



CSE122 Computer Programming

Sheet 4: User-Defined Functions

1. Write a function that check if the given integer value is prime or not. The function should return 1 if the number is prime and 0 if not.
2. Write a C-function to calculate a factorial of x where x is a positive integer greater than or equal to zero.
3. Write a C program that calls a C++ function *Calculate* that gets the two parameters, x , R and computes :

$$C_R^x = \frac{x!}{R!(x-R)!}$$

4. Write a C++ function to count the number of digits of a given long integer number, and print out this number in reverse order.
5. Write the C++ function, digit (n, k), that returns the value of the kth digit from the right of the number n. Write a C++ program that uses this function. The program should read integer values for the n and k.
6. Write a C++ function that returns the number of terms of the following series summation such that their total sum does not exceed 2.

$$\text{Sum} = 1 + 1/2 + 1/3 + 1/4 + \dots$$

7. You can approximate PI by using the following series:

$$\text{PI} = 4 * (1 - 1/3 + 1/5 - 1/7 + 1/9 - 1/11 + \dots)$$

Write a C++ program that will find out how many terms of this series you need to use before you first exceed 3.14159.

8. Write the following functions:

- a. ToLower that takes any character and return its lower case.
 - b. ToUpper that takes any character and return its upper case.
9. Write a C++ function to read a sequence of characters and calculates the number of capital letters in this sequence, the function terminates when a full stop character is entered or the number of character exceeds 100.
10. Write C+ program to evaluate the following formula for a given x.

$$Z = \sum_{i=0}^{\infty} \frac{(-1)^i x^{2i+1}}{(2i+1)!}$$

Show how to manage the infinity number of terms.

11. Write a C-program that calculates $S = \sum_{t=0}^{t=100} e^{-xt}$ for a given x.

12. What will be the output of the following programs?

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| <pre>void F1(); void F2(); void F3(); //////// int main() { F1(); getch(); return 0; } //////// void F3() { cout<<"\nHi"; F1(); } //////// void F2() { F3(); } //////// void F1() { F2();</pre> | <pre>void F1(); void F2(); void F3(); int N = 5; int main() { F1(); getch(); return 0; } //////// void F3() { if(N-->0){ cout<<"\nHi"; F1();} } //////// void F2() { F3(); } //////// void F1() {</pre> | <pre>void F1(); void F2(); void F3(); //////// int N = 5; int main() { F1(); getch(); return 0; } //////// void F3() { int N = 5; if(N-->0){ cout<<"\nHi"; F1();} } //////// void F2() { F3(); } //////// void F1() {</pre> | <pre>void F1(); void F2(); void F3(); //////// int N = 5; int main() { F1(); getch(); return 0; } void F3() { static int N = 5; if(N-->0){ cout<<"\nHi"; F1();} } //////// void F2() { F3(); } //////// void F1() {</pre> |
|---|--|--|--|

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|---|------------|-----------------|-----------------|
| } | F2(); } | { F2(); } | { F2(); } |
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13. What is wrong with the following program?

```
#include <iostream>
#include <conio.h>
using namespace std;
int f(int a) {return a*a;}
int f(int a=1,int b=1) {return a*b;}
int main(){
cout<<"Area="<<f(5);

return 0;
}
```
