# Introduction to Computer Engineering Assignment
To be submitted as PRINTED HARDCOPY

1) Convert your university registration number into binary (base-2), quinary (base-5), octal (base-8), then into hexadecimal (base-16) notation (show your work).
2) Write down your last name using ASCII code using eight bits per symbol (show your work).
3) In your <u>own words</u>, what's meant by:
   1. Algorithm.　　　　2. Abstraction.　　　　3. Flip-Flop.　　　　4. Hard-disk access time.
   5. Most Significant Bit.　6. Byte.　　　　7. Memory Location Address.
   8. Cache Memory.　　9. Machine Instruction. 10. Registers.　　11. Instruction Set.
   12. CISC.　　　　13. Op-Code.　　　14. Data Transfer Instruction.
   15. Fetch　　　　16. Port　　　　17. Serial Transfer　18. Pipelining
4) In no more than 3 lines each, explain how image data is stored in:
   a. Bitmap image format.　　b. GIF.　　　　c. JPEG format.
5) Write the full truth table for the following Boolean circuit:
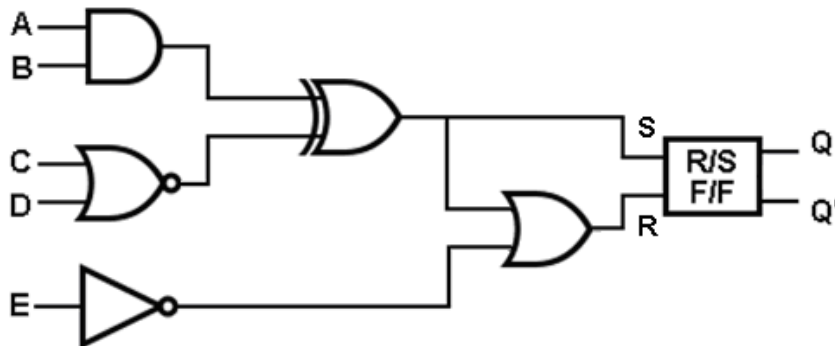
6) Convert each of the following binary representations into its equivalent base ten form:
   a. 11111101　　　b. 11010100　　　c. 01010010
   d. 10010010　　　e. 10001101　　　f. 10101011
7) Convert each of the following base ten representations into its equivalent binary form:
   a. 55　　b. 555　　c. 255　　d. 256　　e. 1023
8) Express the following values in binary notation:
   a. 5/16
   b. 1 1/8
   c. 5.625
   d. 2 ¾
   e. 0.03125
9) Perform each of the following operations in binary notation
   a. 10111　　　b. 1010.001　　c. 11111　　　d. 101.101
   　÷ 1101　　　　-　1.101　　　+0001　　　　x00.010

10) Represent each of the following numbers in floating point notation using 8 bits (as described in section 1.7), which one of them can not be represented accurately using that notation?
    a. 6 ½　　b. 9　c. 13/16　　d. 17/32　　e. 7 ½　　　f. -3 ½　　　g. 1/10　　　h. -2 3/8
11) a. Write the number 321 by representing the 3, the 2, and the 1 in ASCII
    b. Write the number 321 in binary representation.
12) Decode each of the following floating point bit patterns into decimal (suppose we used the notation described in section 1.7):
    a. 10011001　b. 01101111　c. 10101100　d. 00011000　e. 01101001　f. 11011010
13) What is the ASCII code for the following characters when adjusted foe even parity?
    a. 5　b. G　　　c. $　　　d. >　　　e. ?　　　f. z

14) Suppose the memory cells at addresses 00 through 05 in the machine that its instruction set is described in the language description table, contain the following bi pattern:

Address   **Contents**
00   21
01   04
02   31
03   00
04   C0
05   00

Assuming that the program counter initially contained 00, record the contents of program counter, instruction register, and memory cell at address 00, at the end of each fetch phase of the machine cycle until the machine halts.

15) The following are instructions written in the machine language described in the textbook, translate them into English:
a. 407E   b. 8008   c. A403   d. 2835   e. B3AD   f. 153B   g. B038

16) Suppose the following memory cells are as follow:

Address   **Contents**
AF   B0
B0   B0
B1   AF

What would happen if we started the machine with its PC (program counter) equal to AF?

17) The following is a routine encoded in the machine language described in the language description table. Explain (in a single sentence) what the routine does. (Explain what the entire routine does as a unit rather than reciting what each instruction does.)

210F
12A0
8212
32A0

18) Encode each of the following commands in terms of the machine language described in the language description table.

A. _____   ROTATE the contents of register 6 to the right 4 bit positions.

B. _____   JUMP to the instruction at address B1 if the content of register 1 equals that of register 0.

C. _____   ADD the contents of registers 4 and 5 as thought they were values in floating-point notation and leave the result in register 3.

D. _____   AND the contents of registers 4 and 5, leaving the result in register 3.

19) Write a program in the language described in the text that tries to avoid any attacks from the opposing program by moving to different locations. More precisely, write your program to start at location 00, copy itself to location 70, and then jump to this new copy.

Good Luck
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