Unit 1.1 Number Systems

1 Programmers can use denary and hexadecimal values. These values are stored in a computer system using binary.

Explain why binary is used to store data in a computer system. [2]

(a) ....

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(b) Complete the table to show how the denary value would be stored as binary in an 8-bit register.

Denary value	8-bit register
129	
56	

[2]

Working space

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(c) Complete the table to show how the hexadecimal value **3A9** would be stored as binary in a 12-bit register.

[3]

(d) Identify **two** uses of hexadecimal values in computer science.

1 ....

2 ....[2]

2. A hockey club records the number of people that watch each match. An 8-bit binary register is used to store this value.

(a) 46 people watch the first match and 171 people watch the second match.

Show how the registers would store these denary values as 8-bit binary.

Denary value	8-bit binary							
46								
171								

[2]

Working space

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(b) Give the largest denary value that can be stored in the 8-bit binary register.

....[1]

(c) The hockey club wants to increase the number of people that can watch each match to 2000. The 8-bit binary register may no longer be able to store the value.

Give the smallest number of bits that can be used to store the denary value 2000.

.... [1]

Working space

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3. All data needs to be converted to binary data so that it can be processed by a computer.

(a) Explain why a computer can only process binary data.

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.... [2]

(b) The denary values 64, 101 and 242 are converted to 8-bit binary values.
Give the 8-bit binary value for each denary value.

64..

101...

242..[3]

Working space

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(c) The hexadecimal values 42 and CE are converted to binary. Give the binary value for each hexadecimal value.

42 ....

CE...

Working space

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....[4]

4. A computer stores data in binary form. Binary numbers can be represented as hexadecimal and denary numbers.

(a) Convert the 8-bit binary number 01010101 to denary.

....[1]

Working space

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(b) Convert the binary number 11000000 to hexadecimal.

....[1]

Working space

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(c) Convert the hexadecimal number 1A to denary.

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Working space

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....[1]

(d) Binary numbers can be stored as bytes.

State how many bits are in **two** bytes.

....[1]

5. Pradeep is reading hexadecimal values for a project he is working on.

(a) The first three hexadecimal values he reads are 15, 102 and A9.
Give the denary values for the three hexadecimal values.

15

....

102

....

A9

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Working space

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....[3]

(b) Pradeep has two 8-bit binary values that he needs to convert to hexadecimal values for his project.
Give the **hexadecimal** values for the two 8-bit binary values. [4]

01010000..

00111101 ....

6. Benedict has a computer that is assigned an Internet Protocol (IP) address.
The IP address is: 198.167.214.0
The IP address is represented as denary values.

(a) Convert the denary values 167 and 214 from the IP address to 8-bit binary.

167 | | | | | | | | |
|---|---|---|---|---|---|---|---|

214 | | | | | | | | |
|---|---|---|---|---|---|---|---|

Working space

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....[2]