

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 is the largest in binary. Denary equivalent is 255.

(2 marks)

Question 2

How many bits make:

- one **byte** (1 mark) |8|
- one **kilobyte** (1 mark) |8000|
- one **megabyte** (1 mark) |8,000,000|

(3 marks)

Question 3

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

0 or 1

(1 mark)

Question 4

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

37

|32|16|8|4|2|1
|1|0|0|1|0|1
10 0101

84

|64|32|16|8|4|2|1
|1|0|1|0|1|0|0
101 0100

(4 marks)

Question 5

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

<http://imgur.com/Umxarb4> For the working out.

Answer is 111 1001

(2 marks)

Question 6

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

This is when there are too many numbers to fit into the limit the computer can hold. e.g. when there are 9 numbers in one bit, which can only hold 8 numbers. This can happen when adding or multiplying (a calculation) binary numbers.

(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.

<http://imgur.com/Kmkj4Nx>

|64|32|16|8|4|2|1
|1|1|0|1|0|0|0 = **104**
13 x 8 = **104**

(4 marks)

Total 18 marks