

# ASCII and Unicode 1

ASCII and UNICODE are two character coding schemes.

From the statements below that relate to either ASCII or UNICODE, select the **three** statements that are correct.

- ☐ The first 128 codes in ASCII and Unicode are used to represent the same characters.
- ☐ ASCII is able to represent characters from languages other than English.
- ☐ Extended ASCII uses 8 bits to represent each character.
- ☐ Unicode can be used to represent up to 256 different characters.
- ☐ The Unicode character set typically uses 16 bits per character.



# ASCII character code 3

The **ASCII character codes** for the lower case letters of the alphabet run in a sequence. Codes are always stored in binary but can be displayed in denary or binary (or even in hex).

The **denary code** for the letter "a" is 97. The **binary code** (8-bit ASCII code) for the letter "p" is 01110000.

Using this information, work out the **binary code** (8-bit ASCII code) for the letter "n".

Type your answer with **no spaces** between the binary digits.

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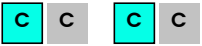
# Bitmap characteristics 3

A bitmapped graphic is stored as an array (grid) of pixels. From the following list of options, select all that correctly describe a pixel.

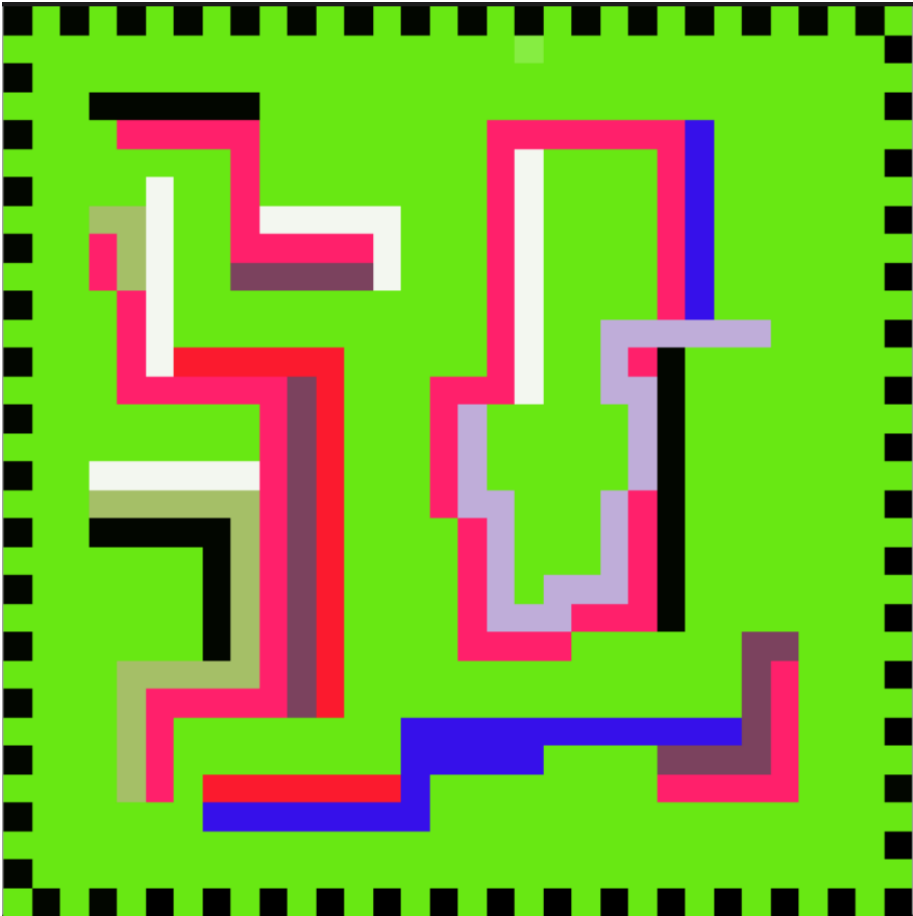
- ☐ A pixel can be resized without losing definition.
- ☐ The value of each pixel is stored as a binary number.
- ☐ A pixel can be made up of more than one colour.
- ☐ A pixel is the smallest element of a bitmapped graphic.

# Calculate image file size 5

GCSE A Level



Naga has made an icon for a maze solving game she has created. The icon has been created as a bitmapped graphic. It is 32 pixels wide and 32 pixels high and uses 9 different colours.



Naga's icon

**Part A    How many pixels?**



How many pixels does the image have in total?



## Part B Colour depth



To represent 9 different colours, what is the minimum colour depth needed? Give your answer in **bits**.

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## Part C File size in bits



What is the total file size (excluding any metadata)? Give your answer in **bits**.

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## Part D File size in bytes



What is the total file size (excluding any metadata) in **bytes**?

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# Calculate colour depth 2

A bitmapped graphic uses a colour depth of 3-bits and this allows for 8 different colours. If the number of different colours that need to be represented increases to 30, what is the minimum new colour depth required?

Enter the minimum colour depth for a bitmapped image with 30 colours.

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# Sampling a sound

Shannon recorded a sound wave by sampling it. Which of the following characteristics of sound is being measured when a sound wave is sampled?

- ☐ Frequency
- ☐ Hertz
- ☐ Bit rate
- ☐ Amplitude

# Sound: Calculate file size 7

A Level



A podcast lasts 40 minutes and is sampled using an 8-bit sample resolution and a sampling rate of 10,000Hz.

Calculate the storage space required for each podcast. Give your answer in megabytes (MB). 1 kilobyte (kB) is 1000 bytes.



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# Sound: sample resolution 1



Brian has recorded his speech for the family's New Year celebration using his phone. The below table shows the representation of three samples of Brian's recording. What sample resolution has been used? Give your answer in bits.

0000 0101 0111 1001
0000 0101 0111 1111
0000 0101 0111 1001

If the sampling rate is set to 16kHz, what is the storage space required for 5 minutes of audio? Give your answer in MBs. Assume 1kB is 1000 bytes.



# Sound: sample resolution 3

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Which one of these is made possible by increasing the sample resolution?

- ☐ Lower pitch sounds can be represented
  - ☐ More audio channels can be represented
  - ☐ Longer audio samples can be represented
  - ☐ More levels of amplitude can be represented
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# Sound: Nyquist 1

A Level



Andriana wants to capture the sound of birds singing. She knows that the frequency range of many bird songs vary between 1000Hz and 8000Hz. According to Nyquist theorem. What is the minimum sampling rate that she needs to use in order to produce accurate digital recordings? Give your answer in kHz (1kHz is 1000Hz).

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