Assignment Project

(i)   The following programing assignment measures the ability to analyze and implement Heap-Sort algorithm. You are required to work *individually* in this work.

   a. Write all required algorithms needed to sort a sequence of numbers using Heapsort Algorithms.

   b. Analyze in detail your written algorithms in Part (a).

   c. Implement your written algorithms in Part (a).

(ii)   The following programing assignment measures the ability to analyze and implement Kruskal's algorithm to find MST of a network. You are required to work with your colleagues in a teamwork (Maximum *Two– Three members*).

   a. Write all required algorithms needed to find MST using Kruskal's Algorithm.

   b. Analyze in detail your written algorithms in Part (a).

   c. Implement your written algorithms in Part (a).

Any further information will be announcement later

(i) The following programing assignment measures the ability to analyze and implement Heap-Sort algorithm. You are required to work *individually* in this work.

    a. Write all required algorithms needed to sort a sequence of numbers using Heapsort Algorithms.

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Max-Heapify (A, i) $T(n) = O(n \log n)$

    L = left(i)
    R = right(i)
    IF (L <= HeapSize && A[L] > A[I])
        Largest=L
    Else
        Largest=l
    If(R <= HeapSize && A[R] > A[Largest])
        Largest =R
    If(Largest !=i)
        Swap(A[i], A[Largest])
        Max-Heapify(A, Largest)   ⟵ $T(2n/3)$

(bracket spanning L through Swap: **1**)

Build-Max-Heap(A)

    HeapSize[A] = Length[A]
    For i = [length[A] /2] downto 1
        Max-Heapify(A, i)

(bracket: **n**)

Heap-Sort(A)

    Build-Max-Heap(A)   ⟵ **n**
    For i=A.Length downto 2
        Swap(A[1] , A[i])
        HeapSize[A]- HeapSize[A]-1 (bracket: **n**)
        Max-Heapify(A,1)   ⟵ $(n-1) \log n$

    $T(n) = O(n \log n)$

(ii)   The following programing assignment measures the ability to analyze and implement Kruskal's algorithm to find MST of a network. You are required to work with your colleagues in a teamwork (Maximum *Two–Three members*).

   a. Write all required algorithms needed to find MST using Kruskal's Algorithm.
   b. Analyze in detail your written algorithms in Part (a).
   c. Implement your written algorithms in Part (a).

MST-Kruskal(G,W)
  A={ }
  Foreach vertex VEG.V   ⎤
       Make-Set(v)   ⎦ V
  Sort the Edges G.E into nondecreasing order by weight w   ⎤
  Foreach edge(u, v) EG.E after ordering   ⎥ E log E
       If **Find-Set**(u) **Find-Set**(v)   ⎤   ⎥
            A = A U (u,v)   ⎥ V log V   ⎦
            Union(u,v)   ⎦
  Return A

  T(n) = O(n log n)