DSA Assignment 1

(1 Point = 5 marks)

Problem 1:

Find the time and Space complexity of following pseudo code and explain the results :

1)
```
function(n,array):
        for i=0, i<n, i++ :
            for j=i, j<n;j++:
                set array[i][j]=i*j;
```

2.5 Point

2)
```
function(n,array):
        for i=0, i<n, i++ :
            for j=i, j<=i;j++:
                set array[i]=i*j;
```

2.5 Point

Problem 2:

Given below are recurrence relation, write the time complexity and explain why. **10 Point**

1. T(**n**) = T(**n**/4) + T(**n**/2) + C**n**^{2}
2. T(n) = 2 * T(n/2) + Cn

Plot a graph comparing both the time complexities (running time vs input size n).

Problem 3:

Given the algorithm

```
set A=array
function(A):
  for j = 2 to length[A]:
        set key = A[j]
        set i = j - 1
        while i > 0 and A[i] > key:
             set A[i + 1] = A[i]
             set i = i - 1
        set A[i + 1] = key
```

Write the time complexity and explain why?

5 Points

Problem 4:

Given an integer array nums, find the subarray with the largest sum, and return its sum. Example 1: Input: nums = [-2,1,-3,4,-1,2,1,-5,4] Output: 6 Explanation: The subarray [4,-1,2,1] has the largest sum 6. And analyse your algorithm by finding time and space complexity.

10 Point