CS 207 Design and Analysis of Algorithms

Assignment - 1

1. The Greatest Common Divisor (GCD) of two integers A and B is the largest integer that divides both A and B. The Euclidean Algorithm is a technique for quickly finding the GCD of two integers. Implement this algorithm in language that you are comfortable. Analyse the performance of algorithm in the best, average and the worst case scenario of input using your program.

   Input: Two integers A, B
   Output: GCD of A and B

   Ans = GCD (A, B)

2. Write program to:
   a. Find the smallest element in an array: Min(A).

      Input: An array A of size n.
      Output: Print the smallest element and its index (location).

   b. Find largest element in an array: Max(A).

      Input: An array A of size n.
      Output: Print the largest element and its index (location).

Plot a graph for the input size (in terms of number of elements in the array) versus the number of steps that your algorithm takes to find the result using pen-paper or any tool. The input size should vary from 10 to 1000 or more to observe the behaviour of algorithm.

3. Write a program to find the nth number in a Fibonacci sequence: Fibo(n).

   Input: An integer n.
   Output: nth Fibonacci number.

   Plot a graph for the input size (in terms of digit n) versus the number of steps that your algorithm takes to find the result using pen-paper or any tool. The input size should vary from 10 to 1000 or more to observe the behaviour of algorithm.

DEADLINE for completing assignments is January 21, 2015. Students will be evaluated on the basis of their submissions by TAs in the lab.