**Lab 1**

**Basic Understanding of Algorithms**

**(Use any Programming language)**

Q1. Given two arrays: arr1 of size n and arr2 of size m. Find whether arr2 is a subset of arr1. Both the arrays are NOT sorted. It may be assumed that elements in both arrays are distinct.

Q2. Given an array of n distinct numbers. The task is to sort numbers in an even index in increasing order and those in an odd index in a decreasing order. The modified array should represent the same. It may be assumed that elements in both arrays are distinct.

Q3. Sort a given set of elements using the two codes given below. The elements can be read from a file or can be generated using the random number generator.

1. Determine the time required to sort the elements.
2. Repeat the experiment for different values of n, the number of elements in the list to be sorted. n can be varied from 2, 100, 1000, 10000, 1000000.
3. Plot a graph of the time taken versus n. (If using python, use python libraries like matplotlib, numpy do so).

**Pseudo Code 1 Pseudo Code 2**

function func1 (array A, int n)

i ← 1

**while** i < length(A)

x ← A[i] j ← i

**while** j > 0 **and** A[j-1] > x

A[j] ← A[j-1]

j ← j - 1

**end while**

A[j] ← x

i ← i + 1

**end while**

if n > 0

func1 (A, n-1)

x ← A[n]

j ← n-1

while j >= 0 and A[j] > x

A[j+1] ← A[j]

j ← j-1

end while

A[j+1] ← x

end if

end function