
ASSIGNMENT #2

PAIR MEMBERS:

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CLASS : BSCS 5th

SUBJECT : Software Engineering

TEACHER : Sir, Ahmad Moshin

```

1  #include <iostream>
2  using namespace std;
3
4  //Stub Helpers
5
6  void Zero_Factorial_Is_One()
7  { cout << "Factoiral of 0 = " << 1 << endl; }
8
9  void One_Factorial_Is_One()
10 { cout << "Factoiral of 1 = " << 1 << endl; }
11
12 void Two_Factorial_Is_Two()
13 { cout << "Factoiral of 2 = 2*1 = " << 2*1 << endl; }
14
15 void Three_Factorial_Is_Six()
16 { cout << "Factoiral of 3 = 3*2*1 = " << 3*2*1 << endl; }
17
18 void Four_Factorial_Is_TwentyFour()
19 { cout << "Factoiral of 4 = 4*3*2*1 = " << 4*3*2*1 << endl; }
20
21 void Five_Factorial_Is_OneTwenty()
22 { cout << "Factoiral of 5 = 5*4*3*2*1 = " << 5*4*3*2*1 << endl; }
23
24
25
26 //Stub
27 int CalculateFactorialOf(int number)
28 {
29     //Dummy Output
30     cout << "CalculateFactorialOf() was called with number = " << number << endl;
31     Zero_Factorial_Is_One();
32     Two_Factorial_Is_Two();
33     Three_Factorial_Is_Six();
34     Four_Factorial_Is_TwentyFour();
35     Five_Factorial_Is_OneTwenty();
36     cout << endl;
37 }
38
39
40
41 int main()
42 {
43     CalculateFactorialOf(1);
44     CalculateFactorialOf(2);
45     CalculateFactorialOf(4);
46
47     return 0;
48 }
49
50

```

```

1  //----- DRIVER PROGRAM -----//
2
3  #include <iostream>
4  #include<cassert>
5  using namespace std;
6
7
8  int CalculateFactorialOf(int number)
9  {
10     assert(number >= 0);
11
12     int fact = 1;
13     for(int i = 2; i<=number ;i++)
14         fact = fact*i;
15     return fact;
16 }
17
18
19 int main()
20 {
21     const int factorial_of_zero = 1;
22     const int factorial_of_one = 1;
23     const int factorial_of_two = 2;
24     const int factorial_of_three = 6;
25     const int factorial_of_four = 24;
26     const int factorial_of_five = 120;
27
28     int result;
29
30     cout << "Testing CalculateFactorialOf() with number = " << 0 <<endl;
31     result = CalculateFactorialOf(0);
32     cout << "Factorial = " << result << endl << endl;
33     assert(result == factorial_of_zero);
34
35     cout << "Testing CalculateFactorialOf() with number = " << 1 <<endl;
36     result = CalculateFactorialOf(1);
37     cout << "Factorial = " << result <<endl << endl;
38     assert(result == factorial_of_one);
39
40     cout << "Testing CalculateFactorialOf() with number = " << 2 <<endl;
41     result = CalculateFactorialOf(2);
42     cout << "Factorial = " << result <<endl << endl;
43     assert(result == factorial_of_two);
44
45     cout << "Testing CalculateFactorialOf() with number = " << 3 <<endl;
46     result = CalculateFactorialOf(3);
47     cout << "Factorial = " << result <<endl << endl;
48     assert(result == factorial_of_three);
49
50     cout << "Testing CalculateFactorialOf() with number = " << 4 <<endl;
51     result = CalculateFactorialOf(4);
52     cout << "Factorial = " << result <<endl << endl;
53     assert(result == factorial_of_four);
54
55     cout << "Testing CalculateFactorialOf() with number = " << 5 <<endl;
56     result = CalculateFactorialOf(6);
57     cout << "Factorial = " << result <<endl << endl;
58     assert(result == factorial_of_five);
59
60     return 0;
61 }
62
63

```

```
1  // -- FINAL APPLICATION AFTER UNIT TESTING --
2
3
4  #include <iostream>
5  using namespace std;
6
7
8  int CalculateFactorialOf(int number)
9  {
10     int fact = 1;
11     for(int i = 2; i<=number ;i++)
12         fact = fact*i;
13     return fact;
14 }
15
16
17 int main()
18 {
19     int number;
20     int result;
21     cout << "Factoiral Application \n";
22     cout << "===== \n\n";
23     cout << "Enter a number : ";
24     cin >> number;
25
26     result = CalculateFactorialOf(number);
27
28     cout << "Factorial = " << result << endl;
29     return 0;
30 }
31
32
```

OUTPUTS

Stubs OUTPUT

```
C:\Users\Probook\Desktop\Stubs.exe
CalculateFactorialOf() was called with number = 1
Factoiral of 0 = 1
Factoiral of 2 = 2*1 =2
Factoiral of 3 = 3*2*1 = 6
Factoiral of 4 = 4*3*2*1 = 24
Factoiral of 5 = 5*4*3*2*1 = 120

CalculateFactorialOf() was called with number = 2
Factoiral of 0 = 1
Factoiral of 2 = 2*1 =2
Factoiral of 3 = 3*2*1 = 6
Factoiral of 4 = 4*3*2*1 = 24
Factoiral of 5 = 5*4*3*2*1 = 120

CalculateFactorialOf() was called with number = 4
Factoiral of 0 = 1
Factoiral of 2 = 2*1 =2
Factoiral of 3 = 3*2*1 = 6
Factoiral of 4 = 4*3*2*1 = 24
Factoiral of 5 = 5*4*3*2*1 = 120

Process returned 0 (0x0)   execution time : 0.235 s
Press any key to continue.
```

Drivers with assert usage OUTPUT

```
C:\Users\Probook\UnitTestFactorial\bin\Debug\UnitTestFactorial.exe
Testing CalculateFactorialOf() with number = 0
Factorial = 1

Testing CalculateFactorialOf() with number = 1
Factorial = 1

Testing CalculateFactorialOf() with number = 2
Factorial = 2

Testing CalculateFactorialOf() with number = 3
Factorial = 6

Testing CalculateFactorialOf() with number = 4
Factorial = 24

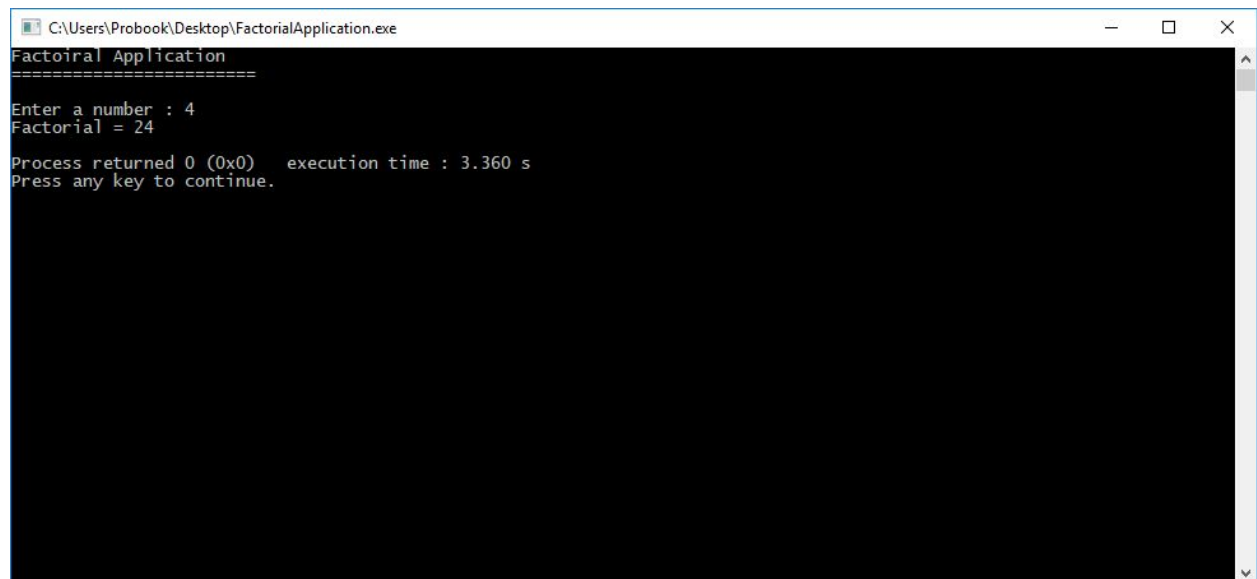
Testing CalculateFactorialOf() with number = 5
Factorial = 720

Assertion failed: result == factorial_of_five, file C:\Users\Probook\UnitTestFactorial\Driver.cpp, line 56

This application has requested the Runtime to terminate it in an unusual way.
Please contact the application's support team for more information.

Process returned 3 (0x3)   execution time : 6.205 s
Press any key to continue.
```

Final Application After Unit Testing OUTPUT



```
C:\Users\Probook\Desktop\FactorialApplication.exe
Factoiral Application
=====
Enter a number : 4
Factorial = 24
Process returned 0 (0x0) execution time : 3.360 s
Press any key to continue.
```