

1. The memory of a computer contains data and instructions in binary.

The following instruction is stored in a location of the memory.

0	0	1	0	1	0	0	1	1	1	1	1	1	1	0	0
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- (a) Convert the instruction into hexadecimal.

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- (b) Explain why a programmer might prefer to read the instruction in hexadecimal rather than in binary.

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- (c) Give two other uses of hexadecimal.

Use 1 \_\_\_\_\_

Use 2 \_\_\_\_\_

(2017-may-11-01)

2. Jane answers an examination question about computers and data correctly.

Six different words or numbers have been removed from her answer.

Complete the sentences in Jane's answer, using the list given. Not all items in the list need to be used.

- 2
- 10
- 16
- analogue
- binary
- denary
- digital
- hexadecimal

As humans, we process ..... data, but a computer cannot process this type of data. For a computer to be able to process data it needs to be converted to ..... data.

As humans, we mostly use a ..... number system;  
this is a base ..... number system.

Computers use a ..... number system;  
this is a base ..... number system.

(2018-may-11-01)

3. Dheeraj identifies three hexadecimal numbers.

Write the denary number for each of the three hexadecimal numbers:

2A \_\_\_\_\_  
101 \_\_\_\_\_  
21E \_\_\_\_\_

Working Space

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(2018-may-11-02)

4. (a) Convert the denary number 107 to binary.

(b) Represent the denary number 300 as it would be stored in a 12-bit binary register.

- (c) Convert the denary number 179 to hexadecimal.

(2018-may-13-05)

5. (a) Six binary or hexadecimal numbers and six denary conversions are given.

Draw a line to connect each binary or hexadecimal number to the correct denary conversion.

Binary or hexadecimal	Denary
01001011	75
4E	78
11011010	157
10011101	167
A7	25
19	218

- (b) Hexadecimal is often used by computer programmers to represent binary values.

Explain why computer programmers may choose to use hexadecimal.

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(2018-oct-11-02)

6. The MAC address of a device is represented using hexadecimal.

A section of a MAC address is shown. Each pair of hexadecimal digits is stored using 8-bit binary.

(a) Complete the table to show the 8-bit binary equivalents for the section of MAC address. The first number has already been converted.

6A	FF	08	93
01101010			

(b) Explain why data is stored as binary in computers.

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(2018-oct-13-04)

7. Different units of data can be used to represent the size of a file, as it changes in size. Fill in the missing units of data, using the list given:

- byte
- gigabyte (GB)
- megabyte (MB)
- nibble

The units of data increase in size from smallest to largest.

Smallest



Largest

Bit

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kilobyte(kB)

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terabyte(TB)

(2018-may-12-01)

8. Miriam needs to use a large high-resolution photo as a thumbnail image on a website.

She will use lossy compression to reduce the file size of the photo to create the thumbnail image.

(a) State why a smaller file size is appropriate for this situation.

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(b) Explain how lossy compression reduces the file size.

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(2018-feb-12-11)

9. Computers use a character set to convert text into binary

One character set that can be used is ASCII.

Each letter in ASCII can also be represented as a denary value.

(a) The word BUS has the denary values:

B	U	S
66	85	83

Convert the denary values into 8-bit binary.

66

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85

--	--	--	--	--	--	--	--

83

--	--	--	--	--	--	--	--

(b) Each letter in ASCII can also be represented as a hexadecimal value.

The word KEY has the 8-bit binary values:

K	E	Y
01001011	01000101	01011001

(i) Convert the three 8-bit binary values into hexadecimal

01001011\_\_\_\_\_

01000101\_\_\_\_\_

01011001\_\_\_\_\_

(ii) Give three other uses of hexadecimal notation in computer science.

1\_\_\_\_\_

2\_\_\_\_\_

3\_\_\_\_\_

(iii) State two benefits of using hexadecimal notation to represent binary values.

Benefit 1\_\_\_\_\_

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Benefit 2 \_\_\_\_\_

(2018-oct-12-01)

10. (a) Gurdeep wants to send a large file to Jennifer over the Internet.

State two benefits of compressing the file to send it.

Benefit 1 \_\_\_\_\_

\_\_\_\_\_

Benefit 2 \_\_\_\_\_

\_\_\_\_\_

(b) Two types of compression are lossy and lossless.

Choose the most suitable type of compression for the following and explain your choice.

(i) Downloading the code for a computer program:

Type of compression \_\_\_\_\_

Explanation \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

(ii) Streaming a video file:

Type of compression \_\_\_\_\_

Explanation \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

(2017-may-11-13)

11. (a) Computer files can be saved in different file formats.

Four file formats and four file types are given.

Draw a line to match each file format to the most suitable file type.

File format	File type
.jpeg	Text file
.mp3	Image file
.mp4	Audio file
.txt	Video file

- (b) Jamelia wants to store an image file. The image has an 8-bit resolution and is 150 pixels by 100 pixels

in size.

Calculate the file size of the image. Give your answer in kilobytes (kB). Show all of your working.

File Size\_\_\_\_\_kiB

(c) Large files can be compressed to reduce their file size.

Two types of compression that can be used are lossy and lossless.

Explain how a file is compressed using lossless compression.

(d) The table contains four different file formats that use compression.

Tick (✓) to show whether each file format uses lossy or lossless compression.

File format	Lossy (✓)	Lossless (✓)
.jpeg		
.mp3		
.mp4		
.zip		