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

MID SEMESTER EXAMINATION   WINTER SEMESTER, 2022-2023
DURATION: 1 HOUR 30 MINUTES   FULL MARKS: 75

CSE 4175: Computer Programming

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) Explain the steps to convert any *.c* file to a machine executable form. Give an example of C program file, and describe the general format of that file. 5 + 3
(CO1)
(PO1)

   b) Write down the output produced by each of the following code fragments. Assume that all variables used in the code fragment are of integer type. 5 × 2
(CO2)
(PO3)

   i. a = 1;
       printf("%d", a++ - 1);
       printf("%d", a);

   ii. x = 3; y = 4; z = 5;
       printf("%d", x++ - y++ + --z);

   iii. i = 6;
        j = i += i;
        printf("%d %d", i, j);

   iv. a = 0; b = 1; c = 1;
       if(c-- || ++a && b--)
       printf("TRUE");
       else
       printf("FALSE");

   v. i = j = k = 1;
       i += j += k;
       printf("%d %d %d", i, j , k) ;

   c) Write a program that will take *n* as input and print the value of the summation by adding up to *n* terms in the series given below: 7
(CO1)
(PO1)

   $$1 - \frac{1}{2} + \frac{1}{3} - \frac{1}{4} + \cdots \cdots \frac{1}{n}$$

Table 1: Sample input and output for Question 1.c)

Sample Input	Sample Output
5	0.7833

2. a) Explain the role of the "break" statement within a "switch" case and what would happen if you omit it? 5
(CO1)
(PO1)

   b) How would you differentiate between implicit and explicit type conversion? - Explain with proper examples. 6
(CO1)
(PO1)

c) The following code is s unnecessarily complicated for finding the largest among the three integer inputs. Redesign the code with fewer comparisons between the variables.

<div style="text-align:right">6
(CO2)
(PO3)</div>

```c
1  #include <stdio.h>
2  int main() {
3      int num1, num2, num3;
4      printf("Enter three integers: ");
5      scanf("%d %d %d", &num1, &num2, &num3);
6      if (num1 > num2) {
7          if (num1 > num3) {
8              printf("%d is the largest number.\n", num1);
9          } else {
10             printf("%d is the largest number.\n", num3);
11         }
12     } else {
13         if (num2 > num3) {
14             printf("%d is the largest number.\n", num2);
15         } else {
16             if (num3 > num1) {
17                 printf("%d is the largest number.\n", num3);
18             } else {
19                 printf("%d is the largest number.\n", num1);
20             }
21         }
22     }
23     return 0;
24 }
```

Code Snippet 1: C program for finding the largest among three numbers for Question 2c)

d) Suppose you are developing a "Fine Calculator" for a local library. Write a program that will take the expected and actual return dates for a book, and calculate the fine (if any) for that particular person. The library has the following rules to calculate the fine:

<div style="text-align:right">10
(CO1)
(PO1)</div>

- If the book is returned on or before the expected return date, no fine will be charged.
- If the book is returned after the expected return date but still within the same month of the year as the expected return date, then the fine would be 10 dollars per day for the number of days late.
- If the book is returned after the expected return date but still within the same year as the expected return date, then the fine would be 550 dollars per month for the number of months late.
- If the book is returned after the calendar year in which it was expected, there is a fixed fine of 10,000 dollars.

A sample input and output are given in Table 2:

Table 2: Sample input and output for Question 2.d)

Sample Input	Sample Output
Return Date: 9/6/2023 Expected Return Date: 6/6/2023	57

3. a) Elaborate on integer overflow while performing arithmetic operation on integer values and/or variables.

<div style="text-align:right">5
(CO1)
(PO1)</div>

b) You are asked to develop an application that will convert a given message according to the following rule set:

10

(CO1)

(PO1)

- All the vowels in the message have to be replaced with . (dot) in the code.
- Any spaces in the message will be replaced with a - (hyphen).

Write a program that will take the size of the message and the message text that needs to be converted. The sample input and output are given in Table 3:

Table 3: Sample input and output for Question 3.b)

Sample Input	Sample Output
16	N.c.-t.-m..t-y..
Nice to meet you	

c) Write a program that will take a character and print it in lower case. You are not allowed to use the `tolower()` library function.

8

(CO1)

(PO1)