

ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)
ORGANISATION OF ISLAMIC COOPERATION (OIC)
Department of Computer Science and Engineering (CSE)

MID SEMESTER EXAMINATION
DURATION: 1 HOUR 30 MINUTES

WINTER SEMESTER, 2022-2023
FULL MARKS: 75

CSE 4373: Computer Programming and Applications

Programmable calculators are not allowed. Do not write anything on the question paper.
 Answer **all 3 (three)** questions. Figures in the right margin indicate full marks of questions whereas corresponding CO and PO are written within parentheses.

1. a) What does the term "Garbage value" mean in the context of C programming? Explain with an example. 5
(CO1)
(PO1)
- b) You and your co-workers like to send documents in a secured manner. Each document ends with a specific number which ensures the authenticity of the document. If the number stays the same even if it is reversed (eg: 12321, 4554, 22, 3), then the document is authentic. Write a C program that will take the number as input from the user and print whether the document is authentic or not. 10
(CO2)
(PO1)
- c) Given a sorted list, the median represents the middle element in an odd numbered list. If the list is even numbered, then the median is the average of the middle two numbers. Write a program that at first takes the size of the list as input from the user. Then, it takes each element of the list as input. Assume that the input will be in sorted order. Finally, it prints out the median of the list. 10
(CO3)
(PO1)
2. a) Evaluate the expression assigned to the variable `answer` shown in Code Snippet 1 by showing all the necessary steps: 6
(CO2)
(PO1)

```
1 int a = 4, b = 3, c = 2, d = 5, answer;
2 answer = (d-- >= ++b) * b++ + c % --a / ++c;
```

Code Snippet 1: A portion of a C program Question 2.a)

- b) The program shown in Code Snippet 2 categorizes movie tickets based on their price. But it has eight errors. Rewrite the code by correcting all the mistakes. 8
(CO4)
(PO2)

```
1 #include<stdio.h>
2 int main()
3 {
4     int price;
5     printf("Enter the ticket price: %d*");
6     scanf("%d", price);
7     switchcase($price)
8     {
9         case 450: printf("Premium");
10        case 300: printf("Regular");
11        default: printf("Invalid input.");
12    }
13    return 0;
14 }
```

Code Snippet 2: Erroneous C program to categorize movie tickets for Question 2.b).

- c) The factorial of a non-negative integer number is the product of all positive integers less than or equal to that number. Implement a program that takes a non-negative integer as input and calculate the factorial of that integer. Also provide a flowchart diagram of your algorithm. 6 + 5
(CO2)
(PO1)

3. a) You and your friend are fascinated by infinite geometric series expansions. Both of you want to find the sum of the given geometric series: 7 + 10
(CO2)
(PO1)

$$1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16} + \dots$$

- i. Your friend wants to use the following equation to calculate the sum of the series:

$$sum = \frac{a}{1-r}$$

Here, a is the first term in the series and r is the ratio between two terms.

Write a C program to calculate the sum of a series using the given formula by taking the first term and the ratio as input from the user.

- ii. You want to check the correctness of the solution generated by your friend. Implement a C program to calculate the sum of the given series up to the first 1000 terms.

- b) i. What are "Escape sequences" in C programming language? Clarify using some examples. 4 + 4
(CO1)
(PO1)
- ii. Describe how multidimensional arrays are stored in computer memory.