# End of Unit Quiz – Unit 2.6 Data representation

1. What is meant by a bit?

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1. What is the highest value that can be represented by a nibble?

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1. How many bits are there in a byte?

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1. How many bytes do 12bits make?

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1. How many megabytes are there in 3 gigabytes?

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1. Convert the following 8-bit binary values into their denary (base 10) equivalent. You must show your working out.
	1. 00110111

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| --- |
|  |

* 1. 10101111

|  |
| --- |
|  |

* 1. 11010110

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1. Convert the following denary (base 10) values into their 8-bit binary equivalent. You **must** show your working out.
	1. 31

|  |
| --- |
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* 1. 104

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* 1. 210

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* 1. Add the following two 8-bit binary values.



* 1. Add the following two 8-bit binary values.



* 1. An overflow error can occur when adding two 8-bit binary values. What is meant by an overflow error?

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* 1. A logical shift instruction moves each bit in the binary value left or right. What is the new value of **00101100** when a logic shift right by two is performed?

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**bi**. What is the new value of **00011100** when a logic shift left by three is performed?

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**bii**. Convert the new binary value into its denary (base-10) equivalent.

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* 1. The number 84 could be represented as either a denary value or a hexadecimal value.If 84 is represented as a hexadecimal, calculate its denary value.

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* 1. If 84 is represented as a denary, calculate its hexadecimal value.

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* 1. Why do people use hexadecimal values to represent numbers stored in computers?

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* 1. Convert the following binary values into hexadecimal representation.
		1. 00111100

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|  |

* + 1. 10100101

|  |
| --- |
|  |

* + 1. 11101111

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| --- |
|  |

* 1. Convert the following hexadecimal values into binary representation.
		1. 98

|  |
| --- |
|  |

* + 1. E7

|  |
| --- |
|  |

* + 1. BE

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|  |

1. Why is a check digit used?

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1. What is meant by the term **character set**?

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1. What does ASCII stand for?

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1. Why would Extended ASCII be used?

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1. What is meant by Unicode?

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1. What is meant by a Pixel?

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1. How many colours can be represented in an image with 8 bits? You **must** show your working out.

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1. Why is metadata included in a file?

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1. How does the resolution of an image affect the size of the file?

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1. Sampling intervals and other factors affect the size of a sound file and the quality of its playback. What is meant by a bit rate?

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1. How can sound be sampled and stored in digital form?

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* 1. Compression is often used to reduce the size of files before sending them electronically. What is **one** advantage for compressing files in this way?

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* 1. What is meant by lossy compression?

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* 1. What is meant by loseless compression?

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**Answers**

1. What is meant by a bit?

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| The smallest representation of data consisting of either a 1 or 0**.** A single binary digit. |

1. What is the highest value that can be represented by a nibble?

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| --- |
| 15 |

1. How many bits are there in a byte?

|  |
| --- |
| 8 bits. |

1. How many bytes do 12bits make?

|  |
| --- |
| 12,288bytesor12 000bytes is acceptable. |

1. How many megabytes are there in 3 gigabytes?

|  |
| --- |
| 3072Megabytesor 3000Mb is acceptable. |

1. Convert the following 8-bit binary values into their denary (base 10) equivalent. You must show your working out.
	1. 00110111

|  |
| --- |
| 55 |

* 1. 10101111

|  |
| --- |
| 175 |

* 1. 11010110

|  |
| --- |
| 214 |

1. Convert the following denary (base 10) values into their 8-bit binary equivalent. You **must** show your working out.
	1. 31

|  |
| --- |
| 00011111 |

* 1. 104

|  |
| --- |
| 01101000 |

* 1. 210

|  |
| --- |
| 11010010 |

* 1. Add the following two 8-bit binary values.



11000011

* 1. Add the following two 8-bit binary values.



1 01101011

reward correct carry over bit, 01101011; reward correct 8 bits

* 1. An overflow error can occur when adding two 8-bit binary values. What is meant by an overflow error?

|  |
| --- |
| There is an extra carry/bitThe result exceeds 8 bitsThe result is more than 255/11111111 |

1. A logical shift instruction moves each bit in the binary value left or right. What is the new value of **00101100** when a logic shift right by two is performed?

|  |
| --- |
| 00001011 |

**bi**. What is the new value of **00011100** when a logic shift left by three is performed?

|  |
| --- |
| 11100000 |

**bii**. Convert the new binary value into its denary (base-10) equivalent.

|  |
| --- |
| 224 |

* 1. The number 84 could be represented as either a denary value or a hexadecimal value.If 84 is represented as a hexadecimal, calculate its denary value.

|  |
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| 132reward for showing working out i.e. 1000 0100/128 + 4 = 132. |

* 1. If 84 is represented as a denary, calculate its hexadecimal value.

|  |
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| 54reward showing working out i.e. 64+16+4 = 84 = 0101 0100. |

* 1. Why do people use hexadecimal values to represent numbers stored in computers?

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| Hexadecimal values are shorter than binary**.** Hexadecimal values are easier to work with than binary**.** Hexadecimal values are easily converted**.** Hexadecimal values are less susceptible to errors. |

* 1. Convert the following binary values into hexadecimal representation.
		1. 00111100

|  |
| --- |
| 3C |

* + 1. 10100101

|  |
| --- |
| A5 |

* + 1. 11101111

|  |
| --- |
| EF |

* 1. Convert the following hexadecimal values into binary representation.
		1. 98

|  |
| --- |
| 10011000 |

* + 1. E7

|  |
| --- |
| 11100111 |

* + 1. BE

|  |
| --- |
| 10111110 |

1. Why is a check digit used?

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| Used to ensure a range of numbers have been entered correctly.Detects errors on identification numbers. |

1. What is meant by the term **character set**?

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| The agreed set of code/bits to represent the computers’ main characters.Characters available to a computer. |

1. What does ASCII stand for?

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| --- |
| American Standard Code for Information Interchange. 7-bit character system used to code the character set the computer uses**.** A system that uses code to represent characters, symbols and numbers. |

1. Why would Extended ASCII be used?

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| --- |
| To use an additional 128 symbols**.** To use other special characters found in different languages. |

1. What is meant by Unicode?

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| --- |
| Up to 32 bits (4 bytes) used to encode set characters. |

1. What is meant by a Pixel?

|  |
| --- |
| Smallest element that makes up an imageA picture/image element. |

1. How many colours can be represented in an image with 8 bits? You **must** show your working out.

|  |
| --- |
| 256. |

1. Why is metadata included in a file?

|  |
| --- |
| A computer needs to know the size of the image in terms of height, width and colour depth in bits per pixel (bpp)…this allows the computer to recreate the image from binary. |

1. How does the resolution of an image affect the size of the file?

|  |
| --- |
| The resolution of an image is the number of pixels per unit (pixels per inch). The more pixels per inch the larger the file size. |

1. Sampling intervals and other factors affect the size of a sound file and the quality of its playback. What is meant by a bit rate?

|  |
| --- |
| The rate at which bits are transferred from one location to another.Number of bits that can be transferred per second. Number of bits processed over a certain amount of time. |

1. How can sound be sampled and stored in digital form?

|  |
| --- |
| Sound is continuously changing values (in analogue).Sound waves are sampled at set intervals. Set values are saved and replayed.The sample rate affects the quality of the sound/ a high sample rate (or sampling sound at shorter intervals) improves the quality of the sound. |

* 1. Compression is often used to reduce the size of files before sending them electronically. What is **one** advantage for compressing files in this way?

|  |
| --- |
| Reduce download size.Reduce download time when transferring a file**.** Reduce storage requirement. |

* 1. What is meant by lossy compression?

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| Removing data from a file (commonly images and sound) to reduce its size.Data is lost when file is uncompressed which means that the image cannot be restored to its original condition. |

* 1. What is meant by loseless compression?

|  |
| --- |
| Compressing a file without losing any information.No bits are lost after the image has been restored. All data is restored after file has been uncompressed. |

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