STAMFORD UNIVERSITY BANGLADESH

Name	:	**Abdullah Al Monayem**
ID	:	**CSE 071 08128**
Subject	:	Algorithms (CSI - 231)
Batch	:	71 - A
Email	:	almonayem2019@gmail.com
Contact No.	:	01747-534818

Ans.the.Q.No : 1

(a)
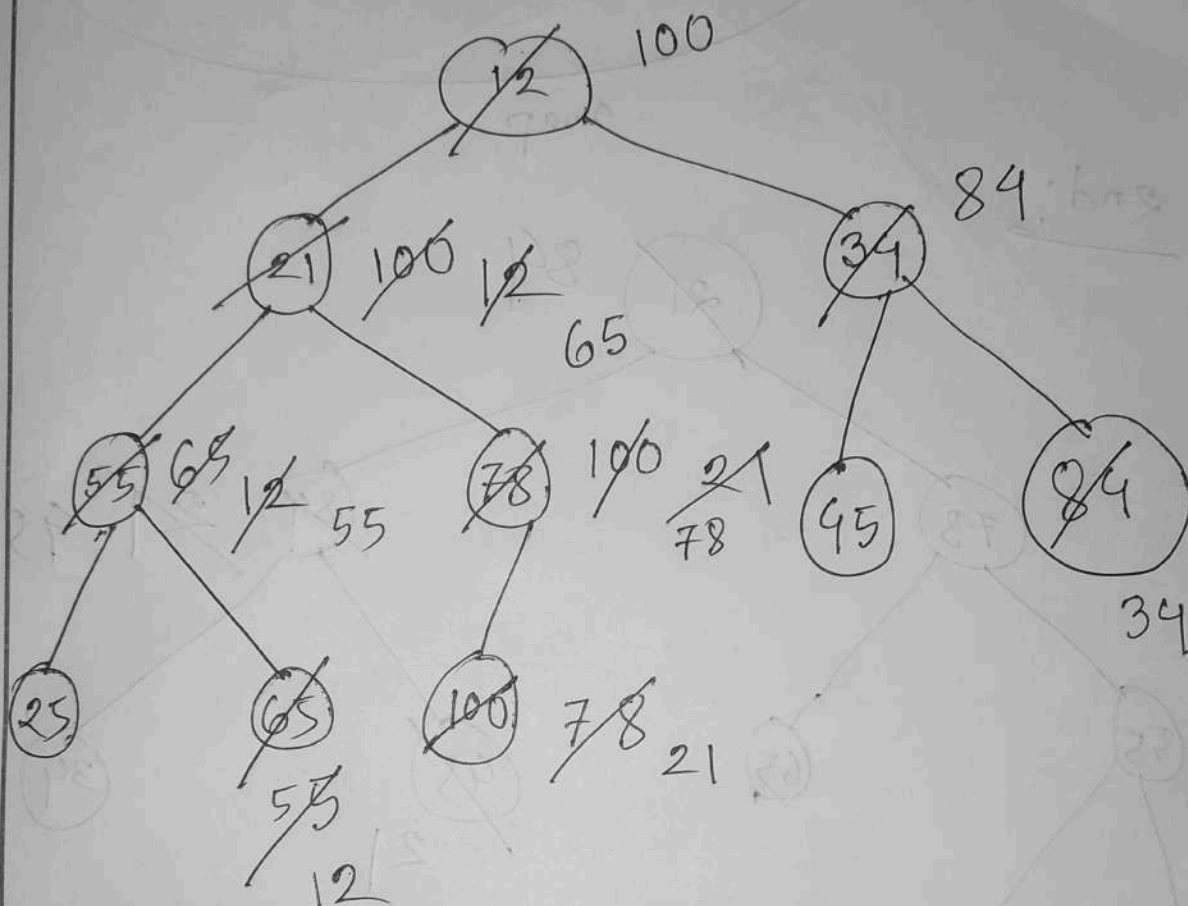
Int:
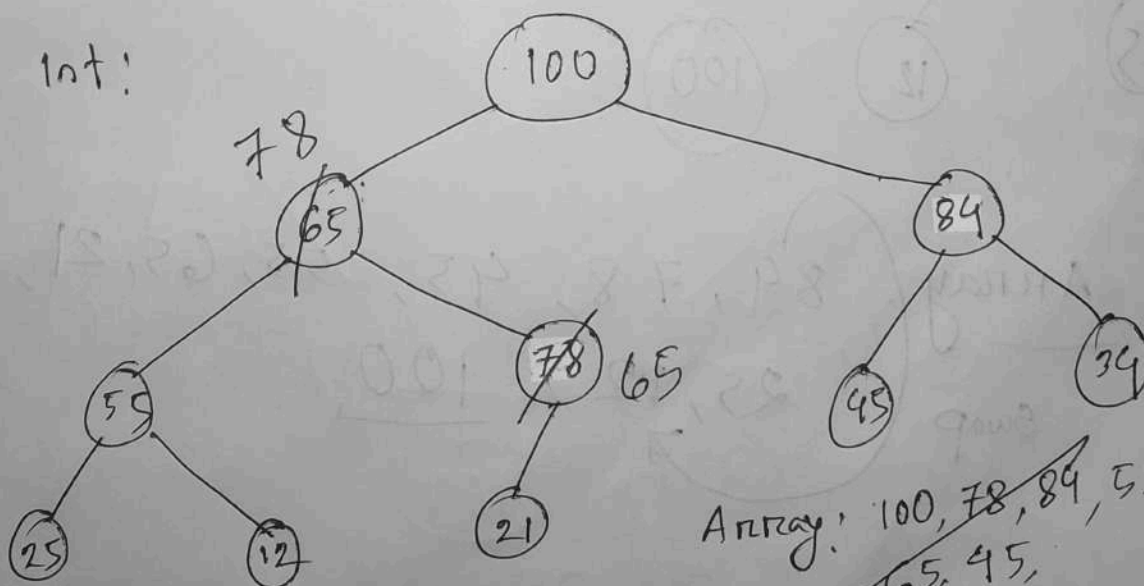
Array: 100, 78, 84, 55,
65, 45,

P.T.O

Subject :

Date :

Array : 100, 78, 84, 55, 65, 45, 34, 25, 12, 21

swap

2nd:

84

21   84

78   89   21 45

55   65   45   34

25   12   100   21

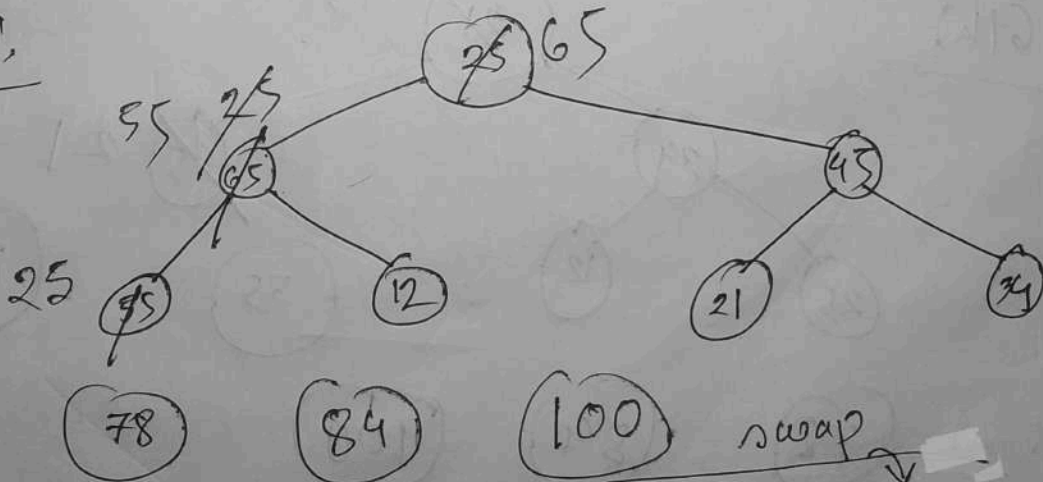Array : 84, 78, 45, 55, 65, 21, 34,
        25, 12, 100

swap

Subject :

Date :
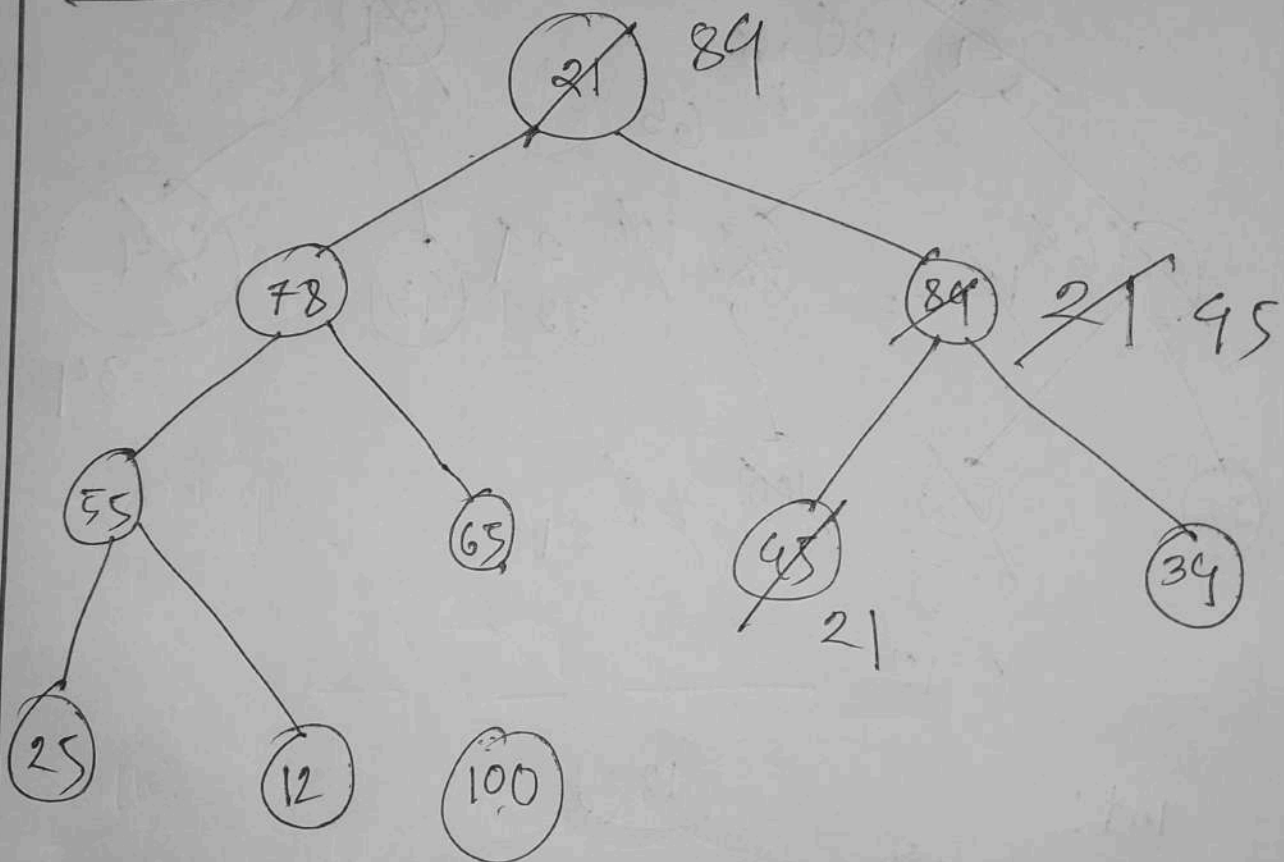
3rd!
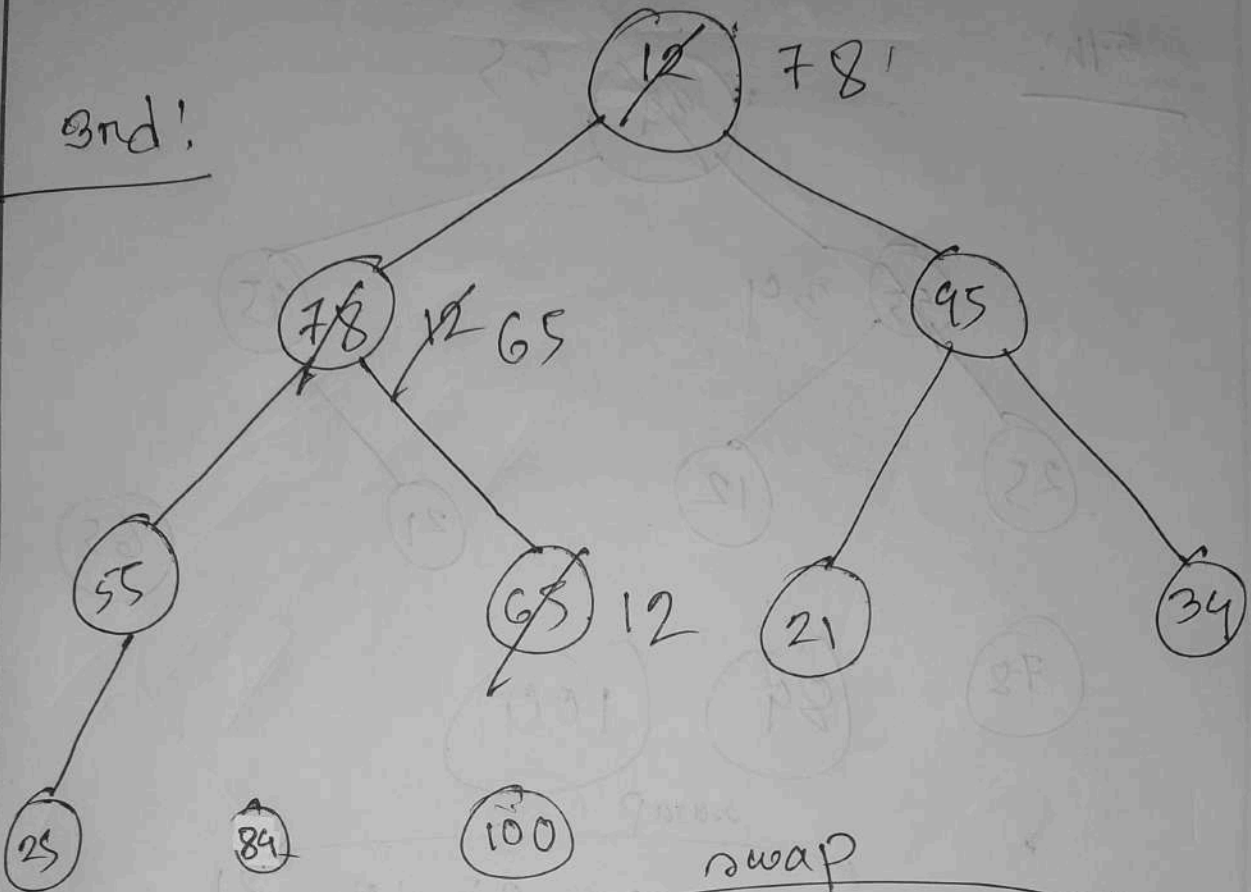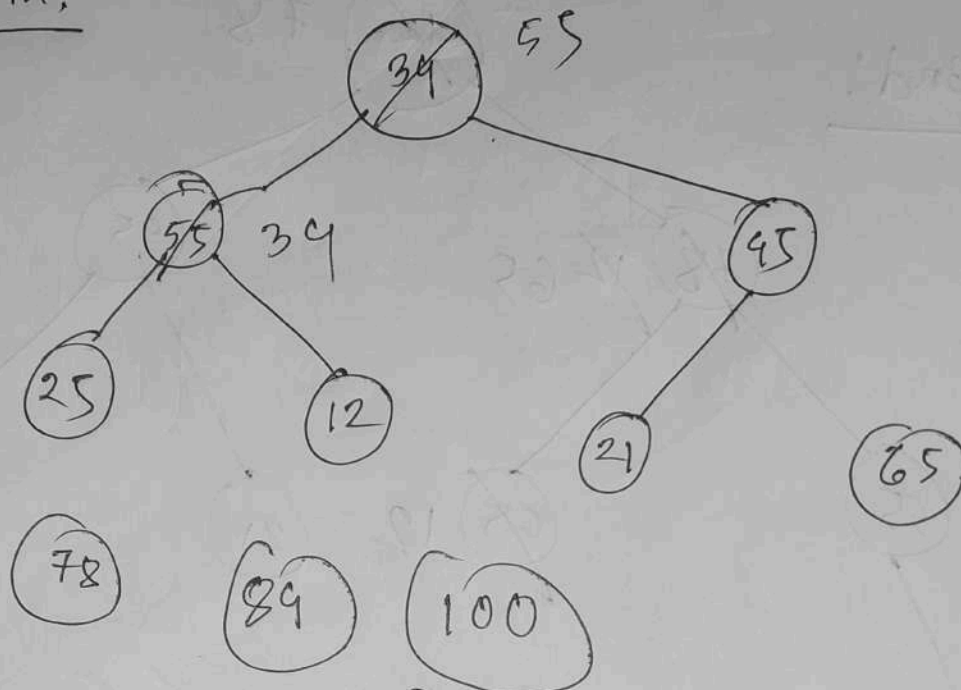

Array: 78, 65, 45, 55, 12, 21, 34, 25,
84, 100

4th!

Array: 65, 55, 45, 25, 12, 21, 34, 78, 89, 100

Subject :   Date :

5th:

34 55

55 34

25

12

45

21

65

78

89

100

swap

Array: 55, 34, 45, 25, 12, 21,

$$65, \overset{78}{\underset{\wedge}{}} 89, 100$$

6th:

21 45

34

25

12

45 21

55

65

78

84

100
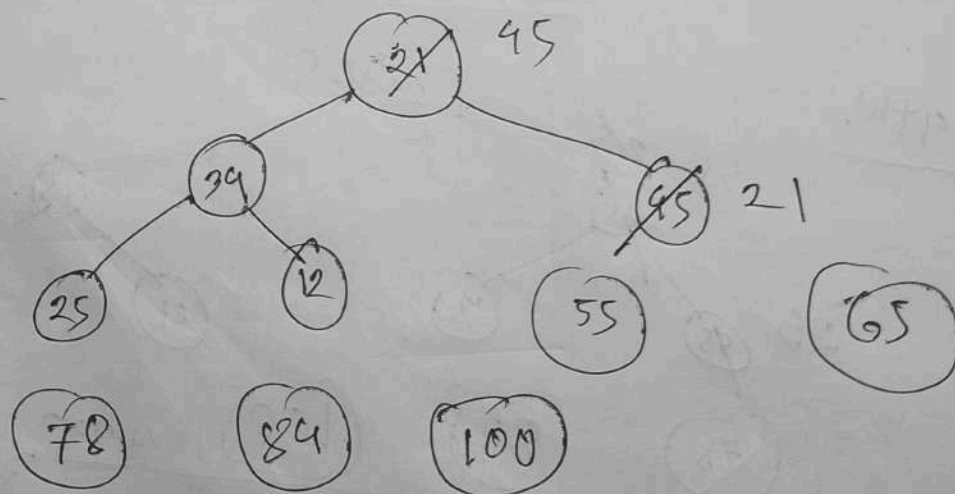
Array!   ~~21~~ 45, 34, 21, 25, 12, 55,

65, 78, 84, 100

7th:
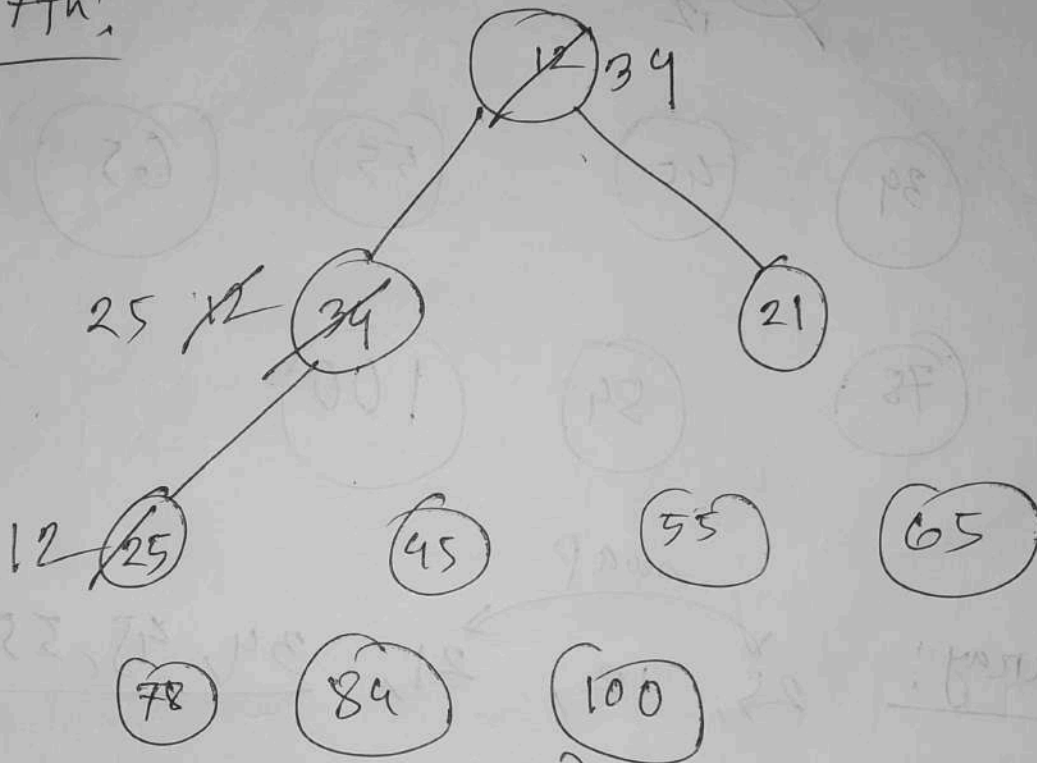
Array: 34, 25, 21, 12, 45,

55, 65, 78, 84, 100

In this way,

Subject :

Date :

8th :

12 25

28 12

21

34 45 55 65

78 84 100
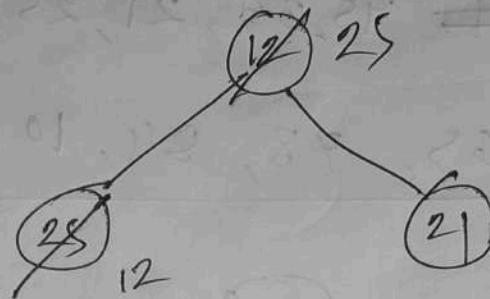
swap

Array : 25, 12, 21, 34, 45, 55, 65

78, 84, 100

Array : 21, 12, 25, 3·4, 45, 55, 65

78, 84, 100

Final Array : 12, 21, 25, 34, 45, 55, 65

78, 84, 100

Subject :

Date :

(12)

(21) (25)

(34) (45) (55) (65)

(78) (89) (100)

Ans. the · Q. NO : 1

— σ —
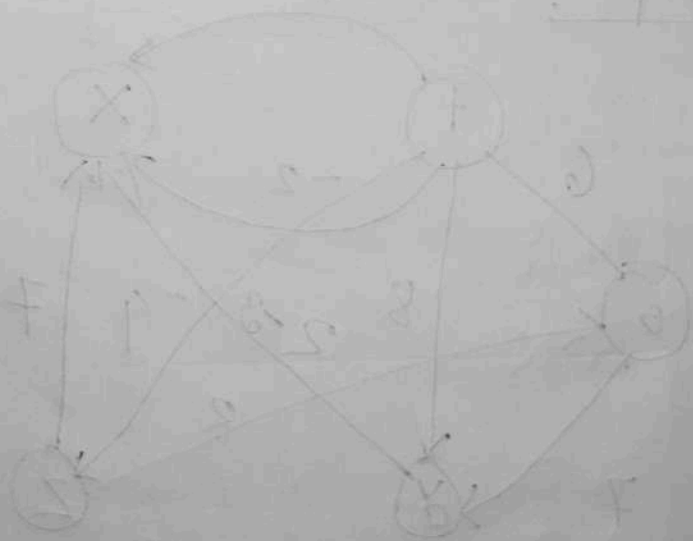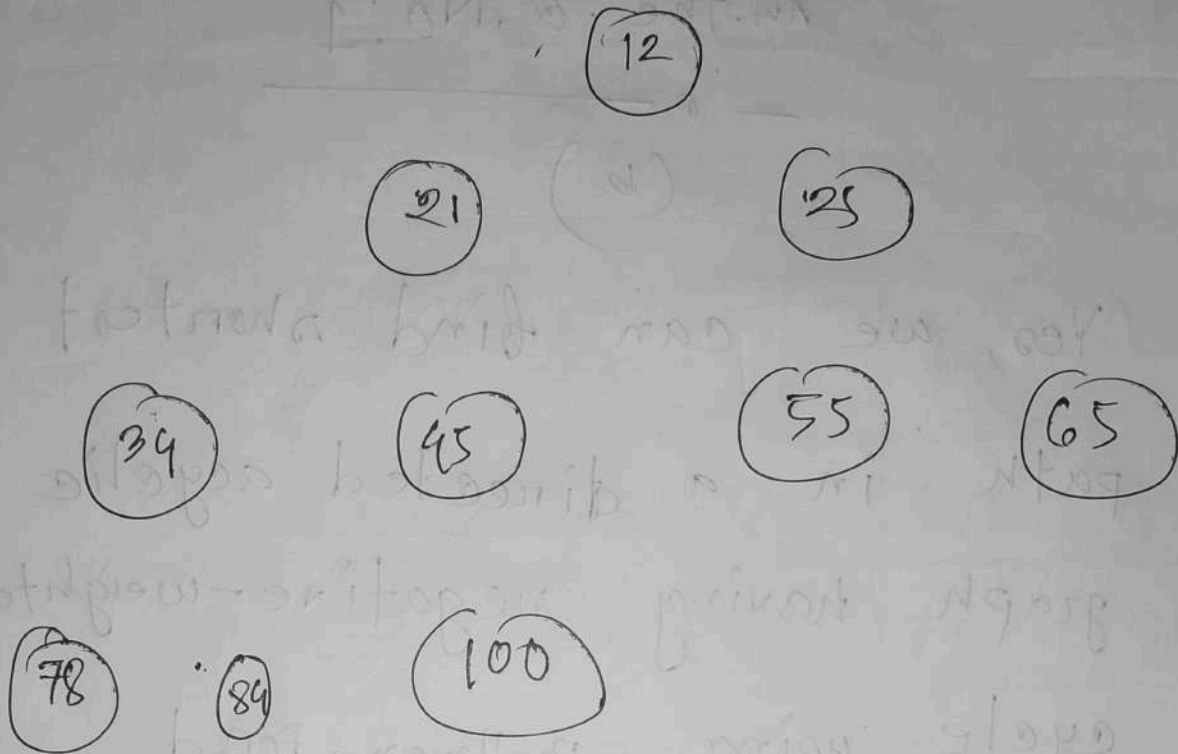
(b)

Yes, we can find shortest path in a directed acyclic graph having negative-weighted cycle using Bellman - Fond Algorithm.

Example!

P.T.O
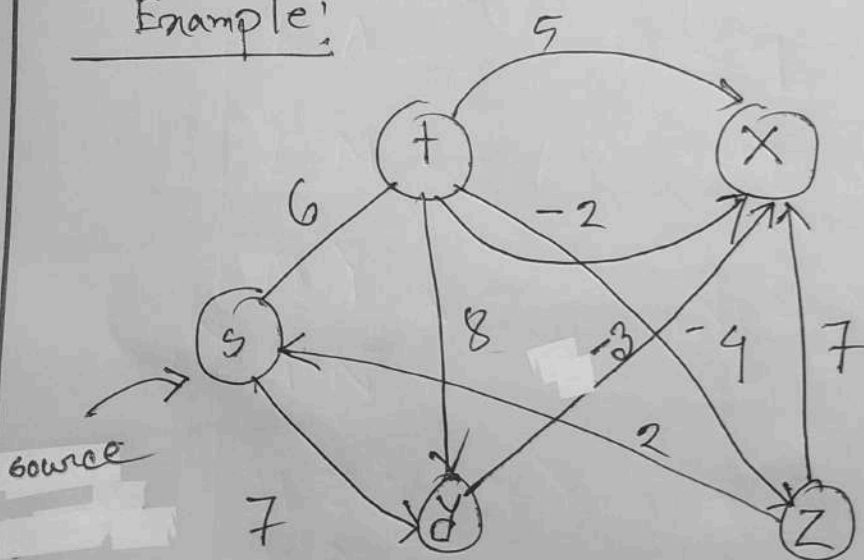
Subject :   Date :

Vertex	s	t	x	y	z
inital	0/NIL	∞/NIL	∞/NIL	∞/NIL	∞/NIL
1st	0	2/x	4/y	7/s	-2/t
2nd	0	2/x	4/y	7/s	-2/t
3nd	0	2/x	4/y	7/s	-2/t
4th	0	2/x	4/y	7/s	-2/t

Subject :

Am.the. Q.NO: 1

(c)

After nort the given

graph

Edge	weight
Y Z	12
A M	15
X Y	22
L A	24
L M	30
M Y	40
A N	41
A Z	50
M N	52
N Z	63
L Y	70

Iteration : 1:

$$K = \{ \quad \}$$

(A) (L) (M) (N) (X) (Y) (Z)

Iteration: 2:

$$K = \{ (Y, Z) \}$$

(A) (L) (M) (N) (X) (Y Z)

Iteration: 3:

$$K = \{ (Y, Z), (A, M) \}$$

(AM) (L) (N) (X) (Y Z)

Subject :

Date :

Iteration-4:

$$K = \{ (Y, Z), (A, M), (X, Y) \}$$

(A M)　(L)　(N)　(X, Y Z)

Iteration-5:

$$K = \{ (Y, Z), (A, M), (X, Y), (L, A) \}$$

(L A M) .　(N)　(X, Y, Z)

Iteration-6:

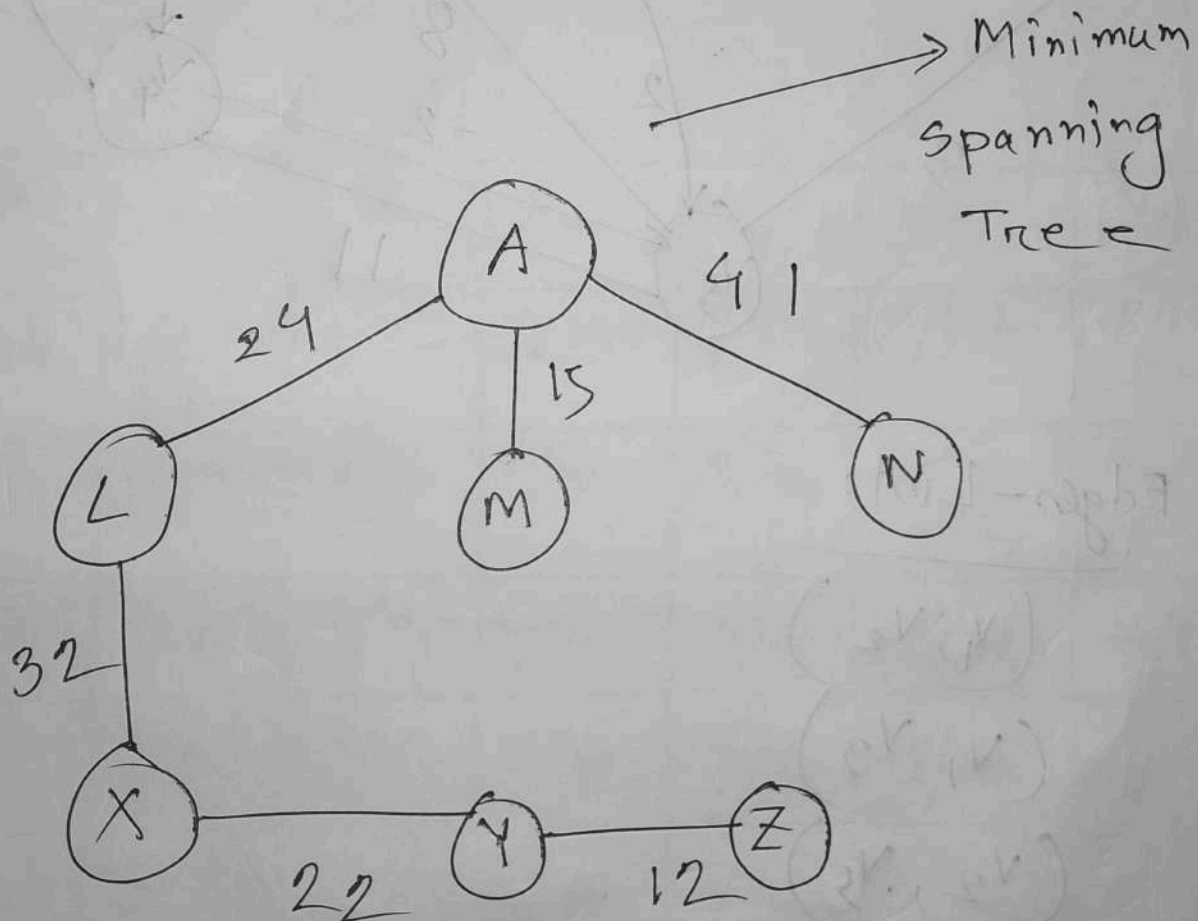$$K = \{ (Y, Z, (A, M), (X, Y), (L, A),$$
$$(L, X) \}$$

(L A M X Y Z)　(N)

Iteration: 7.

$$K = \{ (Y, Z), (A, M), (X, Y), (L, A)$$
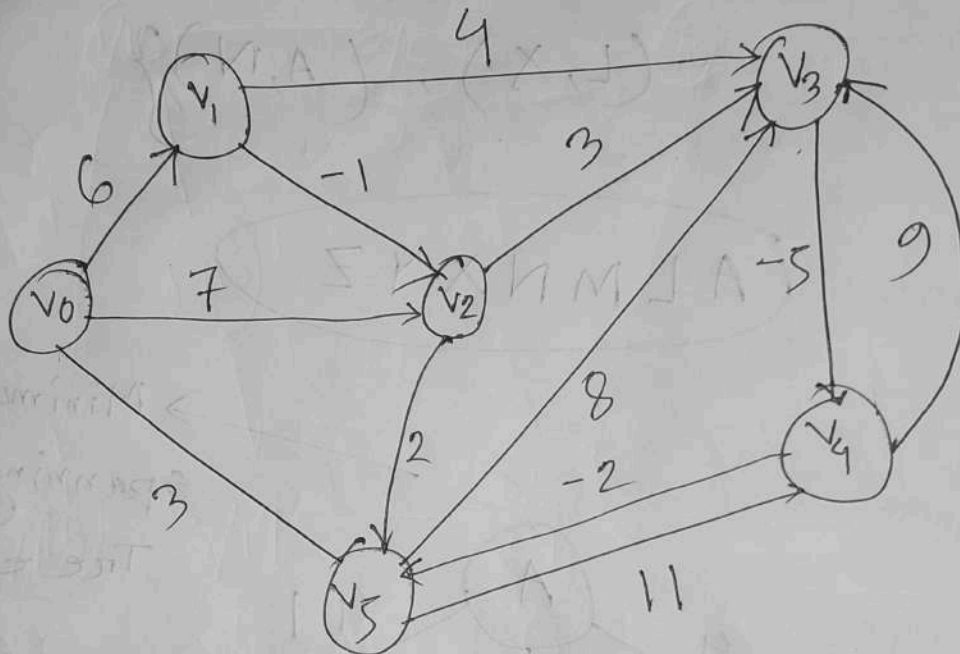$$(L, X), (A, N) \}$$

A L M N X Y Z

→ Minimum
Spanning
Tree

A

24 — L

15 — M

41 — N

L

32 — X

X — 22 — Y — 12 — Z

Minimum
Total cost = 196

Subject :   Date :

Am.the.Q.NO: 2

(a)

Edgen - List:

(v_1, v_2)

(v_1, v_3)

(v_2, v_3)

(v_2, v_5)

(v_3, v_4)

(v_4, v_3)

(v_4, v_5)

(v_5, v_3)

(v_0, v_1)

(v_0, v_2)

(v_0, v_5)

Vertex	v_1	v_2	v_3	v_4	v_5	v_0
Initial	0/NIL	∞/NIL	∞/NIL	∞/NIL	∞/NIL	∞/NIL
1st	0/NIL	-1/v_1	2/v_2	-3/v_3	4/v_2 -5/v_4	∞/NIL
1st Final	0/NIL	-1/v_1	2/v_2	-3/v_3	-5/v_4	∞/NIL
2nd	0/NIL	-1/v_1	2/v_2	-3/v_3	-5/v_4	∞/NIL
3rd	0/NIL	-1/v_1	2/v_2	-3/v_3	-5/v_4	∞/NIL
4th	0/NIL	-1/v_1	2/v_2	-3/v_3	-5/v_4	∞/NIL
5th	0/NIL	-1/v_1	2/v_2	-3/v_3	-5/v_4	∞/NIL

Ans. the. Q. NO : 2

(b)

Topological sort:

10   3 $1 \rightarrow 4 \rightarrow 5 \rightarrow 7 \rightarrow 8 \rightarrow 9$

2
$\downarrow$
6

Ans. the . Q.NO'. 2

(c)
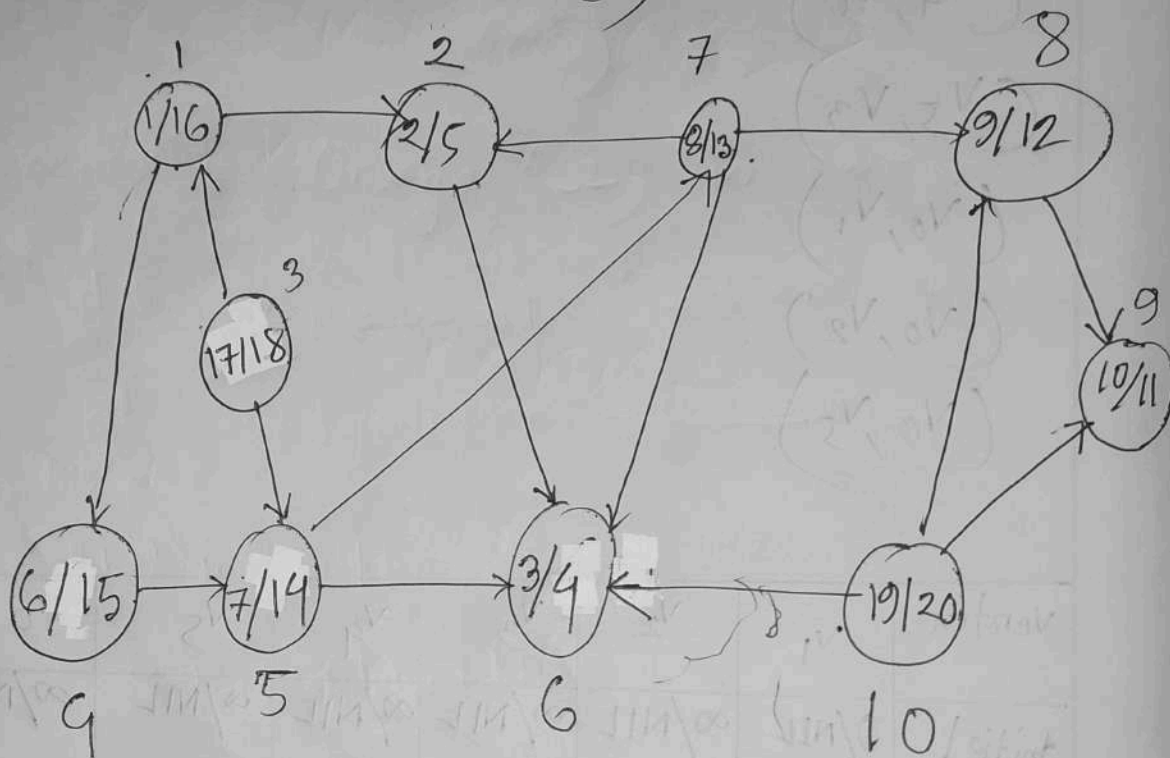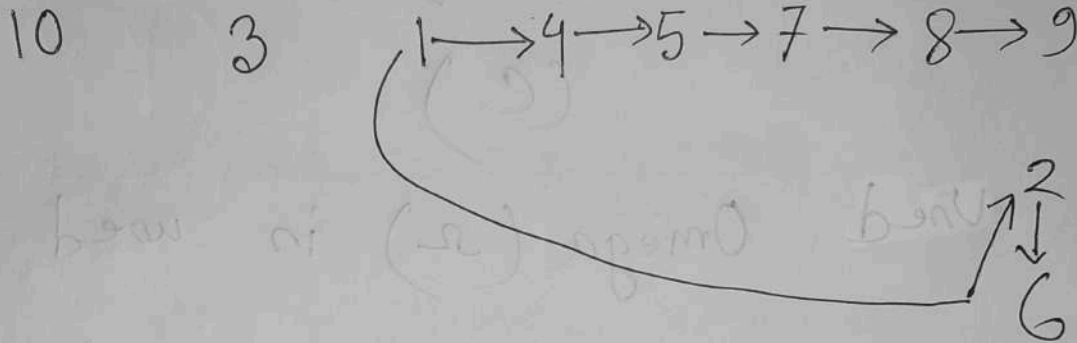
Omega (Ω) is used to represent lower bound of algorithm ———

(i) i.e the best case of an algorithm

(ii) The function $f(n) = \Omega(n)$ iff there exists positive constants c and n_0

(iii) such that $f(n) \geq c * g(n)$ for all, $n, n \geq n_0$

Example –

$$3n + 2 = \Omega(n)$$

so, $f(n) \geq c * g(n)$

$$3n + 2 \geq 3n$$

$$n = 0$$

$$2 > 0 \quad\text{——} \quad\text{True}$$

But definition of Ω (omega)

requires $n \geq 0$ and $n_o > 0$

so, $n = 0$ is not allowed

for, $n = 1$,

$$3 \cdot 1 + 2 \geq 3 \cdot 1$$

$$5 \geq 3 \quad\text{——} \quad\text{True}$$

so, $3n + 2 \geq 3 \cdot n$, for all $n \geq 1$

Subject :

Date :

Ans. the. Q. NO: 2

(d)

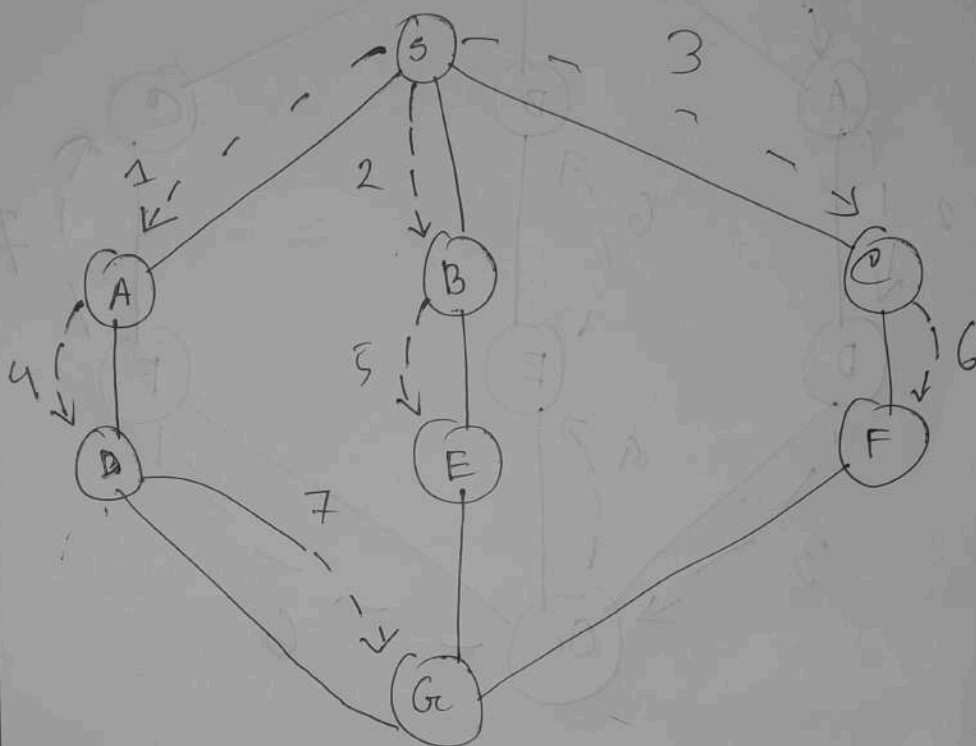| Comparison	BFS	DFS
Basic	Vertex-based algorithm	Edge-base algorith
Data structure used to store the nodes	Queue	Stack
Memory consuption	Inefficient	Efficient

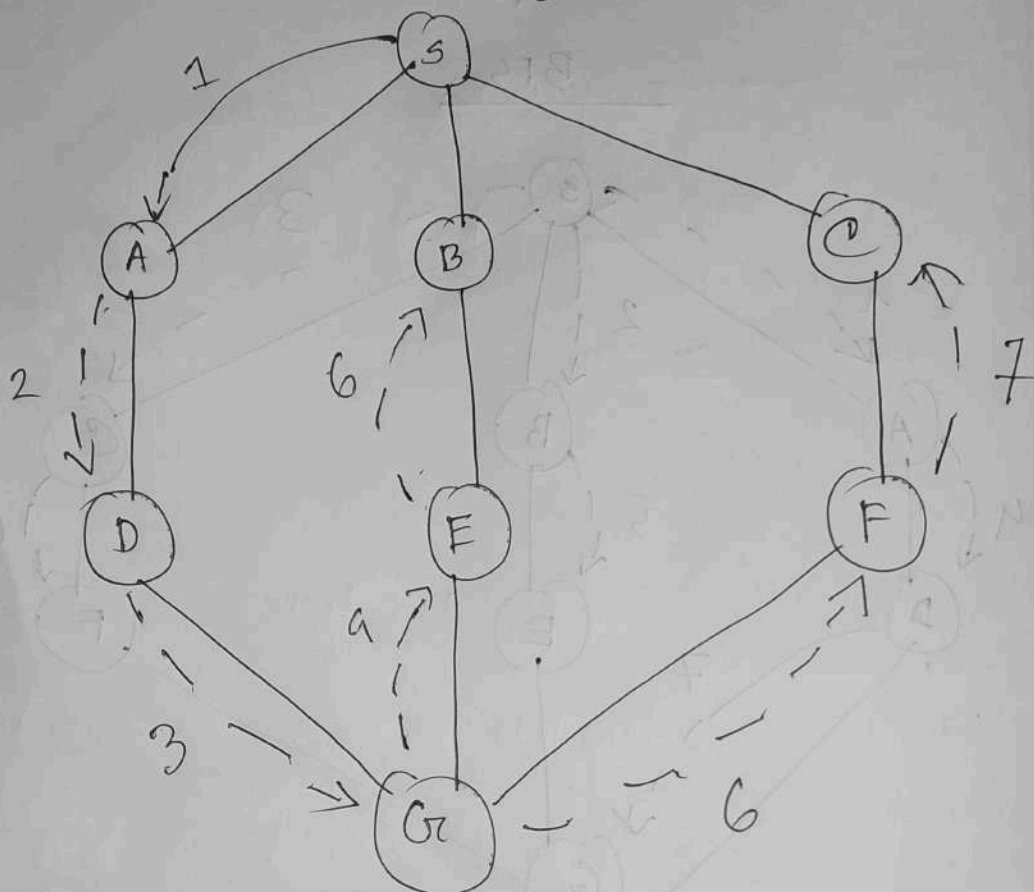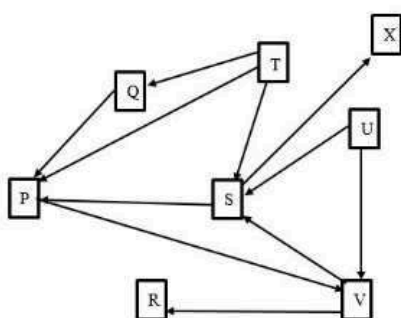Subject :   Date :

Example -

BFS

DFS

Multiple Choice

Consider you have implemented Topological Sort on the following graph. What is the highest finishing time of the following vertices?
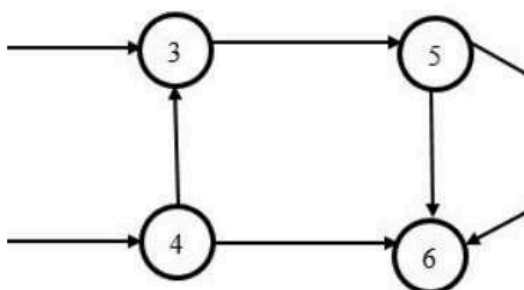
1 attachment ▲

○ 12

◉ 16

○ 18

○ None of the above

Short Answer

Write down the DFS traversal sequence of the following graph starting from node 1.

1 attachment ▲

Your Answer

1,3,5,7,6,2,4

Short Answer

What is the main difference between Prim's and Dijkstra's algorithm?

Your Answer

we use prims to find minimum spanning tree where as we use Dijkstra to find sortest path between two nodes

Multiple Choice

If you implement HeapSort on the following array, what will be the output array after 1st iteration?

< 2, 4, 7, 11, 10, 9, 25, 20, 31, 55, 60, 46 >

⦿ < 2, 55, 46, 31, 10, 9, 25, 20, 11, 4, 7, 60 >

○ < 2, 55, 31, 46, 10, 9, 25, 11 ,20, 4, 2, 60 >

○ < 7, 55, 46, 31, 10, 9, 25, 20, 11, 4, 2, 60 >

○ < 2, 4, 7, 9, 10, 11, 20, 25, 31, 46, 55, 60 >

Multiple Answer

Which of the following statements is not true for Breadth-First search?

Discover one of the adjacent vertex at a time

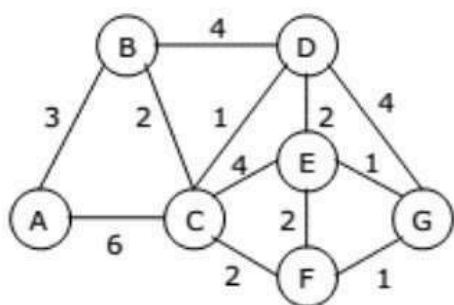☑ Dijkstra's algorithm uses it

Uses Queue

Searching algorithm

Short Answer

If you implement Prim's algorithm on the following graph, what will be the Total cost of the MST? [Here, the starting node is A]

1 attachment ▲

Your Answer

Total cost of Node A is 10

Multiple Answer

Which of the following statements are true for Dijkstra's algorithm?

☐ Single-source shortest path algorithm

☐ Implemented on weighted directed graph

☐ Can handle negative cycle

☑ Both a & b

Short Answer

If the function f(n) = Ω(n), then what will be the value of n ?

1 attachment ▲

$$3n + 12,$$

Your Answer

n=3

Short Answer

What is the main disadvantage of the Generic MST algorithm?

Your Answer

It uses greedy approach |

Screenshot saved

Tap to view your screenshot

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the Generic MST algorithm?

Your Answer

It uses greedy approach

✕

Short Answer

What is the main disadvantage of the Generic MST algorithm?
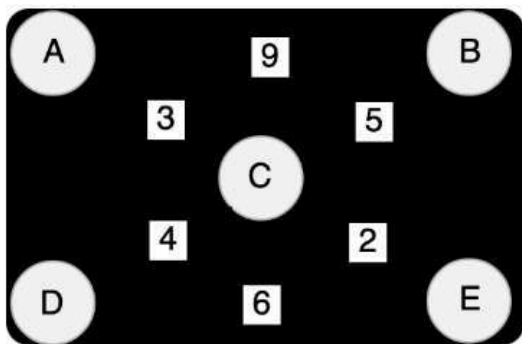
Your Answer

It uses greedy approach

Short Answer

What will be the shortest path from home to office using Dijkstra's algorithm?

1 attachment ▲

Your Answer

14

Fill in the Blank

Write down your ID here:

ID: CSE 071 08128

Fill in the Blank

Write down your ID here:

ID: CSE 071 08128
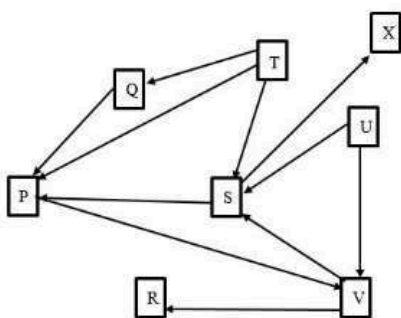
Multiple Choice

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1 attachment ▲

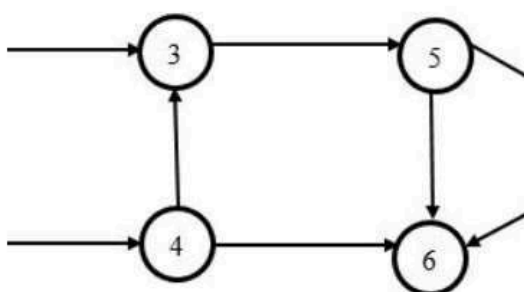○ 12

● 16

○ 18

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Short Answer

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1 attachment ▲

Your Answer

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Multiple Choice

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◉ < 2, 55, 46, 31, 10, 9, 25, 20, 11, 4, 7, 60 >

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Multiple Answer

Which of the following statements is not true for Breadth-First search?

☐ Discover one of the adjacent vertex at a time

☑ Dijkstra's algorithm uses it
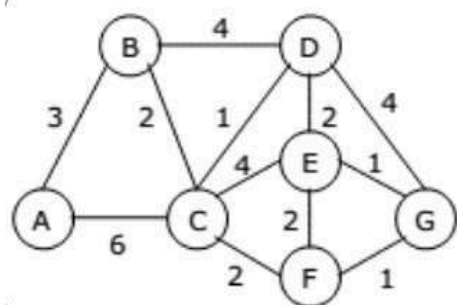
☐ Uses Queue

☐ Searching algorithm

Short Answer

If you implement Prim's algorithm on the following graph, what will be the Total cost of the MST? [Here, the starting node is A]

1 attachment ▲

Your Answer

Total cost of Node A is 10

Multiple Answer

Which of the following statements are true for Dijkstra's algorithm?

☐ Single-source shortest path algorithm

☐ Implemented on weighted directed graph

☐ Can handle negative cycle

☑ Both a & b

Short Answer

If the function f(n) = Ω(n), then what will be the value of n ?

1 attachment ▲

$$3n + 12,$$

Your Answer

n=3

Short Answer

What is the main disadvantage of the Generic MST algorithm?
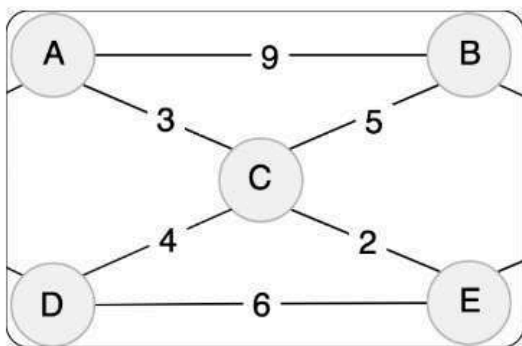
Your Answer

It uses greedy approach |

Short Answer

What will be the shortest path from home to office using Dijkstra's algorithm?

1 attachment ▲

Your Answer

14

Fill in the Blank

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