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Lab Six **Date :** 2/20/23

Objectives:

- Continue understanding of basic output and input (cin/cout).
- Decision structures and conditional branching.
- Nested if statements / selection structures.

Procedures:

1. Examine the program listing below:

```
#include<iostream>
#include<cmath>
using namespace std;

int main()
{
    int x = 5, y = 8, z = 10;

    cout << ( x < y || y > z ) << endl;
    cout << ( x < y && y > z ) << endl;
    cout << ( y < z ) << endl;
    cout << !( y < z ) << endl;
    cout << ( !( y < z ) || ( x < y ) ) << endl;
    cout << ( !( y > z ) && !( x > y ) ) << endl;
    cout << !x << endl;
    cout << ( x + y > z ) << endl;
    cout << !( x + y > z ) << endl;
    cout << ( ( x + y > z ) || !( z - x > y ) ) << endl;

    if ( x > y || y > x && z > y )
        cout << "a" << endl;
        cout << "b" << endl;

    if ( x + y && y + x > z )
        cout << "one" << endl;
    else
        cout << "two" << endl;

    if ( x + y >= y + z || z - y < x )
    {
        cout << "three" << endl;
    }
    else
    {
        cout << "four" << endl;
    }

    return 0;
}
```

OUTPUT

1
0
1
0
1
1
0
1
0
1

a
b

one

none

three

none

Use the spaces to the right of the listing to show the output of the program. Only list output for statements that are actually executed by the program.

Compile and run the above program, comparing its output to your estimate above. Explain any differences between your estimates and the actual output of the program.

2. Write a complete C++ program that implements a game of *Rock, Paper, Scissors* between a user and the computer. Print out a prompt and have the program give the player the following menu:

1. Rock
2. Paper
3. Scissors

After reading in a number from the keyboard, use a selection structure to set the player's choice to one of the strings "Rock", "Paper", or "Scissors". Use the C++ rand method to generate a random number in the range 1-3 for the computer's turn, then use another decision structure to set the computer's choice to one of the three strings. Make sure to seed the random number generator appropriately. Finally, using some combination of decision structures, decide the winner of the game using the following rules:

Rock crushes scissors (Rock wins)
Scissors cut paper (Scissors wins)
Paper covers rock (Paper wins)

Inform the user of the player choices, the rule used, and tell the user who won (the user or the computer).

Make sure you write a complete C++ program. You may use additional variables as necessary. Add judicious comments to document your code.

Include a header, like the one from previous labs, displaying your name, the date, and the course number.

When you have finished, print out the code and hand it in to your instructor.