NUST SCHOOL OF MECHANICAL &MANUFACTURING ENGINEERING

Lab Manual NO:6

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Course: FOP

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Lab Task:

1. Generate the Fibonacci sequence using nested loops.

```cpp
#include <iostream>
using namespace std;
int main() {
    int N;
cout << "Enter the number of terms in the Fibonacci sequence: ";
    cin >> N;

    int first_integer = 0, second_integer = 1;

    cout << "The Fibonacci Sequence is: ";

    for (int i = 0; i < N; ++i) {
        cout << first_integer << " ";

        int next_integer = first_integer + second_integer;

        first_integer = second_integer;
        second_integer = next_integer;
    }
    cout << endl;
    return 0;
}
```
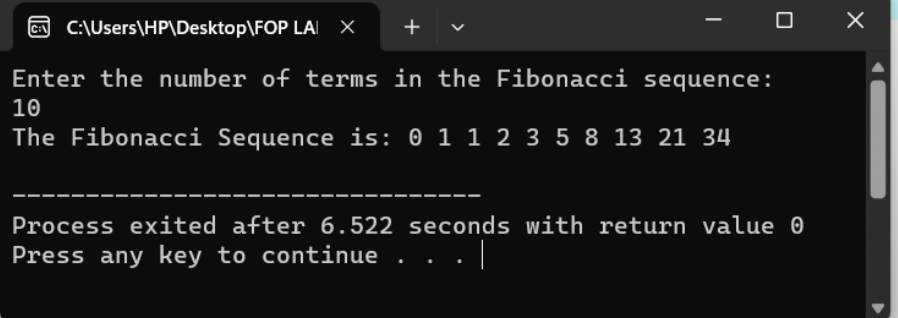
```
Enter the number of terms in the Fibonacci sequence:
10
The Fibonacci Sequence is: 0 1 1 2 3 5 8 13 21 34

-----------------------------------
Process exited after 6.522 seconds with return value 0
Press any key to continue . . .
```

2. Create Pascal's triangle with nested loops.

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

    // Input the number of rows for Pascal's Triangle
    cout << "Enter the number of rows for Pascal's Triangle: ";
    cin >> numRows;

    // Generate and display Pascal's Triangle
    for (int i = 0; i < numRows; ++i) {
        int value = 1;

        // Print leading spaces for alignment
        for (int j = 0; j < numRows - i; ++j) {
            cout << "   ";
        }

        // Calculate and display valuefor the current row
        for (int j = 0; j <= i; ++j) {
            cout << "     " << value;

            // Calculate the next value
            value = value * (i - j) / (j + 1);
        }
        cout << endl;
    }

    return 0;
}
```
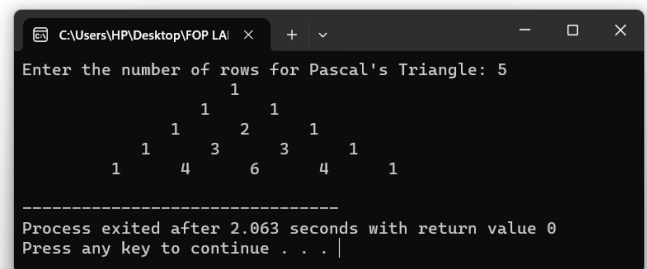
```
Enter the number of rows for Pascal's Triangle: 5
              1
           1     1
        1     2     1
     1     3     3     1
  1     4     6     4     1

-----------------------------------
Process exited after 2.063 seconds with return value 0
Press any key to continue . . .
```
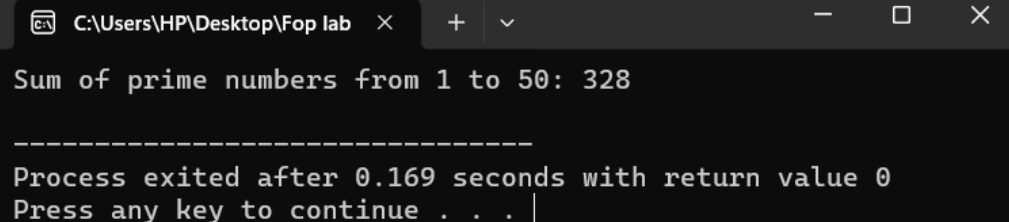
Home Task:

1. Write a program using break or continue statement that only adds prime numbers from 1 to 50 and display the sum on screen

```cpp
#include <iostream>
using namespace std;
int main() {
    int sum = 0;
    for (int i = 2; i <= 50; ++i) {
        int prime = 1;
        for (int j = 2; j <= i / 2; ++j) {
            if (i % j == 0) {
                prime = 0;
                break;
            }
        }
        if (prime) {
            sum += i;
        }
    }
    cout << "Sum of prime numbers from 1 to 50: " << sum << endl;
    return 0;
}
```

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Sum of prime numbers from 1 to 50: 328

Process exited after 0.169 seconds with return value 0
Press any key to continue . . .

2. Write a program in C++ to create the following pattern.

1

1 2

1 2 3
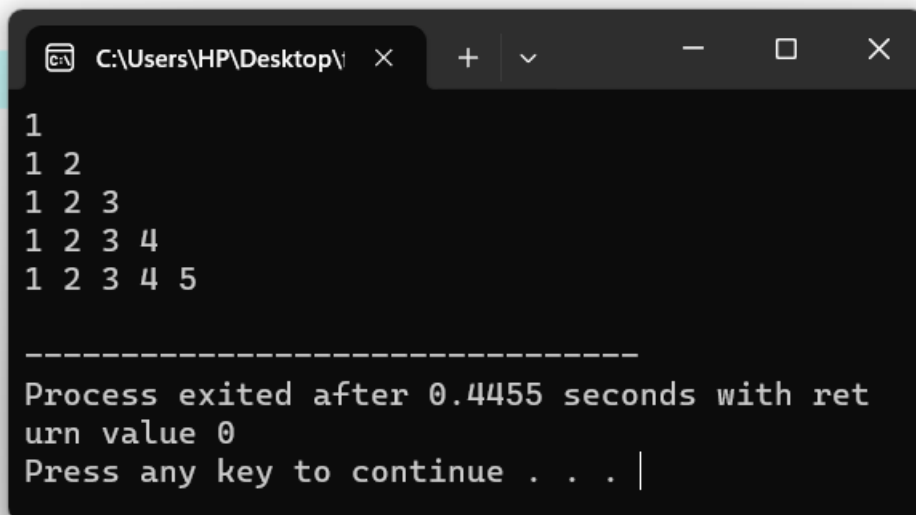
1 2 3 4

1 2 3 4 5 3.

```cpp
#include <iostream>
using namespace std;
int main() {
    int rows = 5;

    for (int i = 1; i <= rows; ++i) {
        for (int j = 1; j <= i; ++j) {
            cout << j << " ";
        }
        cout << endl;
    }
    return 0;
}
```

```
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1
1 2
1 2 3
1 2 3 4
1 2 3 4 5

--------------------------------
Process exited after 0.4455 seconds with ret
urn value 0
Press any key to continue . . . |
```

3. Write a C++ program to print:

1

2 2

4 4 4 4

6 6 6 6 6

```cpp
#include <iostream>
using namespace std;
int main() {
int rows = 3;
    cout<<"1"<<endl;
    for (int i = 1; i <= rows; ++i) {

        // Print the first digit of each row
        cout << i * 2 << " ";
        for (int j = 1; j <= i; ++j) {
            cout << i * 2 << " ";

        }
        cout << endl;
    }
    return 0;
}
```

```
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1
2 2
4 4 4
6 6 6 6

------------------------------------
```

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