

Lab 05

Functions

Lab objectives

After completing this lab, students should be able to

- Explain the concepts of functions
- Explain what a function prototype is and how that is different from the function definition
- Convert the code processing in the main function to a function called from the main function

Task: 01

Write a program that prints all prime numbers between 2 and 1000 inclusive. Your program should have a function named 'prime' which accepts an integer and return a Boolean (a *true* if the number is prime and *false* otherwise).

Task: 02

Write a program that takes 'n' and 'x' from the user and computes the following series.

$$s = \sum_{k=0}^n x^k / k!$$

Note: Implement separate functions for power and factorial and call them 'n' times from the main function.

Task: 03

Implement a 'swap' function having return type void that accepts two variables (by reference) from the main function and swap their values. Print the values of the two variables in the main function before and after the function call.

Task: 04

A “Perfect” number is a positive whole number that is the sum of its proper divisors (including 1 and excluding the number itself). For example, the proper divisors of 6 are 1, 2, 3 and $1 + 2 + 3 = 6$. So, 6 is a perfect number. Similarly, 28 is also a perfect number.

Write a program that displays first 5 perfect numbers. The program should be composed of at least two functions additional to main function, one that accepts a number and returns a Boolean *true* if the number is perfect and *false* otherwise. The other function should display all the proper divisors of the perfect number.

Sample Run:

6 is a perfect number

$1 + 2 + 3 = 6$

28 is a perfect number

$1 + 2 + 4 + 7 + 14 = 28$