Introduction to Computer Systems – CCE1011

Tutorial 1   Binary Data and Arithmetic

1. List the first twenty numbers in order using:
            Decimal, binary, octal, hexadecimal.

2. Find the decimal equivalent of the following:

            101101_2 ; $10F_{16}$; 777_8;

3. Using 8-bit ASCII code write down the code for Malta.

4. Assuming two's complement integer arithmetic, and using a 6-bit binary representation, give the binary code for:

            1;   -2;   -22;   14
    What is the range of this 2's complement representation?

5. An audio sample converts the audio into sixteen bit two's complement representation – What is the code for the following first ten samples –

    -3, 7, 234, 345, 4678, -2345, -4890, 333, 8567, 4

6. A VDU has a screen with 1024 x 860 pixels. Each pixel requires 24-bits to represent colour and luminance. How many memory **bytes** are required for one VDU screen?

7. Find the binary representation for the following decimal numbers:

        0.125; 8.5; 17.625;

8. Calculate the memory size necessary for a film with the following specifications:

            Screen size (frame size) 1024 x 860 pixels;
            Pixel memory   24-bit
            Motion   28 frames per second
            Film Length   90 minutes.

        Give your answer in Gigabytes.

9. ASCII code has code representations for both data and control. Give three ASCII control codes, defining what their function is.

10. Show, using two's complement 6-bit representation the addition of the following:

        11 + 9;   -11 + 9;   11 – 9;   -11 – 9