National University of Computer and Emerging Sciences

FAST School of Computing **Fall-2022** **Islamabad Campus**

CS-1002: Programming Fundamentals-Solution

Serial No:

Sessional Exam-I

Total Time: 1 Hour

Total Marks: 50

Monday, 26th September, 2022

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Signature of Invigilator

Course Instructors

Atif Jilani, Maryam Abdul Ghafoor,
Naveed Ahmed, Uzair Khan

_____ _____

Student Name Roll No. Section Signature

DO NOT OPEN THE QUESTION BOOK OR START UNTIL INSTRUCTED.

Instructions:

1. Attempt on question paper. Attempt all of them. Read the question carefully, understand the question, and then attempt it.
2. There is an extra page at the end for rough work. No additional sheet will be provided for rough work
3. If you need more space, write on the rough page labeled. Clearly mark question and part number etc.
4. After asked to commence the exam, please verify that you have **eight (8)** different printed pages including this title page. There are a total of **5** questions.
5. Calculator sharing is strictly prohibited.
6. Use permanent ink pens only. Any part done using soft pencil will not be marked and cannot be claimed for rechecking.
7. If you have read all instructions, make a smiley on this page to get 2 bonus marks.

	Q-1	Q-2	Q-3	Q-4	Q-5	Total
Marks Obtained						
Total Marks	**20**	**05**	**10**	**10**	**05**	**50**

Question 1 [20 Marks]

Write the output of the following C++ codes in the corresponding output column (if the code is correct). If you find any errors in the code, please explain the errors, correct them and after that write output of the corrected code. Assume that the header files are included in each code snippet.

	C++ Program	Output

1	`int a = 2;`
	`a = a++ + ++a * --a – a--;`
	`cout << a;`
		[1 mark]
		8

2	`int a=2,b=7,c=10;`
	`c=a==b;`
	`cout << c;`
		[1 mark]
		0

3	`int a = 5, b = 5, sum;`
	`sum = -( -a-b );`
	`cout << sum;`
		[1 mark]
		10

4	`cout << sizeof(7.52)<<endl;`
	`cout << sizeof('\t')<<endl;`
	`cout << sizeof("err r seriously!")<<endl;`
	`cout << sizeof((int)7.2)<< endl;`
		[2 marks]
		8
		1
		17
		4

5	`int a = 2, b;`
	`char c = 20;`
	`b = ( a && a-2);`
	`a = b += c *= a - 5 / 2.56 + c %= a;`
	`cout << a << '\n c' << c << endl << b;`
		[2 marks]
		Error due to c%=a and ` `If Fix: elimiantec%=a & ""
		0
		c
		0

6	`short s = 32768;`
	`cout << s++ ;`
	`cout << '\t' << ++(++s);`
		[2 marks]
		-32768 -32765

7	`int a=4, b=16, k = 1;`
	`k *= (++b) / (5+a);`
	`cout << k;`
		[2 marks]
		1

8	`cout << (int)(5.0/2.0) << endl;`
	`cout << (int) 5.0 / 2 << endl;`
	`cout << showpoint << (float) 5 / 2 << endl;`
		[1.5 marks]
		Float sp incorrect
		2
		2
		2.5000

9	`int a = 9;` `cout << (a != a < 10);`	[1 mark] **1**

10	`float _float, float2float = 2;`
	`double 2ble = 2;`
	`cout << _float+ flaot2float + 2ble;`
		[1.5 mark]
		2ble (incorrect variable name) if corrected:
		4

11	`int _ = 2;`
	`int ___= 4;`
	`cout << _ + ___ ;`
		[2 marks]
		6

12	`int min_value = 9, max_value = 13;`
	`float average = min_val + max_val / 2;`
	`cout << average;`
		[1 mark]
		Min_val, max_val not defined, if defined
		15

13	`cout << (20 && -20 || "this is crazy");`	[1 mark] **1**
14	`cout << !1&&3*3+3*3*(3+3*(3+3*3+3)%3)-1 && !1;`	[1 mark] **0**

Question 2 [1+1+2+1 = 05 Marks]

a. Declare a constant float variable "FLOAT".

const float FLOAT = 2.0f; // assign any float value

b. Write a C++ code to print ASCII code of the value stored in the given char variable character.

```
#include <iostream>
using namespace std;
int main()
{

     char character = 'S';
     cout << _______(int)character_____________________________ ;
     return 0;
}
```

c. Write a C++ code to display the number 53.123 in a field of nine spaces with two decimal places of precision

```
#include <iostream>
#include <iomanip>
using namespace std;
int main()
{
  // write your code here
Students can store 53.123 in a float variable
 cout << setw(9) << setprecision(4) << 53.123;
OR
cout << setw(9) << setprecision(2) << fixed << 53.123;




  return 0;
}
```

d. What is the output of the following program

```
#include <iostream>
using namespace std;
int main()
{
  cout << "Be careful\n";
  cout << "This might/n be a trick ";
  cout << "question\n";
  return 0;
}
```

```
Be careful
This might/n be a trick question
```

Question 3 [10 marks]

Given the following variables that are used to keep time and dates

```
int  minutes;     // ranges from 0 to 59
int  hours;       // ranges from 1 to 12
bool am;          // true if am, false if pm
char dayofweek;   // N, M, T, W, R, F and S: Sunday to Saturday
int  dayofmonth;  // 1 - 31
int  months;      // ranges from 1 to 12: January to December
```

Write an expression that evaluates to **true** for each condition below:

i. [1 point] The day is during the beginning of the work week (Monday, Tuesday).

(dayofweek == 'M' or dayofweek == 'T')

ii. [1 point] The date is Columbus Day (October 13th).
(dayofmonth ==13 && months==10)

iii. [3 points] The day is a Tuesday during the Summer (June to August inclusive).

(dayofweek ==’T’ && months >= 6 && months <=8)

iv. [5 points] The time and day are while we are taking this exam (Monday, 10:30 pm to 11:30 pm).

(dayofweek ==’M’ && (hours == 10 && minutes>=30) && (hours ==11 && minutes<=30))

Question 4 [10 marks]

Perfect number is a positive number which is equal to the sum of all positive divisors excluding that number. For example, 6 is a perfect number. Divisors of 6 are 1, 2, 3. Sum of its divisor is 1+2+3 =6. Similarly, 28 is also a perfect number, since 1+2+4+7+14=28. Write a pseudo code to find whether a number (positive integer) given as an input is a perfect number or not.

Example input and output	
Example 1 Enter number: 16 16 is not a perfect number	Example 2 Enter number: 28 28 is a perfect number

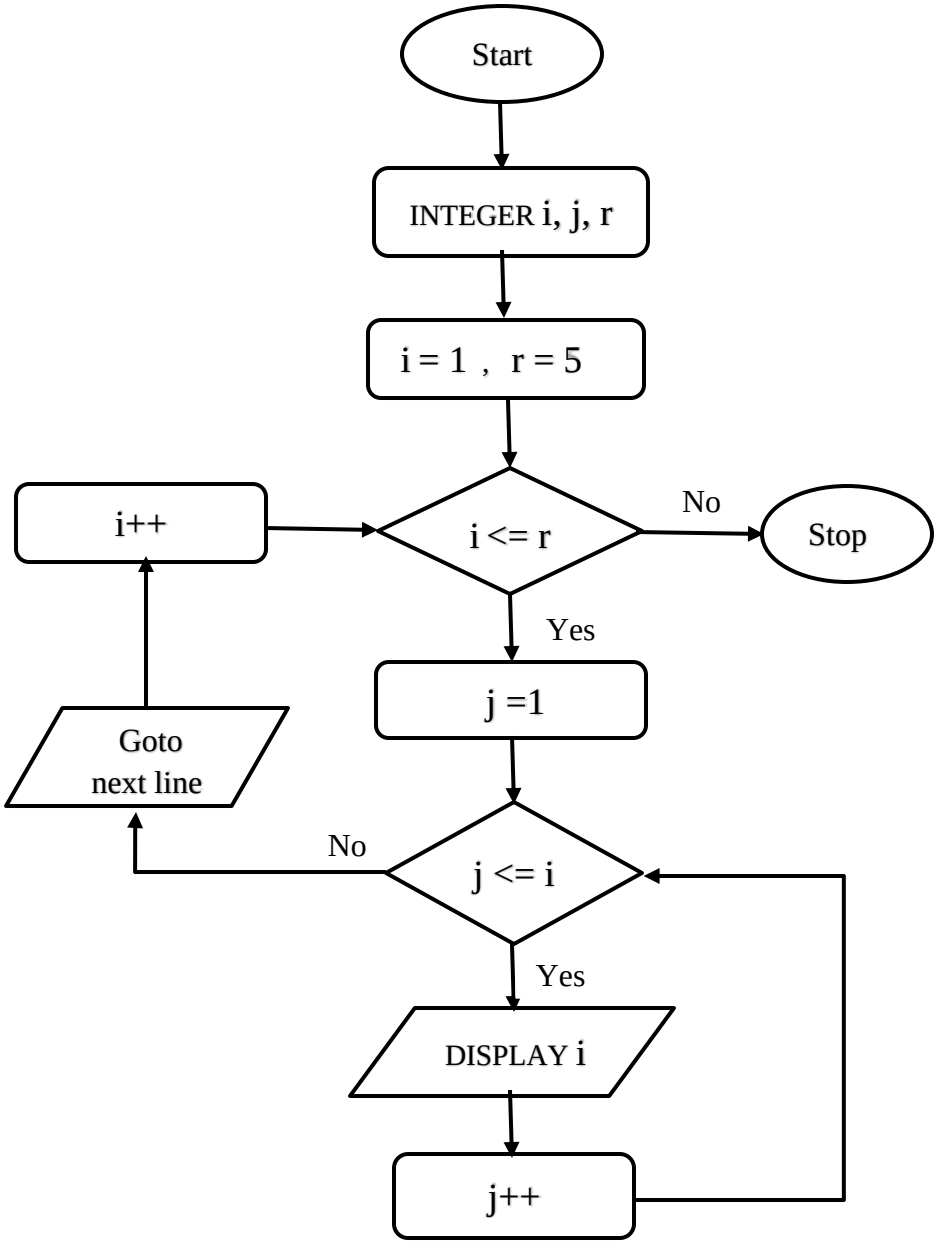
```
Declare integer number, count, sum

Display "Enter number"
Input number

For count=1 to number-1
        If number % count == 0 then
              Sum = sum + count
        Endif
End for

If ( sum == number)
        Display number " is a perfect number"
Else
        Display number " is not a perfect number"
Endif
```

Correctness + logic //6 marks
Declarations, input output, use of loops, ifs //4

//variable declarations and use =2
//factor = 3, proper use of if
//compare sum = 3 , proper use of else-if
//proper use of loops = 2

Question 5 [05 marks]

What will be the output of the following flow chart. Dry run and write down the final output.



Output:

1
22
333
4444
55555

[Rough work]