

CSE102L Computer Programming Lab

LAB # 7



2020

Submitted to:

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Registration No :

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Semester: 2nd

Class Section: C

“On my honor, as student of University of Engineering and Technology,

I have neither given nor received unauthorized assistance on this academic work.”

July 16 , 2020

Department of Computer Systems Engineering
University of Engineering and Technology, Peshawar

Task 1:

Title:

Print 1 to 100 using recursive function in C++.

Code:

```
#include<iostream>
```

```
using namespace std;
```

```
void x();
```

```
int main()
```

```
{
```

```
    x();
```

```
    return 0;
```

```
}
```

```
void x()
```

```
{
```

```
    static int i = 1;
```

```
    if(i > 100) return;
```

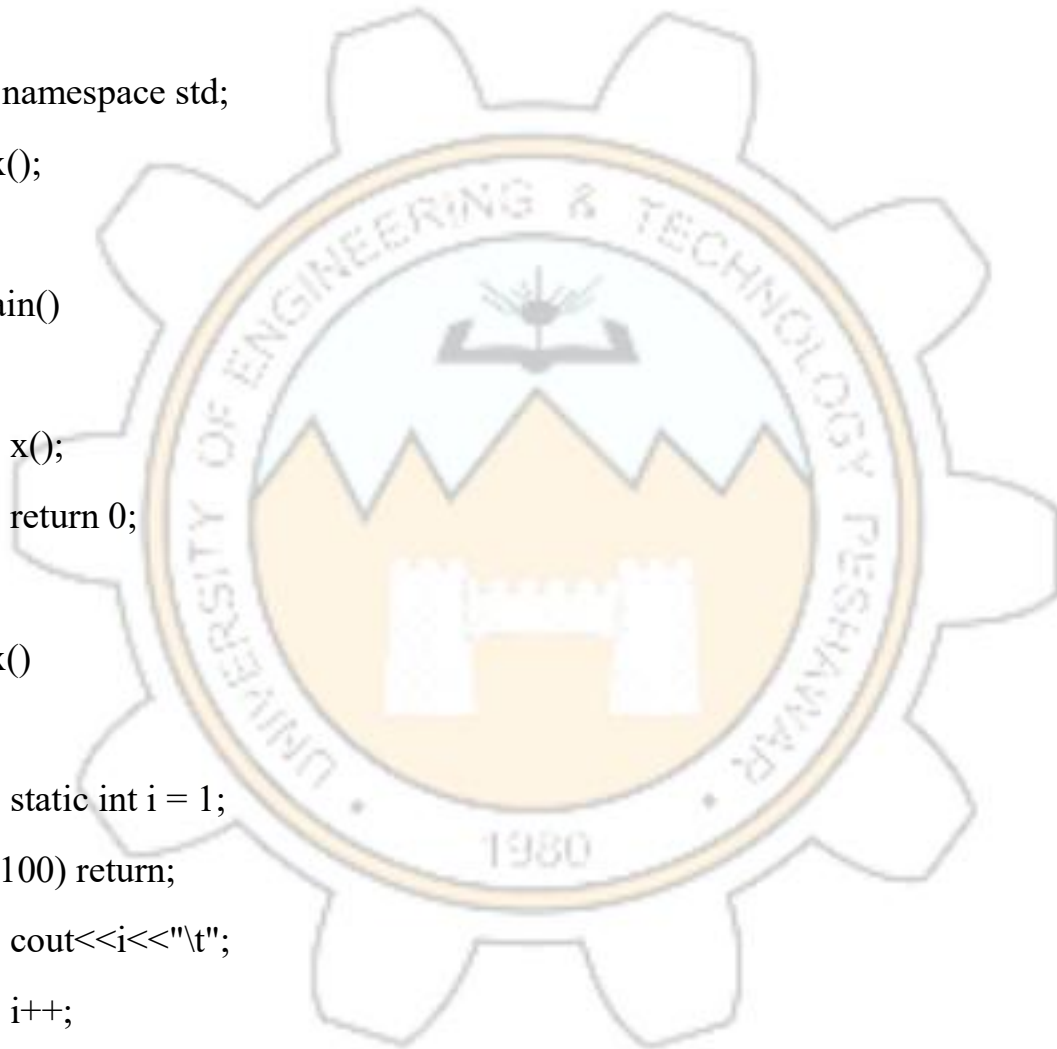
```
    cout<<i<<"\t";
```

```
    i++;
```

```
    x();
```

```
}
```

Output:



```
C:\Users\Pc\Documents\CPP Lab pactice\1_to_100_using_recursion.exe
d; 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
31 32 33 34 35 36 37 38 39 40 41 42 43 44 45
46 47 48 49 50 51 52 53 54 55 56 57 58 59 60
61 62 63 64 65 66 67 68 69 70 71 72 73 74 75
76 77 78 79 80 81 82 83 84 85 86 87 88 89 90
91 92 93 94 95 96 97 98 99 100
-----
Process exited after 0.09001 seconds with return value 0
Press any key to continue . . .
```

Task 2:

Title:

Write a C++ program where you take two values from user if the user enter one or two of the values zero instead of passing the zero values to the function let the function calculate default values if user enters values other than zero pass them to function and calculate their sum.

Code:

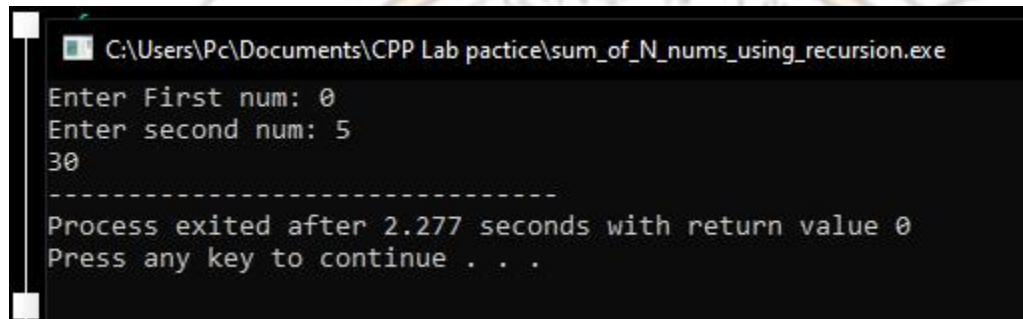
```
#include<iostream>
using namespace std;
int sum(int x = 5, int y = 25);
int main()
{
    int i, j;
    cout<<"Enter First num: ";
    cin>>i;
    cout<<"Enter second num: ";
    cin>>j;
    if((i==0)&&(j==0))
    {
        cout<<sum();
    }else if((i==0) || (j==0))
    {
        cout<<((i==0)?sum(j):sum(i));
    }
```

```
        }else
        {
            cout<<sum(i,j);
        }

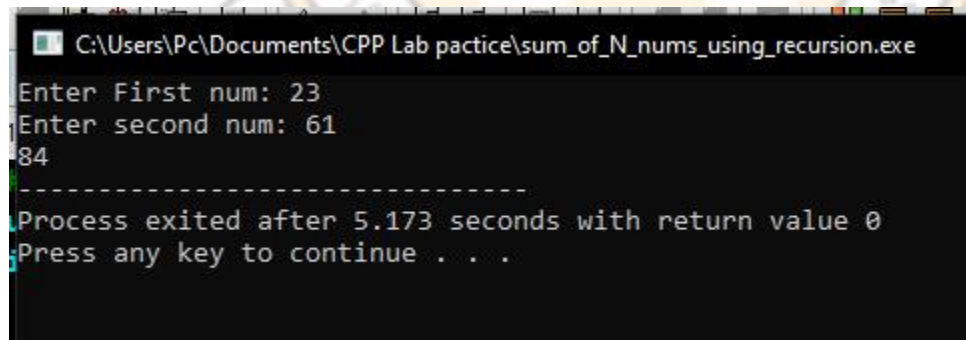
        return 0;
}

int sum(int x, int y)
{ return x + y; }
```

Output:



```
C:\Users\Pc\Documents\CPP Lab pactice\sum_of_N_nums_using_recursion.exe
Enter First num: 0
Enter second num: 5
30
-----
Process exited after 2.277 seconds with return value 0
Press any key to continue . . .
```



```
C:\Users\Pc\Documents\CPP Lab pactice\sum_of_N_nums_using_recursion.exe
Enter First num: 23
Enter second num: 61
84
-----
Process exited after 5.173 seconds with return value 0
Press any key to continue . . .
```

Task 3:

Title:

Write a function to find Sum of N natural numbers using Recursion.

Code:

```
#include<iostream>

using namespace std;

int sum(int x);

int y;

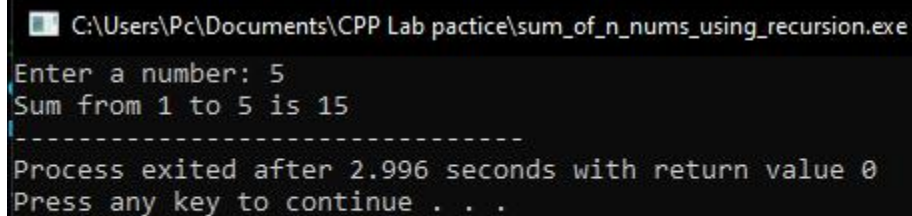
int main() {

    cout<<"Enter a number: ";
    cin>>y;
    cout<<"Sum from 1 to "<<y<<" is "<<sum(y);

    return 0;
}

int sum(int x)
{
    for(int i = 0; i<y; i++)
        x= x+i;
    return x;
}
```

Output:



```
C:\Users\Pc\Documents\CPP Lab pactice\sum_of_n_nums_using_recursion.exe
Enter a number: 5
Sum from 1 to 5 is 15
-----
Process exited after 2.996 seconds with return value 0
Press any key to continue . . .
```

Task 4:

Title:

Calculate the sum of odd natural numbers $1+3+5+7+\dots + n$ using Recursion. Take n as input from user.

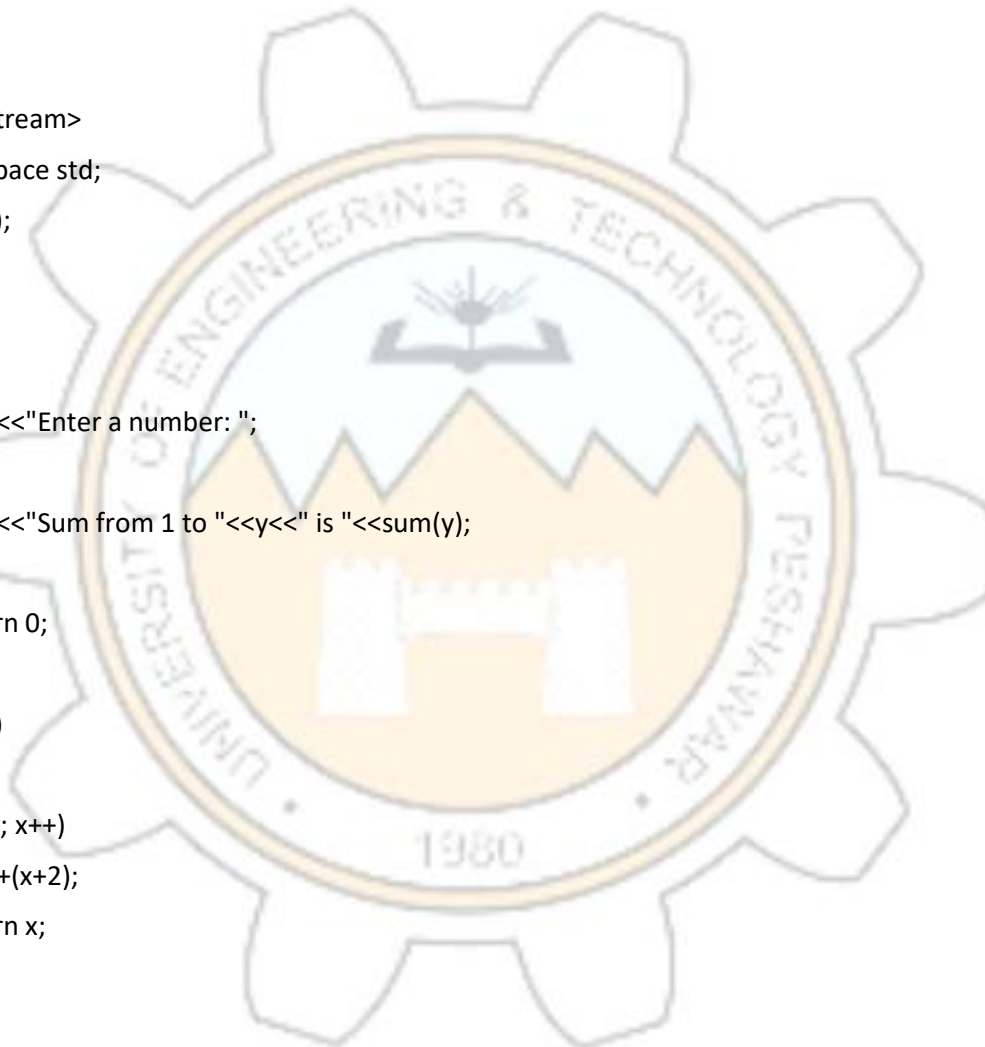
Code:

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

    cout<<"Enter a number: ";
    cin>>y;
    cout<<"Sum from 1 to "<<y<<" is "<<sum(y);

    return 0;
}
int sum(int x)
{
    for(x = 0; x<y; x++)
        x = x+(x+2);
    return x;
}
```

Output:



```
C:\Users\Pc\Documents\CPP Lab pactice\sum_of_n_nums_using_recursion.exe
Enter a number: 5
Sum from 1 to 5 is 9
-----
Process exited after 3.258 seconds with return value 0
Press any key to continue . . .
```

Task 5:

Title:

Overload three functions with name grade() one function should accept marks(int) and output the percentage and the other function should accept the percentage(float) and display the grade based on the percentage from previous function finally the third function also named grade should make a call to these other two functions.

Explanation:

Code:

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

int x;
void grade();
float grade(int marks);
void grade(float percentage);
int main()
{
    cout<<"Enter your marks (Total = 500): ";
    cin>>x;

    grade();
    return 0;
}

float grade(int marks)
```

```

{      return (((float) (marks))/500)*100;
}

void grade(float percentage)
{
    cout<<"Your grade is ";
    if(percentage > 90)
    {
        cout<<"A+";
    }else if(percentage > 80)
    {
        cout<<"A";
    }else if(percentage > 70)
    {
        cout<<"B+";
    }else if(percentage > 60)
    {
        cout<<"B";
    }else if(percentage > 50)
    {
        cout<<"C+";
    }else if(percentage > 40)
    {
        cout<<"C";
    }else if(percentage > 30)
    {
        cout<<"D";
    }else {
        cout<<"F";
    }
}

void grade() {
    float per = grade(x);
    cout<<"Your percentage is "<<per<<endl;
    grade(per);
}

```

Output:


```
C:\Users\Pc\Documents\CPP Lab pactice\grades_recursion.exe
Enter your marks (Total = 500): 444
Your percentage is 88.8
Your grade is A
-----
Process exited after 4.237 seconds with return value 0
Press any key to continue . . .
```

Task 6:

Title:

Write a C++ Program to Find Factorial of a Number Using Recursion.

Code:

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

int fact(int n);

int main() {
    int x;
    cout<<"Enter a number for factorial: ";
    cin>>x;
    if(x >= 0) cout<<"Factorial of "<<x<<" is "<<fact(m);
    else
        cout<<"Factorial of negative numbers cannot be calculated.";

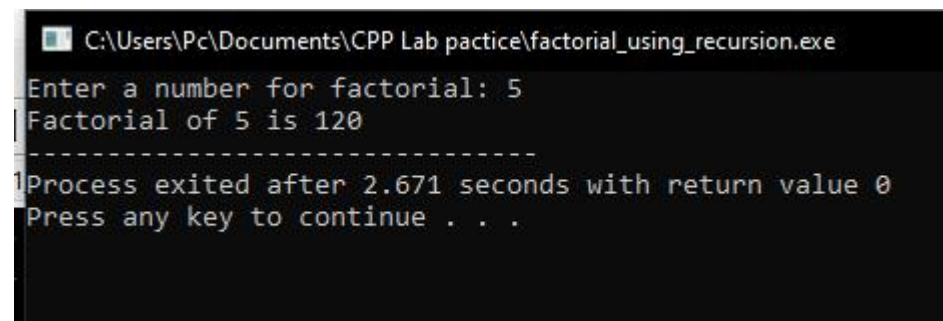
    return 0;
} int fact(int n)
{
```

```
        if(n == 0) return 1;

    return n * fact(n - 1);

}
```

Output:



```
C:\Users\Pc\Documents\CPP Lab pactice\factorial_using_recursion.exe
Enter a number for factorial: 5
Factorial of 5 is 120
-----
Process exited after 2.671 seconds with return value 0
Press any key to continue . . .
```

Task #7:

Title:

C++ Program to Find L.C.M Using Recursion.

Code:

```
#include<iostream>

using namespace std;

int lcm(int x, int y);

int main()

{

    int i, j;

    cout<<"Enter first number: ";
```

```
    cin>>i;

    cout<<"Enter second number: ";

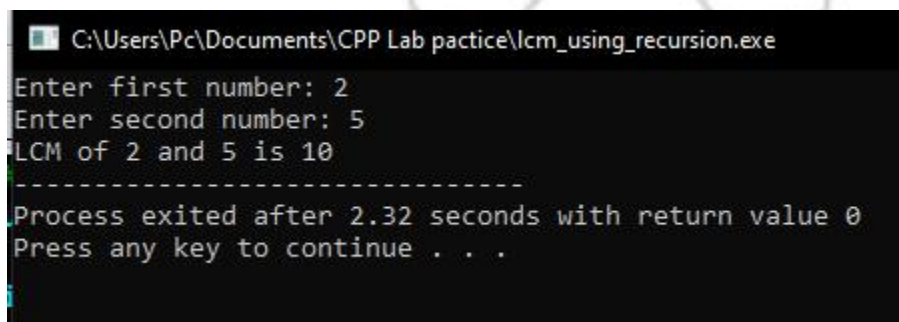
    cin>>j;

    cout<<"LCM of "<<i<<" and "<<j<<" is "<<lcm(i,j);

return 0;
}

int lcm(int x, int y)
{
    static int xiv = x;
    if(x % y == 0) return x;
    x += xiv;
    return lcm(x, y);
}
```

Output:

A screenshot of a Windows command prompt window. The title bar shows the file path: C:\Users\Pc\Documents\CPP Lab pactice\lcm_using_recursion.exe. The output of the program is displayed in white text on a black background. It shows the user entering '2' for the first number and '5' for the second number. The program then outputs 'LCM of 2 and 5 is 10'. Below this, a separator line of dashes is shown, followed by the message 'Process exited after 2.32 seconds with return value 0' and 'Press any key to continue . . .'.

```
C:\Users\Pc\Documents\CPP Lab pactice\lcm_using_recursion.exe
Enter first number: 2
Enter second number: 5
LCM of 2 and 5 is 10
-----
Process exited after 2.32 seconds with return value 0
Press any key to continue . . .
```

Task #8:

Title:

C++ program to print Fibonacci series using recursion.

Code:

```
#include<iostream>

using namespace std;

void fib(int n);

int main()
{
    int x;

    cout<<"Enter a number to find fibonacci series upto that number: ";
    cin>>x;

    fib(x);

    return 0;
} void fib(int n)
{
    static int i = 0, j = 1;

    cout<<i<<" ";

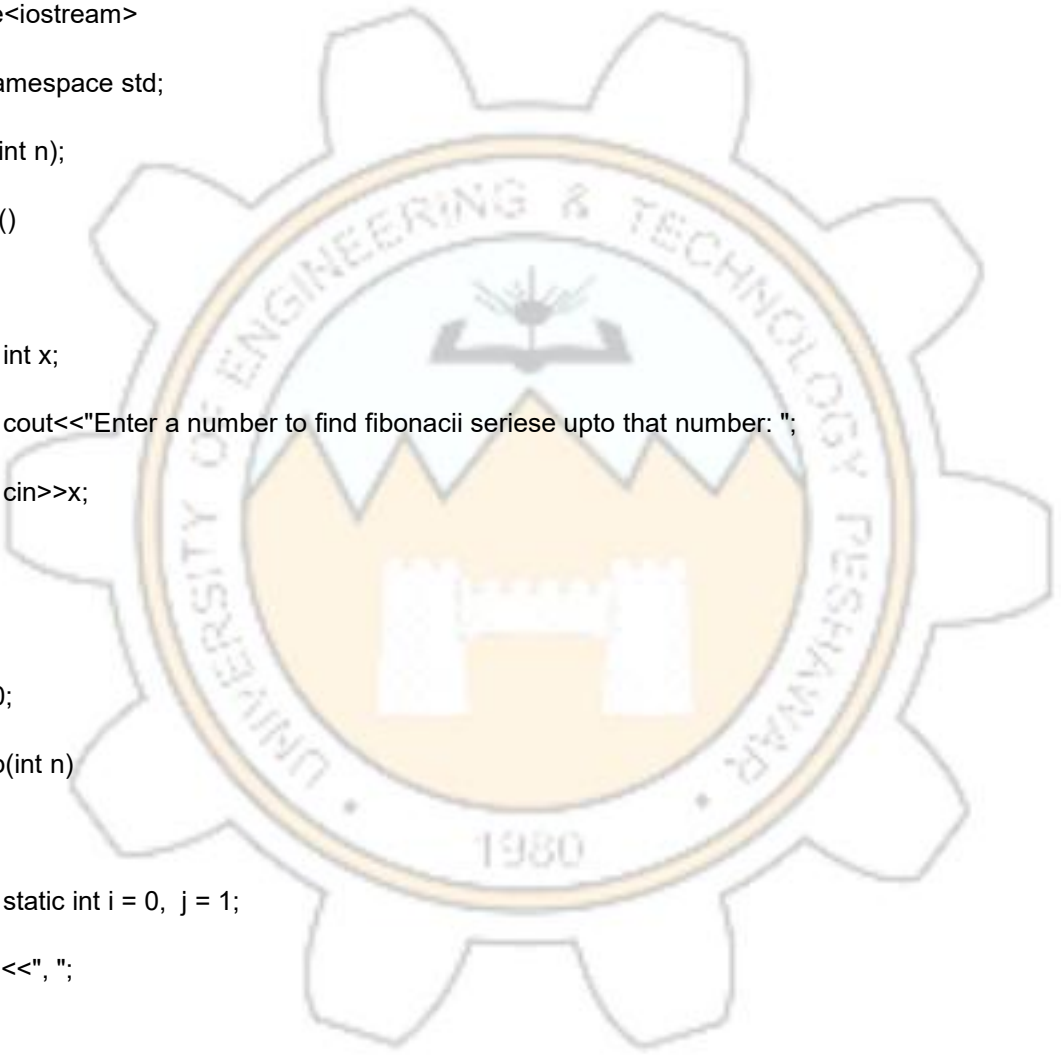
    j+= i;

    i = j - i;

    if(i > n) return;

    fib(n);

}
```

The logo of the University of Engineering & Technology Peshawar is a circular emblem. It features a gear-like outer border. Inside the circle, there is a stylized mountain range with a sun or star rising above it. The text "UNIVERSITY OF ENGINEERING & TECHNOLOGY PESHAWAR" is written around the inner circle, and the year "1980" is at the bottom.

Output:

```
Select C:\Users\Pc\Documents\CPP Lab pactice\fibonacci_series_recursion.exe
Enter a number to find fibonacci series upto that number: 43
0, 1, 1, 2, 3, 5, 8, 13, 21, 34,
-----
Process exited after 2.466 seconds with return value 0
Press any key to continue . . .
```

Task #9:

Title:

C++ program to calculate power of a number using recursion.

Code:

```
#include<iostream>
using namespace std;
int power(int base, int exp);
int main()
{
    int num, exp;
    cout<<"Enter number: ";
    cin>>num;
    cout<<"Enter exponent: ";
    cin>>exp;
    cout<<num<<" Raised to power "<<exp<<" is "<<power(num, exp);
    return 0;
}

int power(int base, int exp)
```

```
{      int static x = base;

if(exp == 1)

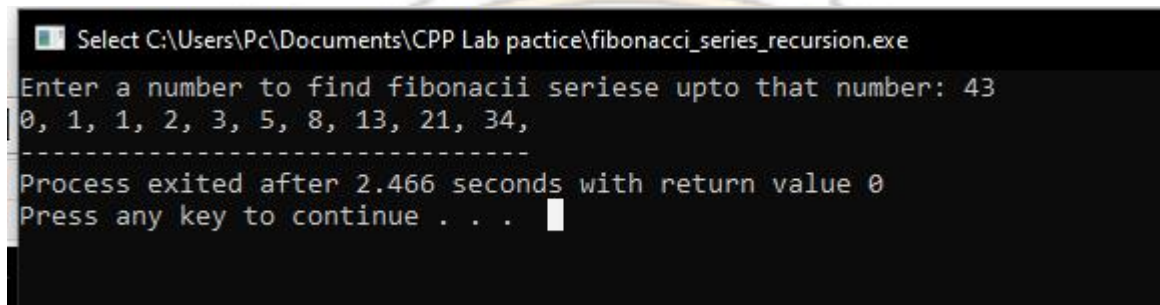
return base;

base = base * x;

return power(base, --exp);

}
```

Output:



```
Select C:\Users\Pc\Documents\CPP Lab pactice\fibonacci_series_recursion.exe
Enter a number to find fibonacci series upto that number: 43
0, 1, 1, 2, 3, 5, 8, 13, 21, 34,
-----
Process exited after 2.466 seconds with return value 0
Press any key to continue . . .
```