Digital Electronics

Tutorial Sheet 2

1.* How many different symbols can be represented with 4 bits?

2.** In a data transmission system the set of possible symbols is:

{lower-case alphabet} U {upper-case alphabet} U {space, comma, full-stop}

where 'U' denotes the 'union' of two sets. How many bits of information are needed for each symbol?

3.*** In the above data transmission system the maximum transmission rate is 9600 bits per second. How long, in seconds, would it take to transmit the message:

Imperial College.

4.* Convert the following decimal numbers into binary. Do not use a calculator.

a) 5 b) 99 c) 1024

5.* Convert the following binary numbers into decimal. Do not use a calculator.

a) 1010 b) 10000000 c) 11111111

6.** Convert the following decimal numbers into hexadecimal. Do not use a calculator.

a) 64 b) 98

7.*** Convert the following hex numbers into binary directly without first converting them to decimal. Do not use a calculator.

a) F8 b) 144

8.*** Perform the following binary arithmetic:

a) 00110111 + 00110010 b) 1100 + 0100

c) 00110100 - 00001010 d) 0010 - 0111