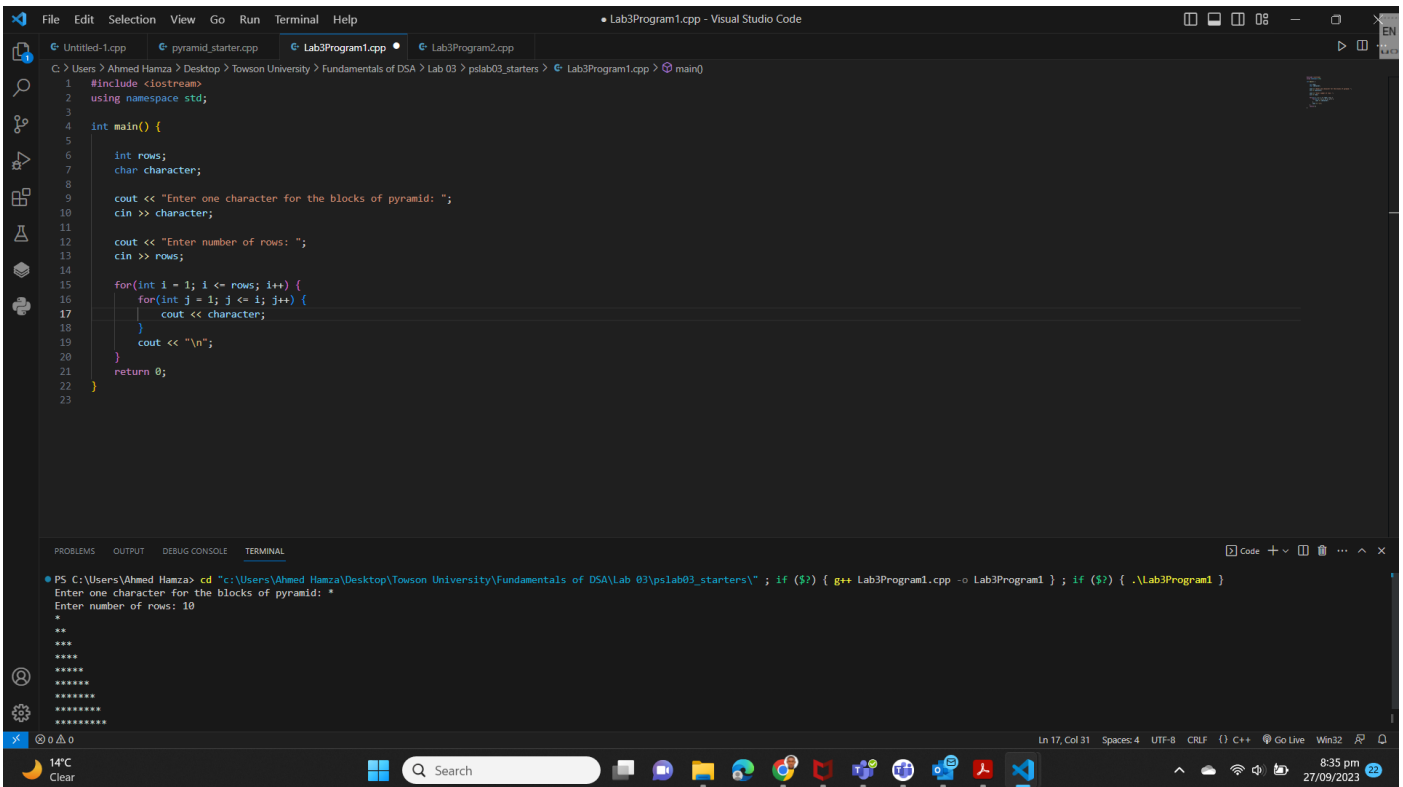


## Lab # Screenshots of Running Results

### 1. Program 1 Screenshot.



```
File Edit Selection View Go Run Terminal Help
• Lab3Program1.cpp - Visual Studio Code

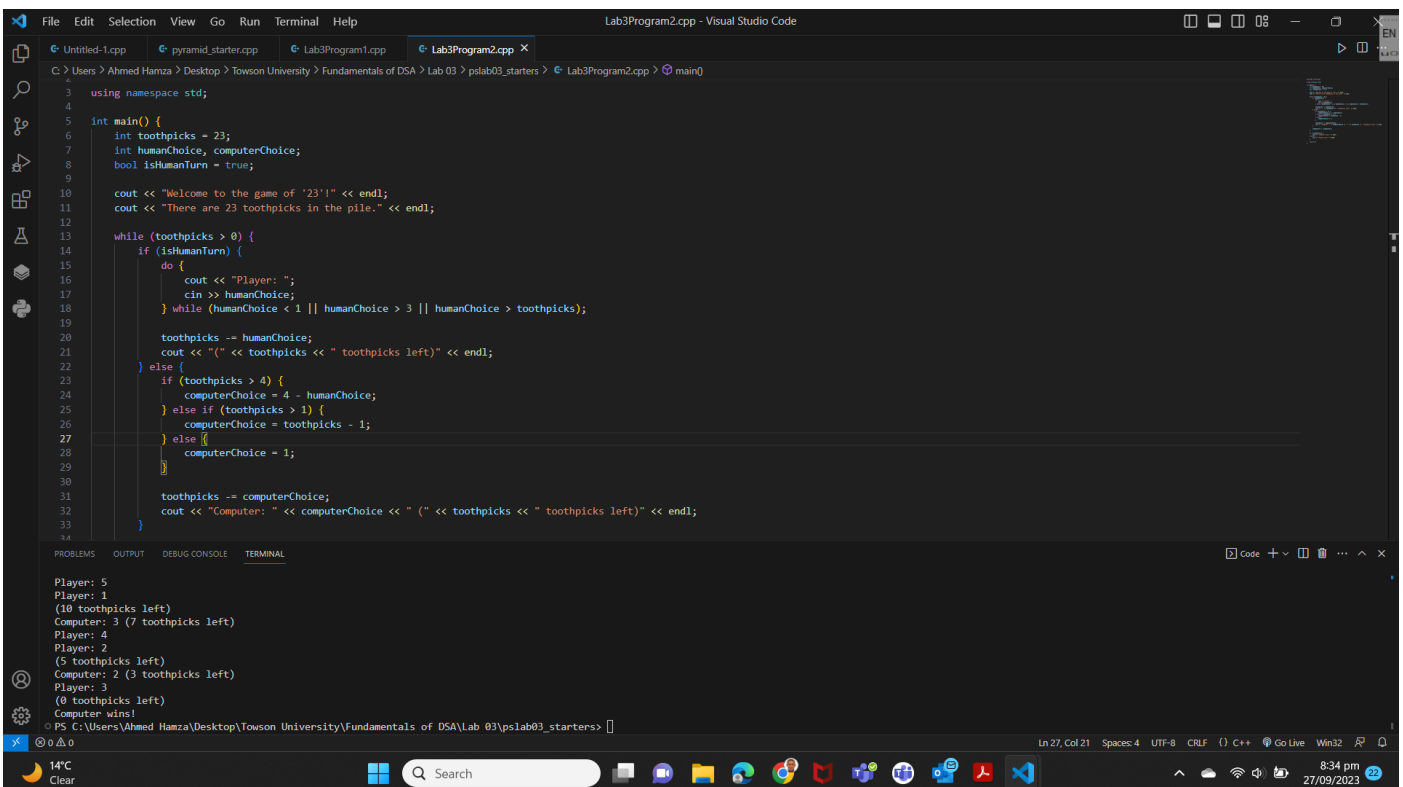
C:\Users\Ahmed Hamza\Desktop> Towson University > Fundamentals of DSA > Lab 03 > pslab03_starters > Lab3Program1.cpp > main()
1 #include <iostream>
2 using namespace std;
3
4 int main() {
5     int rows;
6     char character;
7
8     cout << "Enter one character for the blocks of pyramid: ";
9     cin >> character;
10
11     cout << "Enter number of rows: ";
12     cin >> rows;
13
14     for(int i = 1; i <= rows; i++) {
15         for(int j = 1; j <= i; j++) {
16             cout << character;
17         }
18         cout << "\n";
19     }
20     return 0;
21 }
22
23
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

```
PS C:\Users\Ahmed Hamza> cd "c:\Users\Ahmed Hamza\Desktop\Towson University\Fundamentals of DSA\Lab 03\pslab03_starters\"; if ($?) { g++ Lab3Program1.cpp -o Lab3Program1 }; if ($?) { .\Lab3Program1 }
Enter one character for the blocks of pyramid: *
Enter number of rows: 10
*
**
***
****
*****
*****
*****
*****
*****
*****
```

14°C Clear 8:35 pm 27/09/2023

### 2. Program 2 Screenshot.



```
File Edit Selection View Go Run Terminal Help
Lab3Program2.cpp - Visual Studio Code

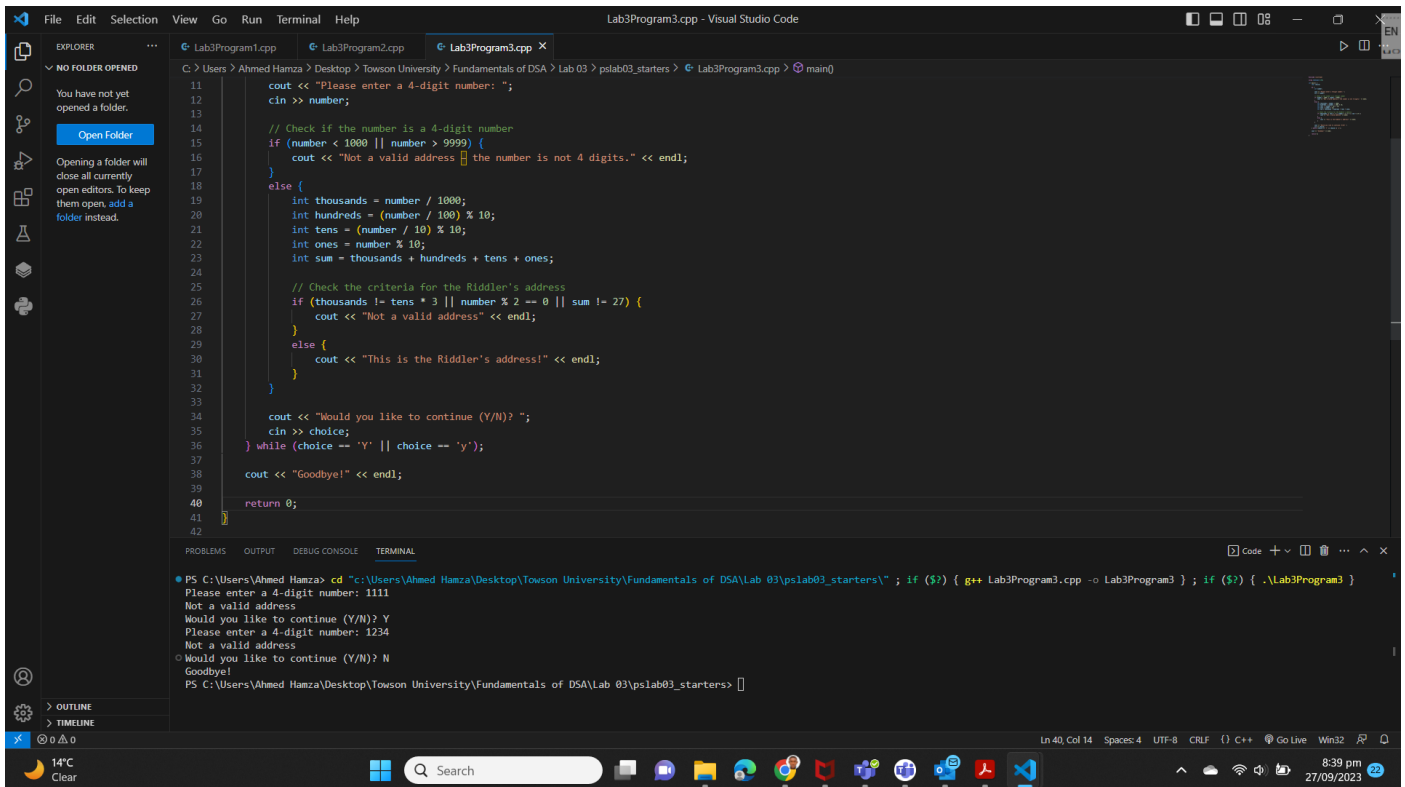
C:\Users\Ahmed Hamza\Desktop> Towson University > Fundamentals of DSA > Lab 03 > pslab03_starters > Lab3Program2.cpp > main()
1 using namespace std;
2
3 int main() {
4     int toothpicks = 23;
5     int humanChoice, computerChoice;
6     bool isHumanTurn = true;
7
8     cout << "Welcome to the game of '23!'" << endl;
9     cout << "There are 23 toothpicks in the pile." << endl;
10
11     while (toothpicks > 0) {
12         if (isHumanTurn) {
13             do {
14                 cout << "Player: ";
15                 cin >> humanChoice;
16             } while (humanChoice < 1 || humanChoice > 3 || humanChoice > toothpicks);
17             toothpicks -= humanChoice;
18             cout << "(" << toothpicks << " toothpicks left)" << endl;
19         } else {
20             if (toothpicks > 4) {
21                 computerChoice = 4 - humanChoice;
22             } else if (toothpicks > 1) {
23                 computerChoice = toothpicks - 1;
24             } else {
25                 computerChoice = 1;
26             }
27             toothpicks -= computerChoice;
28             cout << "Computer: " << computerChoice << "(" << toothpicks << " toothpicks left)" << endl;
29         }
30     }
31     cout << "Computer wins!" << endl;
32 }
33
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

```
Player: 5
Player: 1
(10 toothpicks left)
Computer: 3 (7 toothpicks left)
Player: 4
Player: 2
(5 toothpicks left)
Computer: 2 (3 toothpicks left)
Player: 3
(0 toothpicks left)
Computer wins!
PS C:\Users\Ahmed Hamza\Desktop\Towson University\Fundamentals of DSA\Lab 03\pslab03_starters>
```

14°C Clear 8:34 pm 27/09/2023

### 3. Program 3 Screenshot.



The screenshot displays the Visual Studio Code interface with the file `Lab3Program3.cpp` open. The code is a C++ program that prompts the user for a 4-digit number, checks if it is a valid 4-digit number, and then checks if it meets the criteria for the Riddler's address. The program also asks if the user wants to continue.

```
11  cout << "Please enter a 4-digit number: ";
12  cin >> number;
13
14  // Check if the number is a 4-digit number
15  if (number < 1000 || number > 9999) {
16      cout << "Not a valid address [ ] the number is not 4 digits." << endl;
17  }
18  else {
19      int thousands = number / 1000;
20      int hundreds = (number / 100) % 10;
21      int tens = (number / 10) % 10;
22      int ones = number % 10;
23      int sum = thousands + hundreds + tens + ones;
24
25      // Check the criteria for the Riddler's address
26      if (thousands != tens * 3 || number % 2 == 0 || sum != 27) {
27          cout << "Not a valid address" << endl;
28      }
29      else {
30          cout << "This is the Riddler's address!" << endl;
31      }
32  }
33
34  cout << "Would you like to continue (Y/N)? ";
35  cin >> choice;
36  } while (choice == 'Y' || choice == 'y');
37
38  cout << "Goodbye!" << endl;
39
40  return 0;
41
42
```

The terminal output shows the program's execution with the following steps:

```
PS C:\Users\Ahmed Hamza> cd "c:\Users\Ahmed Hamza\Desktop\Towson University\Fundamentals of DSA\Lab 03\pslab03_starters\" ; if ($?) { g++ Lab3Program3.cpp -o Lab3Program3 } ; if ($?) { .\Lab3Program3 }
Please enter a 4-digit number: 1111
Not a valid address
Would you like to continue (Y/N)? Y
Please enter a 4-digit number: 1234
Not a valid address
Would you like to continue (Y/N)? N
Goodbye!
PS C:\Users\Ahmed Hamza\Desktop\Towson University\Fundamentals of DSA\Lab 03\pslab03_starters>
```

The status bar at the bottom indicates the file is at line 40, column 14, with 4 spaces, UTF-8 encoding, CRLF line endings, and C++ language. The system tray shows the date and time as 8:39 pm on 27/09/2023.