Binary Numbers and Addition Homework

You should refer to the **homework policy** for details on how this homework should be submitted.

Attempt all questions

Question 1

Write down the **largest** binary number that can be held in **8-bits**. Work out what the denary equivalent is.

11111111 = 255

(**2 marks**)

Question 2

How many bits make:

- one **byte** (**1 mark**) 8
- one **kilobyte** (**1 mark**) 8192
- one **megabyte** (**1 mark**) 8388608 *

(**3 marks**)

Question 3

What are the possible values that **one bit** can take?

Units

(**1 mark**)

Question 4

Convert the **denary** numbers **37** and **84** into binary. Be sure to **show your working**.

32 goes into 37, leaving 5. 4 + 1 = 5 + 32 + 37. 100101 64 goes into 84, leaving 20. 16 + 4 = 20 + 64 = 84. 1010100

(**4 marks**)

Question 5

Add the **binary** numbers generated in the previous question together. Be sure to **show your working**.

100101 + 1010100 1 + 4 + 32 = 37 4 + 16 + 64 = 84 84 + 37 = 121 64 goes into 121, leaving 57. 32 goes into 57, leaving 25. 16 + 8 + 1 = 25. 1111001

(**2 marks**)

Question 6

Explain what is meant by **overflow error**. Provide an example to help with your explanation.

An overflow error is when a denary number is more than 255, and cannot be reached using just 8 bits. Therefore a ninth bit must be used to represent 256. For example, the denary number 308 converts into the binary number 100110100.

(**3 marks**)

Question 7

Convert the decimal numbers 8 and 13 into binary. Multiply the binary numbers for 8 and 13, **showing your working**. Then convert the result back to denary to check your answer.

Convert the decimal numbers 8 and 13 into binary. Multiply the binary numbers for 8 and 13, showing your working. Then convert the result back to denary to check your answer. 8 = 1000 13 = 1101 8 * 13 = 104 64 goes into 104 leaving 40. 32 + 8 = 40. Therefore the answer is 1101000.

(**4 marks**)

Total 18 marks