UNIT-5 MCQ Practice Questions for DATA STRUCTURE AND ALGORITMS

Data Structures And Algorithms (SRM Institute of Science and Technology)

1. A connected graph T without any cycles is called .....

A. free graph

B. no cycle graph

C. non cycle graph

D. circular graph

2. If every node u in G adjacent to every other node v in G, A graph is said to be

A. isolated

B. complete

C. finite

D. strongly connected

3. A graph is said to be ..... if every node u in G is adjacent to every other node v in G.

A. Absolute

B. Entire

C. Inclusive

D. Complete

4. What will be the running-time of Dijkstra's single source shortest path algorithm, if the graph G(V,E) is stored in form of adjacency list and binary heap is used −

A - $O(|V|^2)$

B - $O(|V| \log |V|)$

C - $O(|E|+|V| \log |V|)$

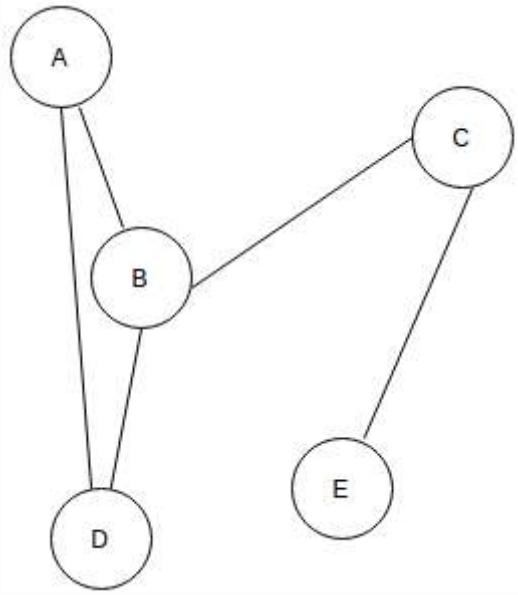
D - None of these

Answer : C

Explanation

The runing time will be $O(|E|+|V| \log |V|)$ when we use adjacency list and binary heap.

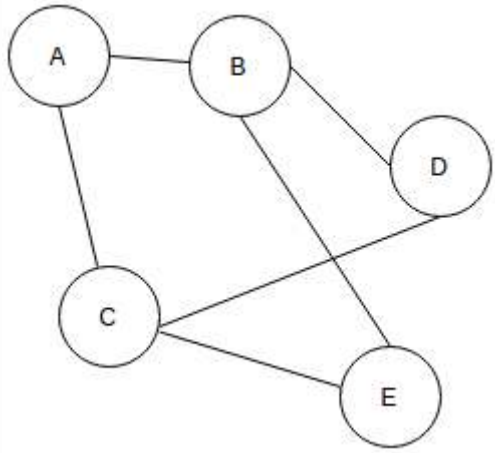
5. In the given graph identify the cut vertices.



a)B and E
b)C and D
c)A and E
d)C and B
View Answer

Answer:d
Explanation: After removing either B or C, the graph becomes disconnected.

6. For the given graph(G), which of the following statements is true?



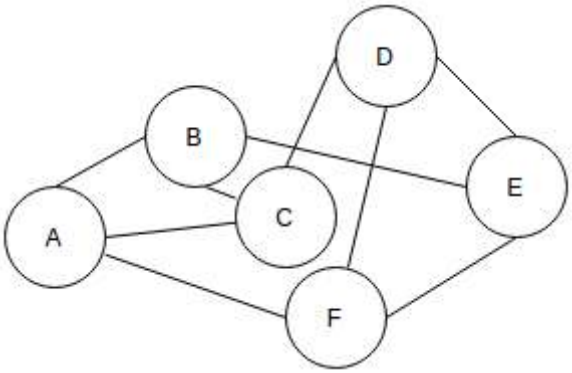
a) G is a complete graph
b) G is not a connected graph
c) The vertex connectivity of the graph is 2
d) The edge connectivity of the graph is 1
View Answer

Answer:c
Explanation : After removing vertices B and C, the graph becomes disconnected.

7. What is the number of edges present in a complete graph having n vertices?
   a)(n*(n+1))/2
   b)(n*(n-1))/2
   c)n
   d)Information given is insufficient

Answer:b
Explanation: Number of ways in which every vertex can be connected to each other is nC2.

8. The given Graph is regular.



   a)True
   b)False
   View Answer

Answer:a
Explanation: In a regular graph, degrees of all the vertices are equal. In the given graph the degree of every vertex is 3.

9. The number of elements in the adjacency matrix of a graph having 7 vertices is _____
   a)7
   b)14
   c)36
   d)9
   View Answer

Answer:d
Explanation: There are n*n elements in the adjacency matrix of a graph with n vertices.

10. The time complexity to calculate the number of edges in a graph whose information in stored in form of an adjacency matrix is _____
    a)O(V)

b)$O(E^2)$
c)O(E)
d)$O(V^2)$

Answer:d
Explanation: As V entries are 0, a total of V^2-V entries are to be examined.

11. For the adjacency matrix of a directed graph the row sum is the _____ degree and the column sum is the _____ degree.
a)in,out
b)out,in
c)in,total
d)total,out

Answer:b
Explanation: Row number of the matrix represents the tail, while Column number represents the head of the edge.

12. What is the maximum number of possible non zero values in an adjacency matrix of a simple graph with n vertices?
a)(n*(n-1))/2
b)(n*(n+1))/2
c)n*(n-1)
d)n*(n+1)
View Answer

Answer:c
Explanation: Out of n*n possible values for a simple graph the diagonal values will always be zero.

13. Space complexity for an adjacency list of an undirected graph having large values of V (vertices) and E (edges) is _____
a)O(E)
b)O(V*V)
c)O(E+V)
d)O(V)

Answer:c
Explanation: In an adjacency list for every vertex there is a linked list which have the values of the edges to which it is connected.

14. Which of the following graphs are isomorphic to each other?

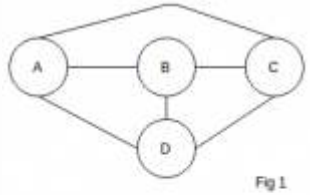


Fig 1

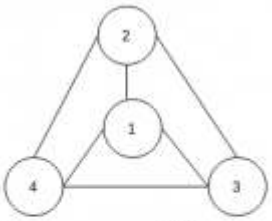


Fig 2

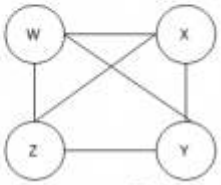


Fig 3

a)fig 1 and fig 2
b)fig 2 and fig 3
c)fig 1 and fig 3
d)fig 1, fig 2 and fig 3

Answer:d
Explanation: All three graphs are Complete graphs with 4 vertices.

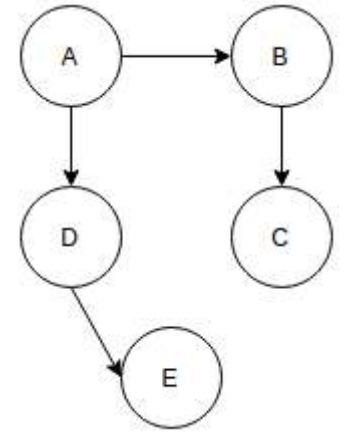
15. Dijkstra's Algorithm will work for both negative and positive weights?
a)True
b)False

Answer:b
Explanation: Dijkstra's Algorithm assumes all weights to be non-negative.

16. What is the maximum possible number of edges in a directed graph with no self loops having vertices?
a)28
b)64
c)256
d)56
View Answer

Answer:d
Explanation: If a graph has V vertices than every vertex can be connected to a possible of V-1 vertices.

17. What would be the DFS traversal of the given Graph?



a)ABCED

b)AEDCB

c)EDCBA

d)ADECB

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Answer:a

Explanation: In this case two answers are possible including ADEBC.

18. The topological sorting of any DAG can be done in _____ time.

a)cubic

b)quadratic

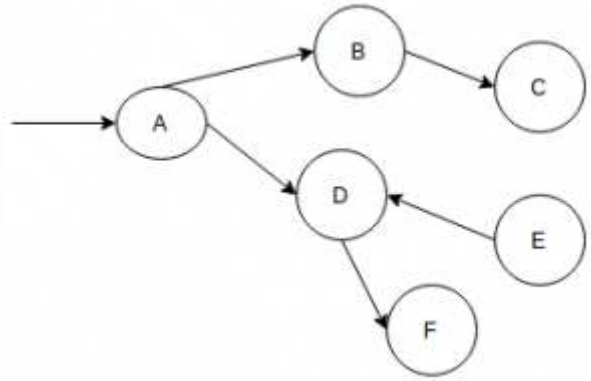
c)linear

d)logarithmic

Answer:c

Explanation: Topological sorting can be done in O(V+E), here V and E represents number of vertices and number of edges respectively.

19. What sequence would the BFS traversal of the given graph yield?



a) A F D B C E

b) C B A F D

c) A B D C F

d) F D C B A

Answer:c
Explanation: In BFS nodes gets explored and then the neighbors of the current node gets explored, before moving on to the next levels.

20. Depth First Search is equivalent to which of the traversal in the Binary Trees?
a)Pre-order Traversal
b)Post-order Traversal
c)Level-order Traversal
d)In-order Traversal

Answer:a
Explanation: In Depth First Search, we explore all the nodes aggressively to one path and then backtrack to the node. Hence, it is equivalent to the pre-order traversal of a Binary Tree.

21. Time Complexity of DFS is? (V – number of vertices, E – number of edges)
a)O(V + E)
b)O(V)
c)O(E)
d)None of the mentioned

Answer:a
Explanation: The Depth First Search explores every node once and every edge once (in worst case), so it's time complexity is O(V + E).

22. The Data structure used in standard implementation of Breadth First Search is?
a)Stack
b)Queue
c)Linked List
d)None of the mentioned

Answer:a
Explanation: The Depth First Search is implemented using recursion. So, stack can be used as data structure to implement depth first search.

23. A person wants to visit some places. He starts from a vertex and then wants to visit every vertex till it finishes from one vertex, backtracks and then explore other vertex from same vertex. What algorithm he should use?
a)Depth First Search
b)Breadth First Search
c)Trim's algorithm

d)None of the mentioned

Answer:a
Explanation: This is the definition of the Depth First Search. Exploring a node, then aggressively finding nodes till it is not able to find any node.

24. In Depth First Search, how many times a node is visited?
a)Once
b)Twice
c)Equivalent to number of indegree of the node
d)None of the mentioned

Answer:c
Explanation: In Depth First Search, we have to see whether the node is visited or not by it's ancestor. If it is visited, we won't let it enter it in the stack.

25. Breadth First Search is equivalent to which of the traversal in the Binary Trees?
a)Pre-order Traversal
b)Post-order Traversal
c)Level-order Traversal
d)In-order Traversal

Answer:c
Explanation: The Breadth First Search Algorithm searches the nodes on the basis of level. It takes a node (level 0), explores it's neighbors (level 1) and so on.

26. Time Complexity of Breadth First Search is? (V – number of vertices, E – number of edges)
a)O(V + E)
b)O(V)
c)O(E)
d)None of the mentioned

Answer:a
Explanation: The Breadth First Search explores every node once and every edge once (in worst case), so it's time complexity is O(V + E).

27. The Data structure used in standard implementation of Breadth First Search is?
a)Stack
b)Queue
c)Linked List
d)None of the mentioned

Answer:b
Explanation: The Breadth First Search explores every node once and put that node in queue and then it takes out nodes from the queue and explores it's neighbors.

28. What can be the applications of Breadth First Search?
a) Finding shortest path between two nodes
b) Finding bipartiteness of a graph
c) GPS navigation system
d) All of the mentioned

Answer: d
Explanation: Breadth First Search can be applied to all of the mentioned problems. Bipartiteness of a graph means that a graph can be divided into two disjoint sets such that every edge connects a vertex in to one in.

29. Regarding implementation of Breadth First Search using queues, what is the maximum distance between two nodes present in the queue? (considering each edge length 1)
a)Can be anything
b)0
c)At most 1
d)Insufficient Information

Answer:c
Explanation: In the queue, at a time, only those nodes will be there whose difference among levels is 1. Same as level order traversal of the tree.

30. Rather than build a subgraph one edge at a time ..... builds a tree one vertex at a time.
A) kruskal's algorithm
B) prim's algorithm
C) dijkstra algorithm
D) bellman ford algorithm

31. The result of prim's algorithm is a total time bound of .....
A) O(logn)
B) O(m+n logn)
C) O(mn)
D) O(m logn)

32. What is a hash table?
a) A structure that maps values to keys
b) A structure that maps keys to values
c) A structure used for storage
d) A structure used to implement stack and queue

Answer:b
Explanation: A hash table is used to implement associative arrays which has a key-value pair, so the has table maps keys to values.

33. If several elements are competing for the same bucket in the hash table, what is it called?

a)Diffusion

b)Replication

c)Collision

d)None of the mentioned

Answer: c

34. What is direct addressing?

a)Distinct array position for every possible key

b)Fewer array positions than keys

c)Fewer keys than array positions

d)None of the mentioned

Answer:a
Explanation: Direct addressing is possible only when we can afford to allocate an array that has one position for every possible key.

35. What is the search complexity in direct addressing?

a)O(n)

b)O(logn)

c)O(nlogn)

d)O(1)

Answer:d
Explanation: Since every key has a unique array position, searching takes a constant time

36. What is a hash function?

a) A function has allocated memory to keys

b) A function that computes the location of the key in the array

c) A function that creates an array

d) None of the mentioned

Answer:b
Explanation: In a hash table, there are fewer array positions than the keys, so the position of the key in the array has to be computed, this is done using the hash function.

37. In simple chaining, what data structure is appropriate?

a)Singly linked list

b)Doubly linked list

c)Circular linked list

d)Binary trees

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Answer:b
Explanation: Deletion becomes easier with doubly linked list, hence it is appropriate.

A hash function f defined as f (key) = key mod 13, with linear probing is used to insert keys 55, 58, 68, 91, 27, 145. What will be the location of 79 ?

A.	1
B.	2
C.	3
D.	5

View/Hide Ans

Correct Answer is D

38. Key value pairs is usually seen in
A. Hash tables
B. Heaps
C. Both a and b
D. Skip list
Answer : a