

CIS 1.5 Fall 2009 Lab II.3

In this lab, you will modify the **roomba.cpp** program which was distributed in the last lab (II.2). The program is also included at the end of this lab sheet.

1. Using a for loop

Replace the `while` loop with a `for` loop that only lets the user enter 5 commands, and then exits.

2. Being random

Instead of initializing the robot to location (0,0), use a random number generator to start the robot in a random location.

Make sure that you use the modulo operator (%) to clamp the output of the random number generator to a value between 0 and 10 (to keep your robot inside its 11×11 room)

3. Logging the robot

Now we know about files, we can use a file to record what the robot does.

Modify the program so that after each command is entered by the user, it is written out to a file called `log.txt`.

4. Quitting a for loop

The `for` loop modification, above, produces a program that is not very user friendly.

What if the user wants to enter fewer than 5 commands?

Think about a way to allow the user to quit before entering 5 commands if s/he wants.

5. More randomness

Instead of asking the user to enter a command (F, B, L or R), use the random number generator to pick a random command for the robot to execute.

Hint: pick a value between 0 and 3, and associate each number with a command, e.g., $0 \Rightarrow F$, $1 \Rightarrow B$, etc.

Another Hint: decide when you want the robot to stop— either execute a fixed number of commands or a random number of commands ...or stop when the robot lands in a particular location.

```

//-----
//
// roomba.cpp
//
// This program simulates a robot wandering around a room.
//// Written by: Elizabeth Sklar
// Modified by: Simon Parsons
//
// Last modified: 15th September

#include <iostream>
using namespace std;

int main()
{
    // Declare variables

    int x;    // robot's x position
    int y;    // robot's y position
    char c;   // user's input
    bool q;   // does user want to quit?

    // Initialize variables

    x = 0;
    y = 0;
    q = false;

    // Loop until user enters Q to quit

    while ( q==false ) {

        cout << "the roomba is at location (" << x << "," << y << ")" << endl;
        cout << "which way should roomba move (enter F,B,L,R or Q)? ";
        cin  >> c;
        cout << "you entered: " << c << "\n";

        if ( c=='F' ) {
            y = y + 1;
        }
        else if ( c=='B' ) {
            y = y - 1;
        }
        else if ( c=='L' ) {
            x = x - 1;
        }
        else if ( c=='R' ) {
            x = x + 1;
        }
        else if (( c=='Q' ) || ( c == 'q' )) {
            q = true;
        }
        else {
            cout << "Oops! you entered something invalid. please try again :-)" << endl;
        }
    }
}

```

```
    }  
    } // end while q==false  
} // end of main()
```