Design and Analysis of Algorithms

CSE RU

**Assignments**

1. You have to set a problem for a competitive programming contest. Write a problem description so that it can be solved using Depth-First-Search algorithm. Prepare sample input-output and judge input-output. Judge input-output should contain at least one critical input-output. Which one is critical input-output and why. Explain.
2. Given some numbers 31,20,30,25,14,8,21,9,26,12,28,14,7,27,,311,19 and 2. Develop an algorithm so that it can sort the numbers in 0(n) time. You can’t use an array.
3. In terms of time complexity and space complexity, which input representation is suitable of Breath-First-Search algorithm and why. Explain.
4. N points of polygon are given. How can you efficiently find out, if a polygon is convex or non-convex?
5. Given a set of numbers. Perform Greatest Common Divisor (GCD) operation to any range of the numbers. Numbers are {2, 3, 60, 90, 50} and queries are given by index ranges {(1, 3), (2, 4) and (0, 2)}. Represent the numbers using an efficient data structure and perform the queries.
6. How can you find the largest circle that can fit inside a non-convex polygon?