Department of Computer Engineering

S. Y. Sem –IV (2023-24 Even sem)

AOA Sample questions

Ch 1: Introduction

1. Explain asymptotic notation with example
2. Explain/short note (on) recurrence relation with example
3. Explain masters method with example
4. Solve the following problem using masters method
   i) $T(n) = 7T(n/2)+18\ n^2$
   ii) $T(n) = 9T(n/3) +4n^6$
5. Solve the following recurrence relations
   i) $T(n) = 2T(n/2) + n^2$
   ii) $T(n) = T(n-1) + cn$
   iii) $T(n) = T(n/3) + T(2n/3) + n$
   iv) $T(n) = T(n/2) + 1$
   v) $T(n) = 2T(n/2) + \Theta(n)$
6. Explain selection sort algorithm and derive it's complexity
7. Explain insertion sort algorithm and derive it's complexity
8. Determine the frequency count for all statement in the following algorithm statement

   (example below. similar example can be ask)

```
A()
{ int I;
for(I=1; I2<=n ; i++)
{ Print("x") }
```

And similar …….

Ch 2: Divide and conquer

1. Give general method for divide and conquer strategy. Explain merge sort and quick sort with example by using divide and conquer and its analysis

2. Explain binary search with example by using divide and conquer and do its analysis

3. Explain min- max algorithm with example by using divide and conquer and do its analysis. Compare it with Straight min-max Algorithm.

4. Apply quick sort to sort the list **{E,X,A,M,P,L,E}** by using divide and conquer its analysis.

5. One way to sort a file of n records is to scan the files first merging consecutive pairs of size one, then merging pairs of site two etc. Write an algorithm which carries out this process. Show how your algorithm works on data set keys (100, 300, 150, 450, 250, 350, 200, 400, 500).

6. Sort the following numbers using quick sort. Also derive complexity of Quick sort

   50, 31, 71, 38, 77, 81, 12, 33

7. Apply merge sort algorithm 14,25,4,12,25,14 by using divide and conquer analysis using master's method

8. Compare straight min max and divide and Conquer min max.

And similar ……

Ch 3: Greedy Method

1. Explain knapsack problem with example using greedy approach

2. Explain Prim's and Kruskal's algorithm with example using greedy approach

3. Explain single source shortest path algorithm with example using greedy approach

4. Explain how job sequencing with deadline can be solved using greedy approach.

5. Explain optimal storage on tape algorithm using greedy approach

6. Apply job sequencing algorithm and find feasible solution for

   i) n=4, (P1, P2, P3, P4)=(100, 10, 15, 27) and (d1, d2, d3, d4) = (2, 1, 2, 1)

ii) n=7, (P1, P2, P3, P4, P5, P6, P7) =(3, 5, 20, 18, 1, 6, 30) and (d1, d2, d3, d4, d5, d6, d7) =(1,3,4,3,2,1,2)

7. Apply job sequencing algorithm and find optimal solution

i) n=4, (P1, P2, P3, P4)=(100, 10, 15, 27) and (d1, d2, d3, d4)=(2, 1, 2, 1)

ii) n=7, (P1, P2, P3, P4, P5, P6, P7) = (3, 5, 20, 18, 1, 6, 30) and (d1, d2, d3, d4, d5, d6, d7) = (1, 3, 4, 3, 2, 1, 2)

8. Solve fractional knapsack problem for the following: n=6, m=20

P = (18,5,9,10,12,7) W=(7,2,3,5,3,2)

9. Find the single source shortest path for the given graph.

And similar …….