1. Non-Optical or greedy algorithm for money change takes O(k)
2. The **Huffman algorithm** finds a (an) optimal solution.
3. Which formula is used for calculating worst case running time? 
4. The reason for introducing sieve technique algorithm is that it illustrates a very important special case of

Divide-and-conquer

1. Sieve technique applies to problem where we are interested in finding a single item from a larger se of n items
2. The number of nodes in a complete binary tree of height h is 2^(h+1)-1
3. If there are  entries in edit distance matrix then the total running time is 
4. When a recursive algorithm revisits the same problem over and over again, we say that the optimization problem has overlapping sub-problems.
5. A p x q matrix A can be multiplied with a q x r matrix B. The result will be a p x r matrix C. There are (p. r) total entries in C and each takes O (q) to complete.
6. Maximum number of edges in a directed graph may be Approximately |V2|
7. An adjacency matrix for a graph it is not necessary for it to be square in shape
8. In fractional knapsack we sort the value per unit weight in decreasing order
9. The greedy part of the Huffman encoding algorithm is to first find nodes with smallest frequency.
10. The code word assigned to characters by the Huffman algorithm have the property

That no code word is the prefix of any other

1. In undirected graph there is convention of only back edges
2. In time stamp DFS for the edge (u , v) if f(u) > f(v) the edge is tree or cross or forward
3. **Kruskal’s algorithm** choose the best non-cycle edge
4. In Prim’s algorithm we use priority queue data structure
5. Adding any edge to a free tree create a unique cycle
6. **Floyd-Warshall algorithm** is based on dynamic programming approach and allow negative edges
7. **Dijkstra’s algorithm** is used for single source shortest path problems
8. **Bellman Ford algorithm** applies relaxation to every edge of the graph repeats exactly v-1 times
9. Running time of **Floyd-Warshal algorithm** is 
10. If we can solve a single NP problem in P time. All NP problem can be solved
11. If a problem in NP-complete it must also be in NP
12. 3- color problem is known as NPC
13. Clique cover problem arises in applications of clustering
14. In the clique cover problem, for two vertices to be in the same group, they must be adjacent to each other.
15. In the 3-coloring problem, for two vertices to be in the same color group, they must not be adjacent.
16. What is the worst-case time for merge sort to sort an array of n elements? O (n log n)
17. Search technique of various algorithm look at many possible solutions
18. The Huffman encoding algorithm is a greedy algorithm
19. Breath first search is shortest path algorithm that works on un-weighted graphs
20. Consider the string “abacdaacac” if the string is coded with ASCII codes using Huffman encoding scheme, the message length would be 80 bits
21. What is the asymptotic growth of  ? 
22. A heap is a left complete binary tree that confirm to the heap order
23. What is common between Bubble sort, Insertion sort, Quick sort, and Heap sort? All are in-place algorithms

|  |  |  |
| --- | --- | --- |
| Algorithm | In-Place | Stable |
| Bubble Sort | Yes | Yes |
| Insertion Sort | Yes | Yes |
| Selection Sort | Yes | No |
| Merge Sort | No | Yes |
| Heap Sort | Yes | No |
| Quick Sort | Yes | No |



1. In In-place sorting algorithm is one that uses no additional array for storage.
2. The main shortcoming of counting sort is that it is useful for small integers
3. The original recursive algorithm takes time, where 
4. The Huffman codes provides a method of encoding data which is efficient and use fixed length codes i.e. ASCII
5. Using ASCII standard the string “adacdaacac” will be conceded with 8 bytes
6. In undirected graph there is convention of only back edges
7. In time stamp traversal we can calculate whether the graph has cycles
8. Precedence constraint graph is acyclic directed graph
9. In **Prim’s algorithm**, the additional information maintained by the algorithm is

The length of the shortest path from vertex v to the vertex u

1. In strongly connected components the component graph is necessarily cyclic
2. **Floyd-Warshal algorithm** is based on dynamic programming approach and allow negative edges
3. **Kruskal’s algorithm** has time complexity 
4. In NP-Problems “NP” represents Non-deterministic polynomials
5. Generalize coloring problem arises in various partitioning problems where there is a constraint

That two objects cannot be assigned to the same set of partitions and is belong to NP class

1. Sieve technique can be applied to solve selection problems
2. Usually which type of algorithm is harder to prove the correctness? Brute force
3. Flowchart is a graphical representation of an algorithm
4. When we call heapify then at each level the comparison performed takes time? 
5. Who invented quick sort procedure? Hoare
6. If we encode and compress text using ASCII standard each character is represented by, Fixed length code word of 8 bits
7. The Huffman coding used, Prefix property that no code word is prefix of any other code
8. In directed graph the cardinality of edges |E| =

Sum of out=degree of all the vertices

Sum of in-degree of all the vertices

1. A Hamiltonian cycle is a cycle, that visit every vertex in the graph exactly once
2. In generic graph traversal algorithm we, put edges in the bag data structure
3. The generic graph traversal algorithm stores a set of candidate edges in some data structures we well call a “bag”
4. **Dijkstra’s algorithm:**

The length of the shortest path to the start vertex is always zero.

It will work on any weighted graph with positive weights.

The running time of Bellman- Ford algorithm is greater than Dijkstra’s algorithm

1. Kruskal’s algorithm is used for calculating minimum spanning tree.
2. Dijkstra’s algorithm is used for single source shortest path problems
3. Floyd-Warshal algorithm dates back to the early 60’s
4. Space used by Floyd-Warshal algorithm is 
5. The running is . The Space used by the algorithm is 
6. What is the solution to the recurrence T(n) = T(n/2) + n ? O(n)
7. If a pseudo code is memory wise efficient then it may be memory wise efficient but not necessary
8. Merge sort makes two recursive calls. Which statement is true after recursive call finish, but before the merge step?

Elements in each half of the array are sorted amongst themselves

1. Random access machine or RAM is a/an Mathematical model
2. In order to say anything meaningful about our algorithms, it will be important for us to settle on a

Mathematical model of computation

1. Divide-and-conquer involves breaking the problems into a small number of sub problems
2. In Bucket sort, if there are duplicates then each bin can be replaced by a Linked list
3. A p × q matrix A can be multiplied with a q × r matrix B.

The result will be a p × r matrix C. In particular, for 1 ≤ i ≤ p and 1 ≤ j ≤ r 

1. Worst case running time of **Quick sort algorithm** for an array n elements is? 
2. The Huffman algorithm time complexity can be improved up to O (n log n)
3. Using ASCII standard the string “abacdaac”. If we use fixed code for ASCII it will be 64 bits
4. Using Huffman encoding technique the string”abc” will take 24 bits
5. Using Huffman encoding technique the string “a@$a” will be encoding with\_\_\_\_\_\_ bits.

Huffman encoding fail at this string.

1. When the graph relatively few edges, Kruskal’s algorithm is better than prim’s
2. An un-weighted graph can be considered as a graph in which every edge has by default weight of one unit
3. All algorithm having the time complexity O (n10) and O (n100) fall.

O (n10) in P class and O (n100) in NP class

1. If a problem “S” is NP-complete it must be NP and NP-hard
2. Which traversal technique is look like propagating wave-front outward, Breath First Traversal
3. An optimization problem is one in which you want to find. The best solution
4. Suppose that a graph G = (V,E) is implemented using adjacency lists. What is the complexity of a breath-first traversal of G?

O (|V| +|E|)

1. Non- optional or greedy algorithm for money change takes O(k)
2. The running time of Quick sort depends heavily on the selection of pivot
3. If a sorting algorithm solely based on comparisons of keys in the array then it is impossible to sort more efficiently than 
4. Fibonacci sequence was posed by Leonardo Pisano
5. A free tree with “n” vertices has exactly n-1 edges
6. GT for the digraph can be computed in 
7. Which of the following is not true about Dijkstra’s algorithm?

It can find the shortest paths to all other vertices in the same worst case time that it needs to finds the shortest path a single vertices

1. The running time of the Dijkstra’s algorithm is 
2. The running time of Floyd-Warshal algorithm is 
3. The function having complexity O (nn) belongs to NP-Class
4. The function having complexity O (nk) belongs to NP-Class
5. Which type of instructions Random Access Machine (RAM) can execute? Arithmetic and logic