

CS3201: OBJECT ORIENTED PROGRAMMING LABORATORY

Topic: Programs using Data Types, Operators and Control Structures

Lab: 01

Date: 01/03/2024

OBSERVATION (PREPARATORY TOPICS)

1. What is the significance of data types in memory allocation?
2. What will the following program print?

```
#include<iostream>
using namespace std;
int main(){
    int a = 17, b=22, c=2, x,y,z;
    x = a == b != c;
    y = a == ( b != c );
    z= 3*(5-2*y+11*x/2%3-1 + a++);
    cout<<z<<endl;
    return 0;
}
```

3. Will the given program print anything? Explain.

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

    int num = 5;
    cout << "Original value of num: " << num << endl;
    cout << "Value after ++num: " << ++num << endl;
    cout << "Value after operation: " << num << endl;
    return 0;
}
```

4. What differentiates do-while loops and while loops? Give one instance of when do-while loops are used over while loops.
5. What is the following program trying to calculate? Predict the output when the user enters: **2** and **4.5** as input.

```
#include<iostream>
using namespace std;
int main() {
    int length, breadth;
    cout << "Enter length of rectangle: ";
    cin >> length;
    cout << "Enter breadth of rectangle: ";
    cin >> breadth;
    float ans = length * breadth;           //program calculation
    cout << "Answer is: " << ans << endl;
    return 0;
}
```

EXECUTION QUESTIONS

LEVEL 1

1. Check whether a given year is a leap year using-
 - (a) if-else control structure
 - (b) ternary operators
2. Write a program to calculate volume of a sphere. The program should be menu driven, where the user is asked to either input the radius, diameter or the circumference of the circle.

LEVEL 2

3. Write a program that takes an integer input from the user and multiplies it by a power of 2 using bitwise operators. Display the result.

Constraint: -

- (a) The number inputted by the user should be greater than 0. If they enter a number less than 0, they should not be allowed to progress in the program. Implement using *do-while loop*.
- (b) The power entered should be a non-negative integer. If the user does not follow this, display an error message and terminate the program.

SPOT QUESTION

LEVEL 3

1. You are developing a very simplistic bank assistive program for calculating the amount a person has to pay when they take out a loan. The customer will enter the principal amount they are borrowing, and the number of years for which they are borrowing that amount. Your program should output the amount they have to pay back at the end of that time and what % of the principal amount the interest is.

Constraints: -

- (a) Principal amount (PA) cannot be ≤ 0 . If the user inputs any value less than 0, then they should be prompted to enter a proper value.
- (b) Rate of interest (ROI) should be as follows:

Time Period	Rate of Interest (ROI)
0 – 1 year	3%
≥ 1 year & < 2 years	6.5%
≥ 2 years	7.5%

- (c) If the Principal Amount is above 100,000, then the user should be intimated that the amount is too high to be given a loan.
- (d) Time period should be *positive* and user should be given the option to enter the time period in either *months* or *years*.