sound accuracy will reduce.

Sampling:

- amplitude of sound wave taken at different points in time.
- Measurement the value of the analogue signal at regular time interval.

Sampling rate:

- Number of time that the amplitude of (analogue) sound wave is taken
- Per unit time
- Higher sampling rate results in more accurate digital representation.

Sampling resolution:

- Resolution is the number of distinct value able to encode/represent each sample
- Specified the number of bits used to store each sample
- Also called bit depth
- The higher the sampling resolution, the lower the quantization error
- The higher the sampling, the less sound distortion.
- Usually 8 bits, 16 bits, 24 bits or 32 bits.
- **Benefits:**

- Allows for larger dynamic ranges
- More accurate representation/ sound quality
- **Drawbacks:**
 - Bigger files / larger memory
 - Takes longer to transmit/download
 - Greater processing power needed

Sound editing software:

- Edit start time, stop time and duration of any sound/time
- Extract/delete/save part of a clip
- Frequency, amplitude, pitch alteration
- Conversion between different audio file formats
- Use of filters
- Mix/merge multiple sound sources

Sound edit:

- Fading
 - Change a volume of a section of sound for it to get louder.
- Removing sound element
 - Delete sections of the sound wave.
- Copy
 - Repeat elements of the sound wave.

Sound:

- Analogue value
- Use ADC (analogue digital converter)
- To convert to digital value