Introduction to the Use of Computers (IS50004A) Assignment 1 : 2012-13

You should construct your submission to this assignment as an HTML document, and make it accessible at the URL `http://www.doc.gold.ac.uk/~maXXXyy/is50004a/assignment1.html` (replacing `maXXXyy` with your own user identifier). There are 15 marks available for the formatting of the document, including clear expression and legible diagrams as well as suitable, standards-compliant HTML formatting. [15]

1. This part is about binary logic and arithmetic.

   (a) Convert the decimal number $(103)_{10}$ to its binary (base-2) representation. [3]

   (b) Copy and complete the following truth table for the exclusive-or (XOR) logical operation: [2]

A	B	$A \oplus B$
0	0	
0	1	
1	0	
1	1	

   (c) Compute the bitwise logical XOR of $(103)_{10}$ with $(10110101)_2$ (keep your answer in its binary representation). [2]

   (d) Convert the answer from part 1c to its decimal (base-10) representation. [3]

2. This part is about text encoding.

   (a) decode the following ASCII-encoded text (byte values are hexadecimal):
   `49 53 35 30 30 30 34 41 20 43 77 6b 20 23 31 2e` [2]

   (b) encode the following text, using the ASCII encoding; you may leave your encoded byte values as hexadecimal:
   `First Submission` [2]

   (c) explain why the text '`£2 = $1.6`' cannot be encoded using ASCII. [3]

   (d) encode the text '`£2 = $1.6`' using the UTF-8 encoding; you may leave your encoded byte values as hexadecimal. [3]

3. This part is about the processor inside a computer system.

   (a) Draw a diagram to illustrate the communication of data between the components of a computer system. [5]

   (b) State Moore's Law. [2]

   (c) If a computer circuit had 10,000 transistors in 1980, in which year would a similar computer circuit have 1,280,000? [3]

   (d) Discuss to what extent Moore's Law can be expected to hold in the future. (To answer this part, you may wish to read more information about Moore's Law; if you do, you must include references to what you read as part of your answer. A good place to find things to read is the Wikipedia entry for Moore's Law; however, the Wikipedia page itself is *not* an acceptable source of information, but rather a source of things to read.) [5]

The deadline for this coursework is **Thursday 22nd November 2012**. Submission will occur by the automatic reading of the specified personal URL in your homespace on `igor`, the Department's server; it is your responsibility to make sure that the URL is accessible and returns the content you intend to submit by the day of the deadline.