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SANTHIRAM ENGINEERING COLLEGE: NANDYAL

Scheme of Evaluation for MID-I Examination

Subject: Design and Analysis of Algorithms

PART-A

Answer the All Five Questions (2 Marks Each)

1.

a) Knapsack problem definition **-1M**

The constraint for knapsack problem is

$$\sum_{n=1}^{n}(x_i.wi) \leqslant W$$

-1M

b) Time complexity is the computational complexity describing the amount of time required for the execution of an algorithm **-1M**

Space complexity represents the amount of memory one program uses in order to achieve its execution. **-1M**

c) The sequencing of jobs on a single processor with deadline constraints is called as Job Sequencing with Deadlines. **-2M**

d) Definition of best case, worst case and average case **-2M**

e) Divide and Conquer algorithm consists of a three steps, divide, conquer, and combine **-2M**

PART-B

Answer the All Two Questions (10 Marks Each)

UNIT-I

2.

a) Merge sort algorithm

MergeSort (arr[], l, r)

If r > l

1. Find the middle point to divide the array into two halves: **-1M**

Middle m = l+ (r-l)/2

2. Call MergeSort for first half: **-1M**

Call MergeSort(arr, l, m)

3. Call MergeSort for second half: **-1M**

Call MergeSort(arr, m+1, r)

4. Merge the two halves sorted in step 2 and 3: **-2M**

Call merge(arr, l, m, r)

2.

b) Time complexity and space complexity used to performance evaluation of an algorithm. Explain one algorithm

Algorithm Example **-1M**

Calculate time complexity of it **-2M**

Calculate space complexity of it **-2M**

OR

3.

a) Quick sort

```
quickSort(arr[], low, high)
{
   if (low < high)
   {
      /* pi is partitioning index, arr[pi] is now
         at right place */
      pi = partition(arr, low, high);          -1M
      quickSort(arr, low, pi - 1);             -2M
      quickSort(arr, pi + 1, high);            -2M
   }
}
```

3.

b) Binary search algorithm

```
binarySearch(arr, item, beg, end)
   if beg<=end
      midIndex = (beg + end) / 2               -1M
      if item == arr[midIndex]                 -1M
         return midIndex
      else if item < arr[midIndex]             -2M
         return binarySearch(arr, item, midIndex + 1, end)
      else                                     -1M
         return binarySearch(arr, item, beg, midIndex - 1)
```

UNIT-II

4.

a) Knapsack problem by using dynamic programming Let n=3, (w1,w2,w3) = (2,3,4), (p1,p2,p3) = (1,2,5),m=6?

Given data	-1M
Problem solution procedure	-3M
Solution x={x1,x2,x3}={1,0,1}	-1M

4.

b) Job sequencing with deadlines explain with one example

Definition	-1M
Problem solution procedure	-3M
Solution	-1M

OR

5.

a) All pairs shortest path example graph	-1M
Solution for all pairs shortest path for a graph	-4M
b) Prim's algorithm procedure	-3M
Example for minimum cost spanning tree using prim's algorithm	-2M

V.Lakshmi Chaitanya

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COMPUTER SCIENCE & ENGINEERING

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