National University of Computer and Emerging Sciences

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

CS-1002: Programming Fundamentals (CS)

Serial No:

Sessional Exam-I

Total Time: 1 Hour

Total Marks: 60

Monday, 26th September, 2022

Course Instructors

Dr. Aleem, Dr. Akhtar, Mr. Sheheryar, Ms. Ifrah

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Signature of Invigilator

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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. No additional sheet will be provided for rough work. Use the last page for rough work.
3. After asked to commence the exam, please verify that you have **ten (10)** different printed pages including this title page. There are a total of 4 questions.
4. Calculator is not allowed.
5. Use permanent ink pens only. Any part done using soft pencil will not be marked and cannot be claimed for rechecking.

	Q-1	Q-2	Q-3	Q-4	Total
Marks Obtained					
Total Marks	**20**	**9**	**17**	**14**	**60**

Question 1 [5+6+9=20 Marks]

a. For each expression at left, indicate its value. Consider there is no syntax error.

Expression	Value
3 * 5 / 4 * 3 * 2 % 4 + !5 * static_cast<double>(3) / 12	**2**
(3 != 10 || 6 <= 10 * -200)	**1 OR true**
'b' > 'Z'	**1 OR true**
static_cast<char>(11 / 7 * 3 * 2 * 39 % 102 + 55)	**'U'**
pow(8, 730 % 9) - pow(2 , 5 / 2) / 2	**6**

b. For each expression construct and write a logical expression to represent each of the following conditions.

Example:
Expression: N is a lower case or capital case alphabet.
Logical Expression: (N >= 'A' && N <= 'Z') || (N >= 'a' && N <= 'z')
Note: consider N is a variable.

Expression	Logical Expression
N is any number other than multiple of 3.	**!(N %3 == 0)** **OR** N%3!=0
N is any lower-case alphabet other than vowels (a, e, i, o and u)	(N >= 'a' && N <= 'z' && !(N=='a' || N=='e' || N=='i' || N=='o' || N=='u')) OR (N >= 'a' && N <= 'z' && (N!='a' && N!='e' && N!='i' && N!='o' && N!='u'))
N lies outside the range [-20, 20] and [120, 2020]	!(N >= -20 && N <= 20) && !(N >= 120 && N <= 2020) OR !((N >= -20 && N <= 20) || (N >= 120 && N <= 2020)) OR (N < -20 || N > 20) && (N < 120 || N > 2020)

c. Read the following program carefully, write down missing code (underline) for output of this program.

```
#include<iostream>
#include<bitset>
using namespace std;
int main()
{
unsigned short int n;
int bitposition;

cout<<"Enter a number"<<endl;
cin>>n;
cout<<"Enter position of bit you want to reverse"<<endl;
cin>>bitposition;
cout<<"Number & it\'s bit representation before conversion"<<endl;
cout<<n<<"  "<<bitset<16>(n)<<endl; //bitset will convert n into 16 bit binary.

/*In the following missing statements, write an expression to reverse a bit of
the input number n at given bit position.

int temp=1;
temp= temp << bitposition - 1; // int temp =1<<bitposition -1
n= n ^ temp;
```

OR

```
n = n ^ 1 <<  bitposition - 1;
```

OR

```
  n = n ^ (int(pow(2.bitposition-1)));// #include<cmath>

cout<<"Number & it\'s bit representation after conversion"<<endl;
cout<<n<<"   "<<bitset<16>(n)<<endl;
return 0;
}
```

Expected Output 01:

Enter a number
5
Enter position of bit you want to reverse
6
Number & it's bit representation before conversion

5 0000000000000101
Number & it's bit representation after conversion
37 0000000000100101

Expected Output 02:
Enter a number
5
Enter position of bit you want to reverse
3
Number & it's bit representation before conversion
5 0000000000000101
Number & it's bit representation after conversion
1 0000000000000001

Question 2 [6 + 3 = 9 Marks]

Complete the following code segments by writing statement in the blanked lines. Assume that libraries and main are already included.

a.

```
//This program calculates the loss or profit of a product based on cost and
selling price.

    int cp,sp, amt;
    cout<<"Enter cost price: ";
    cin>>cp;
    cout<<"Enter selling price: ";
    cin>>sp;

    if(_____________sp > cp_____________________________)
    {
        // Calculate Profit
       ___________________amt = sp - cp ___________________________;

       cout<<"Profit: "<<amt<<endl;
    }

    if(___________cp > sp ____________________________________)
    {
        // Calculate Loss
       _____________amt = cp - sp_____________________________;

        cout<<"Loss: "<<amt<<endl;
    }

    if(_____________sp == cp_____________________________)

        cout<<"No profit no loss..."<<endl;
```

b.

// A year is a leap year if it is exactly divisible by 4 AND year is not divisible by 100 OR a year is leap year if it is exactly divisible by 400
 	
`int year;`
`cin>>year;`
 	
`if((year%4==0 && year%100!=0)|| (year%400==0))`
 	
`cout<<"LEAP YEAR";`
 	
`else`
`cout<<"COMMON YEAR";`	

Question 3 [3+2+3+4+2+3=17 Marks]

Write the output of the following programs. Please note that there is no syntax or logical error in the program. Assume that required libraries and main function are already included in the program.

a.

```
cout<<"\'D\'\t\'i\'\t\'g\'\t\'e\'\t\'s\'\t\'t\'\n"; [1 marks]
cout<<setw(10)<<"\\\n"<<setw(8)<<"\\\n"<<setw(6)<<"\\\n"<<setw(4)<<"\\\n"<<
setw(2)<<"\\\n"<<endl; [1 marks]
cout<<setw(2)<<"/\n"<<setw(4)<<"/\n"<<setw(6)<<"/\n"<<setw(8)<<"/\n"<<setw(10)<<
"/\n"<<endl; [1 marks]
```

Output:

```
'D'  'i'  'g'  'e'  's'  't'
          \
        \
      \
    \
  \

/
  /
    /
      /
        /
```

b.

```
int flightNum = 89,travelTime,distance;
travelTime = distance = 250 / (double)40 ;
cout<<travelTime<<endl;
```

Output:

6

c.

```
short int unus, duo, tres;
unus = duo = tres = 5.5;
unus += 4;
duo *= 2;
tres -= 4;
unus /= 3;
duo += tres;
cout << unus << endl;
cout << duo << endl;
cout << tres << endl;
```

Output

3
11
1

d.

```
char ch=128;
if(ch>0)
cout <<(int)ch<<endl;

ch=-129;
if(!(ch<0))
cout <<(int)ch<<endl;

ch= ('a' - 'A')*2 + 5;
cout <<ch<<endl;
```

Output:
127
E

e.

```
int flag = (int(1.5 + 6) % 4);
if (!!!flag)
cout<<"*"<<(5>=6 || 1<8 && 9==7)<<endl;
cout <<"@"<<(5+1==6 || 8-1 >4)<< endl;
```

Output:

@ 1

f.

```
int i=5,k=6;
int j=7;
 if (17<13 && 14>2 || 155%5==1 && 17/5>2 )
      cout<<j+i<<endl;
 else
        cout<<i-j<<endl;
j-=1;
if (17<13 && 14>2 || 155%5==1 && 17/5>2 )
      cout<<j+i<<endl;
 else
        cout<<i-j<<endl;
j-=1;
if (17<13 && 14>2 || 155%5==1 && 17/5>2 )
      cout<<j+i<<endl;
 else
        cout<<i-j<<endl;
```

Output:

-2.
-1
0

Question 4 [5+4+3+2=14 Marks]

Identify the errors in the following programs, **correct** them and **write** the **corrected output**.

a.

```
#include <iostream>
#include<iomanip>
using namespace std;
int main()
{
int return=2000; //error return is reserved word
cout<<"Loan returned =" << return <<endl; //error return is reserved word
int length= 200.5;
cout <<"Length  = " <<length;
char initial = 'a' ;
char newchar =  initial-32;
cout<< newchar <<endl;
int ch=100;
cout<< (char)ch <<endl;
return 0;}
```

Output:

```
Loan returned =2000
Length =200A
d
```

b.

```
#include <iostream>
using namespace std;
int main() {
    // Float const PI=3.7;  Float should be small case
    float const PI=3.7;  //correction
    cout<<PI+0.3<<endl;
    //PI = 3.7125; Value of constant cannot be changed
    // remove the statement correction
    cout<< "new value \n" << PI <<endl; return 0;
}
```

Output:

4
new value
3.7

c.

```
//answer must be in floating point
#include <iostream>
#include<cmath>
using namespace std;
int main()
{
int value1=3, value2, value3;
double value1=3,value2,value3; // correction
value2 = 3 * pow(value1, 2.0);
(double)value3 = 3 + value2 /2-1;  error: lvalue required as left operand of
assignment // invalid typecasting
value3= 3 + (double)value2/2-1; //correction
cout << value3 << endl;
return 0;}
```

Output:

15.5

d.

```
int n=89;
if(n>'A')
cout<<(int)A<<endl; //error: A not declared in scope
//correction : cout<<(int)'A'<<endl;
else
cout<<(char)n;
```

Output

65

ROUGH WORK

Note: anything written on this page will not be marked.