National Institute of Technology Hamirpur
End Semester Examination, Even Sem, AY 2022-23
Computer Programming (CS-101)

Branch: B. Tech.
Time: 9:30 AM – 12:30 PM
Duration: 3 hours

Year/Sem: 1st/2nd
Date: 24.06.2023
Max. Marks = 50

Note 1: Attempt all questions from 1 to 10.

1. What is a computer system? What are the different components that comprise a typical computer system? Explain using a block diagram. What is an object file? What are the different ways in which we can reach object file from source file?

2. What are the different generations of programming languages? Discuss briefly using suitable examples for each generation. As we have 2's complement in binary, we have 10's complement in decimal. Find the 10's complement of 314700.

3. What are the main differences between algorithm and pseudocode? What are the different symbols used in a flowchart? What is the purpose of each of the symbols?

4. Draw a flowchart to read the marks of 10 students. A student passes if the marks are greater than 50, otherwise (s)he fails. Count and output the number of passing and failing students.

5. What is the major difference between a `while` loop and a `do...while` loop? Are there any cases that can be expressed using a `do...while` loop whereas they are not possible with a `for` loop? If yes, which are the cases? If no, why not?

6. Write a program to calculate tax given the following conditions:

   - If income is up to 1,50,000 then no tax
   - If income is in the range 1,50,001 – 3,00,000 then charge 10% tax on amount greater than 1,50,000
   - If income is in the range 3,00,001 – 5,00,000 then charge 10% tax on 1,50,001 – 3,00,000 and 20% on amount greater than 3,00,000
   - If income is greater than 5,00,000 then charge 10% tax on 1,50,001 – 3,00,000, 20% on 3,00,001 – 5,00,000 and 30% on amount greater than 5,00,000

7. Briefly describe the different storage classes in C with suitable examples. What is the main difference between a structure & union in C? Consider a situation with a structure and a union where both have same data members: a char array of 10 characters *name*, an integer *age* and a float *salary*. What differences will be observed when working with the variables of given structure and union ?

8. What are pointers? Why do we use pointers? When would you use a pointer to a function? Explain by giving suitable example. Write a function in C using call by value to swap two numbers using bitwise XOR operator.

9. What are the different functions available in C to read data from a file? Explain the working of each using a suitable example. How can you detect the end of a file while reading data from files? Briefly discuss the modes available for reading data from a binary file.

10. What do you understand by preprocessor directives? Give 3 examples. What is the difference between the following ways to include a library file in your program: *#include⟨stdlib.h⟩* and *#include "stdlib.h"*?

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