

{ Blue Ball point used for the answers }

CS502 FINAL 2020 SEP

25/09/2020

5:00 pm

MCQS'

1) An optimization problem is one in which you want to find

* Not a Solution

* Good Solution

* An algorithm

* The best Solution

2) Adding edge to a free tree

* Keeps it the free tree and increases the size of the tree

* Creates a unique cycle

* It is not allowed to add the edge in free tree

* creates multiple cycles.

3) Dijkstra's algorithm is used for

* calculating multiple source shortest path problems

* calculating Minimum Spanning tree

* Shortest and Minimum Spanning tree both can be calculated by it

* single source shortest path problems

4) Bellman Ford algorithm applies relaxation to every

* Edge of the graph and repeats exactly $v-1$ times

* Vertex of the graph and repeats exactly $E-1$ times

* edge of the graph and repeats exactly $E-1$ times

* every v use the back edges for the completion

5) If we can solve a single NP-problem in P time

- * All NP-problems can be solved
- * All P problems can be solved
- * We cannot predict about the solutions of other NP-problems.
- * This can be never possible to solve the NP problem in P-time.

6) ~~If~~ a problem is NP-complete

- * it must be in P
- * it must also be in NP
- * there is no relation b/w NP and NP-complete
- * it can be solved in P-time

7) Clique cover problem arises in applications of _____

- * Map drawing
- * Architectural
- * Clustering
- * Clique

8) Generalize Coloring problem arises in various partitioning problems where there is a constraint

- * that two objects can not be assigned to the same set of partitions and is belong to NP-class
- * that two objects can not be assigned to the same set of partitions and is belong to P class.
- * if that we can organize the different partitions in P ~~at~~ time and NP space
- * ~~of solve~~ does not effect the classifications



9) Kruskal's Algorithm is used for

- * Calculating shortest path problem
- * Calculating Minimum Spanning tree.
- * Shortest and Minimum Spanning tree both can be calculated by it
- * single source shortest path problems

10) Kruskal's Algorithm has time complexity

* overall $O(E \log E)$ and for sparse graph $O(E \log V)$

* overall $O(EV)$ and for sparse graph $O(V^2)$

* overall $O(V \log E)$

* overall $O(E \log V)$ for sparse graph $O(V \log E)$

11) In NP-problems "NP" represents

* Non-deterministic Polynomials

* Null-hypothesis polynomials

* Negative polynomials

* Non-polynomials

12) Space used by Floyd-Warshall algorithm is

* $O(n^4)$ * $O(n^3)$ * $O(n^2)$ * $O(2^n)$

13) In the clique cover problem, for two vertices to be in the same group, they must be each other.

* Apart from * Far from

* Near to * Adjacent to

14) Divide and Conquer involves breaking the problem into a small number of

- * Sub-problems
- * pivot
- * selection
- * Sieve

15) An un-weighted graph can be considered as a graph in which every edge has

- * no weight assigned to it
- * by default weight of one unit
- * its own different keys of weights
- * there are no such type of graphs in theory

16) In strongly connected components the component digraph is

- * necessarily cyclic
- * necessarily acyclic
- * not necessary it can be both cyclic and acyclic
- * cyclic with some other constraints

17) The recurrence represented by

$$T(n) = \sum_{i=0}^n 2 + \sum_{i=0}^n \frac{1}{2} \text{ has time}$$

complexity belongs to

- * P-Class
- * NP-Class
- * Co-NP class
- * unpredictable class

18) Floyd - Marshall Algorithm is based on

* Dynamic Programming

Q19) Merge sort is _____

- * stable
- * Not stable
- * All versions
- * Stable but not an in-place algorithm

Q20) Merge sort

- * It requires extra storage.

* 21) Counting sort is suitable to sort the elements in range 1 to K

- * K is Large
- * K is not known
- * K may be large or small
- * K is small

22) The knapsack problem belongs to the domain of _____ problems.

- * Optimization
- * N.P-complete
- * Linear Solution
- * Sorting

23) A topological sort of a DAG is a _____ ~~linear~~ ordering of the vertices of the DAG such that for each edge (u, v) , u appears before v in the ordering.

- * Linear

Q24) In Prim's algorithm, at any time, the subset of edges A forms a _____
* single tree

* 25) What algorithm technique is used in the implementation of Kruskal solution for



(26) Time complexity of Brute force algorithm?

* $O(n^2)$ [time]

(27) The greedy algorithm results in a solution, but ~~not in~~ is a solution.
* non-optimal

(28) A w is adjacent to vertex v if there is an edge from v to w .
* vertex

(29) A directed graph is
* acyclic

(30) The Huffman Encoding algorithm can be used to generate

* Variable Length Codes

* Fixed Length Codes

* Both Fixed and Variable Length Codes

* ASCII Codes

(31) Which of the following statements is Not true about a free tree?

* A free tree with n vertices has exactly $n-1$ edges

* 1st vertex of a free tree is designated as the root vertex

* There exists a unique path b/w any two vertices of a free tree.

* Adding any edge to a free tree creates a unique cycle

32) _____ denotes the time complexity
of Breadth First Search (BFS) algorithm,
where (V - no. of vertices, E - no. of edges)

* $O(V)$ * $O(E)$ * $O(V+E)$
* $O(V * E)$

33) Consider the set of vertices part of tree
Some _____ crossed the cut are no longer
- crossing it

* Edges

{ Seven MCqs ki statements yaad ni
proper }

Q34) "0" binary code for the string
_____ ?

SUBJECTIVE

Q1) Diff. b/w Back Edge & Cross Edge?

Q2) How Kruskal's algorithm works?

Q3) How many number of bytes required to encode a string "Algorithms" using ASCII-8 bits?

Q4) What are the short comings of counting sort and why?

Q5) Yes or No. Justify your answer.

'A' problem is reduced to problem B, problem B is in ^(problems) P, then A is also problem in P problem.

Q6) Which algorithm uses greedy algorithm why?

Q7) Consider the case of 3 matrices A_1 5×4 , A_2 4×6 , A_3 6×2 .

If the multiplication can be carried out this way $((A_1 A_2) A_3)$ then find out the cost.

Q8) Suppose you could reduce an NP-complete problem to a polynomial time problem in polynomial time. What would be the consequences?