

**Quiz 01****Subject:** Advanced Algorithms - CES 608**Date:** Tue 18/04/2017**Duration:** 10 minutes**№ of Questions:** 2 in 1 page(s)**Total Points:** 10 (10 Marks)

Attempt the following questions.

Question 1:**(05 pts)**

Given the following algorithm:

```

ALGORITHM Minimum Difference (A[0..n - 1])
  x ← ∞
  for i ← 0 to n - 1 do
    for j ← 0 to n - 1 do
      if i ≠ j and |A[i] - A[j]| < x
        x ← |A[i] - A[j]|
  return x

```

- a) Implement the given algorithm as a function/method/subprogram in your favorite programming language.

Write the code on the right hand side of the given algorithm.

- b) What does the given algorithm return?

- c) Trace the given algorithm on [4,7,1,9]

- d) Apply the *plan for analyzing the time efficiency* (five steps) to the given algorithm.

- e) How can the given algorithm be improved?

Question 2:**(05 pts)**

- a) List $n^3, n!, n^n, 2^n, n \log n, \log n^4, \log^2 n, n^{\log 3}, 5^{\log n}$ from the lowest to the highest order of growth:

- b) Solve the following recurrence relations: $x(n) = x(n-2) + n$ when $n > 1$, and 0 otherwise.

- c) What is the distinction between *Binary Search* and *Interpolation Search*?

- d) *Presorting* is a good example of *Instance Simplification* strategy. Mention three example problems.

- e) *Problem Reduction* is an important problem-solving strategy. Demonstrate with example how it works.

Good Luck
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