Introduction to Computer Science
Tutorial 9: Functions

1. Some Arithmetic Functions

In a C file, define the following functions:

1. `int square(int)` that calculates the mathematical function x -> x^2.

2. `int abs(int)` that calculates the function x -> {-x if x <0, x otherwise}.

3. `int max(int,int)` that calculates the function (x,y) -> {x if x>y, y otherwise}.

4. `int maxAbs(int,int)` that calculates the function (x,y) -> {|x| if |x|>|y|, |y| otherwise}. The definition of `maxAbs` should not use any conditional statement or operator, and should use call the previous functions `abs` and `max`.

Write a main function that allows you to test your functions.

2. Prime Numbers and Fibonacci Numbers

2.1 Define a function **int isPrime(int n)** that returns 1 of n is a prime and 0 otherwise. Write a main function that reads an integer from standard input, and checks whether it is a prime number, showing the result of the check on standard output.

2.2 Write a function **int fibonacci(int n)** that returns the nth Fibonacci number. Write a main function that reads an integer n from standard input, prints out the n-th Fibonacci number on standard output.

2.3 Write a program that reads an integer n from standard input (or, better, as a command line argument), and finds the positive integers smaller or equal to n that are at the same time Fibonacci numbers and prime numbers.

3. Goldbach Conjecture

The Goldbach conjecture says that every even integer n greater than 2 is the sum of two prime numbers. Computers have been used extensively to test this conjecture. No counterexample has ever been found.

Write a C program that will test that the conjecture for all even integers between n and m, positive integers received from standard input. Your output must show, for each even integer, if decomposable as two primes, the two that lead to the number. For instance:

```
700 = 17 + 683
702 = 11 + 691
```

4. Strings

4.1 Design and implement in C a program that receives two strings from standard input (or from the command line, would be better), and decides whether these strings are anagrams.