

Started on	Wednesday, 3 April 2024, 9:52 PM
State	Finished
Completed on	Wednesday, 3 April 2024, 10:22 PM
Time taken	29 mins 46 secs
Grade	8.00 out of 10.00 (80%)

Question 1

Correct

Mark 1.00 out of 1.00

A spanning tree for an undirected graph G is

Select one or more:

- ☒ a. An undirected graph ✓
- ☒ b. Has no cycles ✓
- ☐ c. Contains all the edges of G ,
- ☒ d. A connected graph ✓

Your answer is correct.

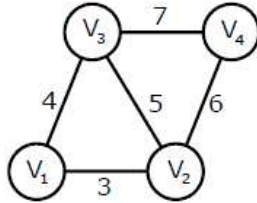
The correct answers are: An undirected graph, Has no cycles, A connected graph

Question 2

Correct

Mark 1.00 out of 1.00

An undirected graph $G(V, E)$ contains $n(n > 2)$ nodes named $V_1, V_2, V_3, \dots, V_n$. Two nodes V_i, V_j are connected if and only if $0 < |i - j| \leq 2$. Each edge (V_i, V_j) is assigned a weight $i + j$. A sample graph with $n=4$ is shown below.



What will be the cost of the minimum spanning tree (MST) of such a graph with n nodes?

Select one:

- ☒ a. $n^2 - n + 1$ ✓
- ☐ b. $\frac{1}{12}(11n^2 - 5n)$
- ☐ c. $6n - 11$
- ☐ d. $2n + 1$

The correct answer is: $n^2 - n + 1$

Question 3

Correct

Mark 1.00 out of 1.00

Which of the following is true about Prim's algorithm?

Select one:

- ☒ a. It is a Greedy algorithm ✓
- ☐ b. It is a Divide and conquer algorithm
- ☐ c. It uses Dynamic Programming
- ☐ d. None of the statements are true

Your answer is correct.

The correct answer is:

It is a Greedy algorithm

Question 4

Correct

Mark 1.00 out of 1.00

If a graph has 'n' edges, its minimum spanning tree will always have exactly 'n-1' vertices. (True/False)

Select one:

- ☐ True
- ☒ False ✓

The correct answer is 'False'.

Question 5

Correct

Mark 1.00 out of 1.00

Consider a weighted complete graph G on the vertex set V_1, V_2, \dots, V_n such that the weight of the edge (V_i, V_j) is $2|i - j|$. The weight of a minimum spanning tree of G is:

Select one:

- ☐ a. nC_2
- ☐ b. n^2
- ☐ c. $n - 1$
- ☒ d. $2n - 2$ ✓

The correct answer is: $2n - 2$

Question 6

Incorrect

Mark 0.00 out of 1.00

Select the correct answers regarding statement A and statement B

A) A directed graph is acyclic if DFS yields no back edges

B) DFS yields no back edges if a directed graph is acyclic

Select one:

- ☐ a. Only statement B is true
- ☐ b. Only statement A is true
- ☐ c. Both Statements are true
- ☒ d. Both statements are false ✗

Your answer is incorrect.

The correct answer is: Both Statements are true

Question 7

Correct

Mark 1.00 out of 1.00

The spanning trees do not have any cycles

Select one:

- ☒ True ✓
- ☐ False

The correct answer is 'True'.

Question 8

Correct

Mark 1.00 out of 1.00

Take a complete graph G with 4 vertices. Each edge is of the same weight. Then how many minimum spanning trees are there for graph G?

Answer: 16 ✓

A complete graph with n vertices has $n^{(n-2)}$ spanning trees.

The correct answer is: 16

Question 9

Incorrect

Mark 0.00 out of 1.00

In Prim's algorithm, which pair of data structures are most suitable to select the next vertex with the minimum key value?

- ☐ a. Stack, Heap
- ☐ b. Priority Queue, Heap
- ☐ c. Array, Heap
- ☒ d. Priority Queue, Linked List ✗

Your answer is incorrect.

The correct answer is:

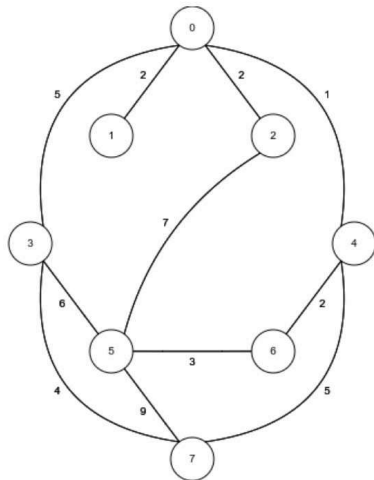
Priority Queue, Heap

Question 10

Correct

Mark 1.00 out of 1.00

What is the sum of all the weights of the edges in the MST of this graph?

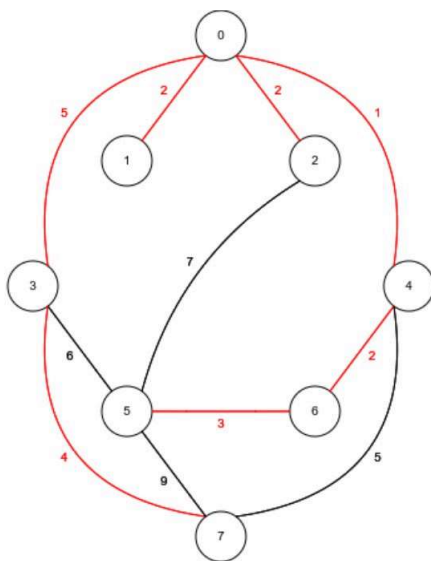


Answer:

19



MST is as follows



The correct answer is: 19