CRASH COURSE 2025 DS & AI

Algorithms

Greedy Method

Q1 Consider the statements

S1: Both prim's and kruskals will always have same structure of MST irrespective of whether all the edges are distinct or not.

S2: Prim's algorithm for MST is guaranteed to produce MST even if there is negative weight cycles.

(A) only S1 is true

(B) only S2 is true

(C) Both S1 and S2 are true

(D) Neither S1 nor S2 is true

Q2 What is the time complexity of the merge sort algorithm if the array contains more than half of repeated elements?

(A) O(nlogn)   (B) O(n)

(C) $O(n^2)$ (D) None of these

Q3 What is the time complexity of Dijkstra's algorithm in case of a sparse directed connected graph represented as an adjacency matrix.

(A) O(vlogv)

(B) O(Elogv)

(C) $O(v^2)$

(D) None of these

Q4 What is the time complexity of the job sequencing with deadline algorithm if greedy method is used?(without heap)

(A) $O(n^2)$ (B) O(nlogn)

(C) O(n)   (D) $O(n^2logn)$

**Q5** The profit of the optimal schedule with the following jobs and deadlines given below.

Job	1	2	3	4	5	6
Deadline	5	4	4	2	1	2
Profit	15	12	5	15	13	14

What is the total profit?

Q6 Consider P, Q, R, S which is used to make a text each occurring with the probability of 0.38, 0.25, 0.08, 0.15, 0.14 respectively. Then optimal coding technicians will have the average length per character as:

(A) 2.21   (B) 2.9

(C) 1.58   (D) 1.69

Q7 Consider the following Graph G.
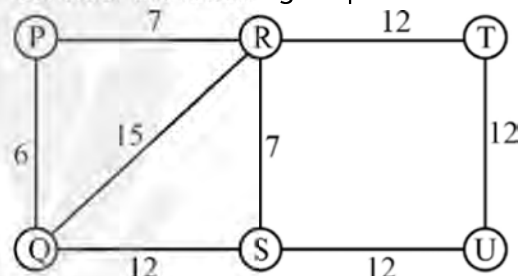
What is the total number of minimum spanning trees possible using prim's (or) Kruskal's algorithm? _____

Q8 Consider a modified version of Quick sort where we have an input as an sorted array X[1 ……. n], all element of the array is distinct and n ≥ 3. Pivot is median of set of 3 elements (first, middle, last). Then what is the worst-case time complexity of this algorithm?

(A) $O(n^2)$

(B) O(nlogn)

(C) $O(n^2 logn)$

(D) O(nlog logn)

Q9 Consider the following array with 88 as the first element, all other elements can be in any order.
88, 116, 20, 76, 104, 176, 36
quick sort partition algorithm is used by choosing 1st elements as pivot, then what is the total number of arrangements of integer is

possible to preserve the effect of first pass of partition algorithm?

Q10 Consider an array X of length n array contains number between (1 – 10) in any arbitrary order, best sorting algorithm takes 325 ns if n = 25, the time required by algorithm when, n = 150 is _____?

Answer Key

Q1	(B)		Q6	(A)
Q2	(A)		Q7	3
Q3	(C)		Q8	(B)
Q4	(A)		Q9	36
Q5	61		Q10	1950

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