CS1002 Programming Fundamentals

Tuesday, Nov 7, 2023

Mid II [illegible]
Total Time: 1 Hour
Total Marks: 55

Course Instructors

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Signature of Invigilator

DO NOT OPEN THE QUESTION BOOK OR START UNTIL INSTRUCTED.

Instructions:

1. Verify at the start of the exam that you have a total of Three (3) questions printed on Seven (7) pages including this title page.
2. Attempt all questions on the question book and in the given order.
3. The exam is closed books, and closed notes. Please see that the area in your threshold is free of any material classified as 'useful in the paper' or else there may a charge of cheating.
4. Read the questions carefully for clarity of context and understanding of the meaning and make assumptions wherever required, for neither the invigilator will address your queries, nor the teacher/examiner will come to the examination hall for any assistance.
5. Fit in all your answers in the provided space. You may use extra space on the last page if required. If you do so, clearly mark the question/part number on that page to avoid confusion.
6. Use only your own stationery.
7. Use only permanent ink-pens. Only the questions attempted with permanent ink-pens will be considered. Any part of the paper done in lead pencil cannot be claimed for checking/rechecking.

	Q-1	Q-2	Q-3	Total
	CLO 1	CLO 3	CLO 3	
Total Marks	20	15	20	**55**

Q1	20

Write the output of the given code in the space provided. **(Suppose there is no error)**

Sr.	Code	Answer

a.	`for (int i = 1; i <= 3; ++i)`
	`{`
	`  for (int j = 1; j <= i; ++j)`
	`  {`
	`  for (int k = 1; k <= j; ++k)`
	`  cout << '*';`
	`  cout << endl;`
	`  }`
	`  cout << endl;`
	`}`	

b.	`for (int i = 1; i <= 4; i++)`
	`  {`
	`  for (int j = 1; j <= 4; j++)`
	`  {`
	`  if (i == j)`
	`  {`
	`  cout << "0 ";`
	`  }`
	`  else`
	`  {`
	`  cout << "1 ";`
	`  }`
	`  }`
	`  cout << endl;`
	`  }`	

c.	`int i = 0;`
	`  int j = 5;`
	`  while ( i < 10 && j > 0 )`
	`  {`
	`  cout << i * j;`
	`  j = i - j;`
	`  i++;`
	`  }`	

d.	`int main()`
	`{`
	`  int firstNum = 28;`
	`  int secondNum = 25;`
	`  cout << (firstNum = 38 - 7) << endl;`
	`  cout << (firstNum <= 75) << endl;`
	`  cout << (firstNum > secondNum + 10) <<`
	`endl;`
	`cout << (firstNum >= 3 * secondNum - 100)`
	`<< endl;`
	`cout << (secondNum - 1 == 2 * firstNum) <<`
	`endl;`
	`}`	

e.

```
int main()
{
      int r,a,b,c;
      r = (a>b?(a>c?5:7):(b>c?9:10));
      cout<<r;
    return 0;
}
```

Q2		15

Write a C++ program to calculate the sum of the following series where "X" and "N" are input from user.

$$\text{Sum} = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!} + \frac{x^8}{8!} - \ldots$$

1. Calculate the power of "X" to "N" using a loop. (3.5 Marks)
2. Calculate the factorial of a number "X" using a loop. (3.5 Marks)
3. Use the solutions of part-1 and 2 to find the sum of the series up to "N" terms. (8 Marks)

Your program should take the following inputs: value of "X" (a double) and "N" (an integer). Your program should output the final sum of the above series.

Q3	20

a) If the number of items bought is less than 5, then the shipping charges are 200.00 for each item bought; if the number of items bought is at least 5, but less than 10, then the shipping charges are 150.00 for each item bought; if the number of items bought is at least 10, there are no shipping charges. Write down the code to calculate the correct shipping charges 5 Marks

b) Suppose that **classStanding** is a char variable, **gpa** and **dues** are double variables. Write a switch expression that assigns the dues as following: If classStanding is 'f' or 'F', the dues are 20000.00; if classStanding is 's' or 'S', (if gpa is at least 3.75, the dues are 15000.00; otherwise dues are 10000.00); if classStanding is 'j' or 'J', (if gpa is at least 3.75, the dues are 9000.00; otherwise dues are 11000.00); if classStanding is 'n' or 'N', (if gpa is at least 3.75, the dues are 5000.00; otherwise dues are 7500.00). (Note that the code 'f' stands for first year students, the code 's' stands for second year students, the code 'j' stands for juniors, and the code 'n' stands for seniors. 10 Marks

04

c) Write down the following scenario using conditional (ternary) operator. The grade allocated to the students 5 = 2.5 * 2 Marks

i.
```
if (x + y > 15)
        y = x;
else if (x == y)
        y = 2 * y;
else
        y = 2 * x;
```

ii.
```
if (x + y > 15) {
        if (x == z)
                z = x + 5;
        else
                z = x;
}
else if (x < y)
        z = x + y;
else
        z = x * y;
```