1/12/17

Indian Institute of Engineering Science and Technology, Shibpur
B. Tech. 1st Semester (AE/CE/ME/MET/MIN) Examinations, 2017
Introduction to Computing (CS 1201)

Full Marks: 35   Time: 2 Hours

Answer question no. 1 and any four from the rest.
For the programming problems use C language.

1. *Answer any five questions.*   [3 × 5]

    (a) What is ASCII? What is the ASCII code for the 'newline'?

    (b) What do you mean by dynamic memory allocation? In which situation we prefer this type of memory allocation?

    (c) What are the differences between structure and union? Explain using a suitable example.

    (d) What are the advantages and disadvantages of using recursive functions?

    (e) What may be the possible reasons of getting a negative number when two positive numbers are multiplied?

    (f) Explain XOR logic with the truth table. Convert a 3-input XOR gate to a NOT gate.

    (g) What is Gray code? Where is it used?

    (h) Name the storage classes available in C. Why the scope of the local variables of a function is confined within the function itself?

2. (a) Draw the truth table and logic expression for the sum and carry for the full adder. Also, draw the logic circuit diagram for the full adder.

    (b) Show that the full adder can be designed using half adders.   [4 + 1]

3. (a) Define a structure to represent complex numbers.

    (b) Write a function that will accept two complex numbers as formal parameters, add these two complex numbers and return the sum to the calling function. Also write *main()* to demonstrate the call to the function to add the complex numbers.   [1 + 4]

4. (a) What is the difference between 'A' and "A" in C?

    (b) Write a program to populate an array with 10 characters and sort the array in alphabetical order.   [1 + 4]

5. (a) What is a *text file*?

    (b) Write a program to copy a text file (say, file1.txt) into another text file (say, file2.txt). In this case take file names as input through command line arguments as follows:

    $$unix > ./\text{a.out file1.txt file2.txt}$$

    Here *unix >* is the command prompt. Your program also displays the number of characters copied.   [1 + 4]

6. (a) Write a program that can accept n number of integers and store them in an array. Here, n is an user input. Compute and print the sum and average of those n integers.

    (b) How can you allocate space using dynamic memory allocation technique to store n integers.   [3 + 2]

7. Write functions to compute the factorial of n using

    (a) iteration, and

    (b) recursion.   [$2\frac{1}{2}$ × 2]