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Lab: Lab Example
Date: 8/29/2021

Program Description: brief *description* of the purpose of the *program and* an explanation of what your software does and what problem it solves.

> If user pass the factorial number as part of program command line parameter, it will use the command line parameter to calculate the factorial. If user didn't use the command line parameter, the program will continuously ask user to enter a number and then calculate the factorial of the inputted number. If user enters an invalid input, it asks user to enter a valid number and then calculate. Once user enters "Quit" then the program will exist.

Program Source Code

File Factorial.cpp:

```cpp
1    #include <iostream>
2    #include <cstdlib>
3    #include <string>
4    #include "factorial.h"
5
6    #include "printMeFirst.h"
7
8    using namespace std;
9
10   int getNumber(int minNum, int maxNum);   /* forward declaration */
11
12   /*
13    * This program will print out factorial number of
14    * command line input argv[1]
15    * Usage: program factNum
16    *
17    * Return: 0 - success
18    *         1 - error
19    *
20    * @file factorialSample.cpp
21    * @author Ron Sha
22    *
23    */
24
25   const int MIN NUM = 0;
26   const int MAX NUM = 15;
27
```

```cpp
28    int main (int argc, char *argv[])
29    {
30        int factNum=1;
31        int n=0;
32        int choice;
33
34        cout << "Program Name: " << argv[0] << endl;
35        cout << "Number of Program argument: " << argc - 1 << "\n\n";
36
37        printMeFirst("Ron Sha", "CS-116 Example");
38
39
40        if (argc < 2) { /* will ask user to enter factorial number */
41            do {
42                // displays menu
43                cin.clear();
44                cout << "Choose a selection below:" << endl;
45                cout << "\t1 - Enter a number to calculate factorial number" << endl;
46                cout << "\t2 - Quit" << endl;
47                cin >> choice;
48
49                if (cin.fail()) { /* this is used to clear input buffer */
50                    cin.clear();
51                    cin.ignore();
52                };
53
54                // handles choice input
55                switch (choice) {
56                    case 1:
57                        n = getNumber(MIN NUM, MAX NUM); /* get a number between pa
58                        factNum = factorial(n);
59                        cout << "Factorial of " << n << " is " << factNum << endl;
60                        break;
61                    case 2:
62                        break;
63                    default:
64                        cout << "Please enter a valid selection." << endl;
65                        break;
66                };
67                cout << endl;
68            } while (choice != 2); // loops menu and functions until quit
69        }
70        else {
71
72            /*
73             * convert argv[1] to integer and
74             * print out factorial of argv[1] input
75             */
76
77            n = atoi(argv[1]);
78            factNum = factorial(n);
79
80            cout << "Factorial of " << n << " = " << factNum << endl;
81        }
82
83        return(0);
84    }
```

(more codes from this file if any)
*****

File factorial_func.cpp:

```cpp
1    #include <iostream>
2    #include <cstdlib>
3    #include <string>
4
5    # include "factorial.h"
6
7    using namespace std;
8
9    /*
10    * Purpose:  this function will take a number input and return the
11    *   factorial of number input.
12    *
13    * @parm n - number to be used to calculate the factorial.
14    *           n must be positive number
15    * @return - return the factorial of n
16    *
17    */
18
19    int factorial (int n)
20    {
21        int num=1; // initialize default factori number to 1
22
23        if (n < 1) {
24            cout << "Factorial number must be > 0\n";
25            num = 0;
26        } else if (n == 1)
27            num = 1;
28        else {
29            for (int i=1; i<=n; i++) {
30                num = num * i;
31            }
32        }
33        return (num);
34    }
```

Program Output

Run the program using the command line parameter:

```
cnet@cnet:~/Documents/Sample/Makefile_Sample$ ./factorial 10
Program Name: ./factorial
Number of Program argument: 1

Program written by: Ron Sha
Course Info: CS-116 Example
Date: Sun Aug 29 22:40:00 2021

Factorial of 10 = 3628800
```

Run the program asking user's input:

```
cnet@cnet:~/Documents/Sample/Makefile_Sample$ ./factorial
Program Name: ./factorial
Number of Program argument: 0

Program written by: Ron Sha
Course Info: CS-116 Example
Date: Sun Aug 29 22:41:11 2021

Choose a selection below:
        1 - Enter a number to calculate factorial number
        2 - Quit
1
Enter a number between 0 and 15: 3
Num: 3
Factorial of 3 is 6

Choose a selection below:
        1 - Enter a number to calculate factorial number
        2 - Quit
1
Enter a number between 0 and 15: 25
Enter a number between 0 and 15: 6
Num: 6
Factorial of 6 is 720

Choose a selection below:
        1 - Enter a number to calculate factorial number
        2 - Quit
2
```