

CSPB 3104 - Park - Algorithms

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Started on Tuesday, 2 April 2024, 8:52 PM

State Finished

Completed on Tuesday, 2 April 2024, 8:55 PM

Time taken 3 mins 8 secs

Marks 16.00/16.00

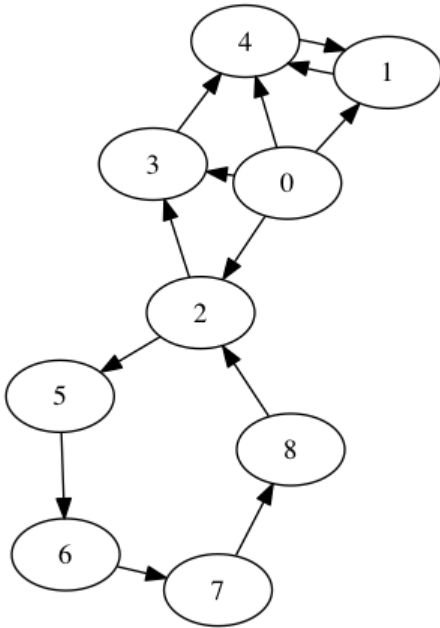
Grade 10.00 out of 10.00 (100%)

Question 1

Correct

Mark 7.00 out of 7.00

Consider the graph shown below with 9 nodes:



Which of the sets below is a strongly connected component of the graph?

- ☐ 0,2,3
- ☐ 0,2,3,5,6,7,8
- ☐ All the nodes in the graph
- ☒ 2,5,6,7,8 Correct
- ☐ 2

Mark 2.00 out of 2.00

The correct answer is: 2,5,6,7,8

How many strongly connected components are there in the graph?

4

Suppose a DFS is called on the graph G starting from node 0, choose the node with the largest finish time?

Assume that the DFS chooses to visit adjacent vertices of a node in the increasing order of their IDs.

0

Let G^R be the graph with the edges reversed. What are the nodes visited when a dfsVisit of G^R is performed starting from the node 0?

Write down the sequence of nodes visited in G^R separated by commas (,). Please avoid whitespaces in your answer.

0

After calling dfsVisit on G^R starting from nodes 0, suppose we were to call dfsVisit on node 2 for the graph G^R . Write down the sequence of nodes visited by this call? In particular, nodes visited in the previous problem will not be revisited.

2,8,7,6,5

Correct

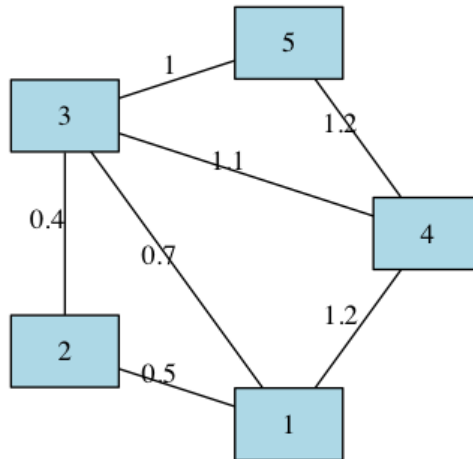
Marks for this submission: 7.00/7.00.

Question 2

Correct

Mark 4.00 out of 4.00

Suppose we wish to find the minimum spanning tree using Prim's algorithm, select the sequence of edges that are chosen by the algorithm for the graph below:



Let 1 be the node that is initially chosen for the set S .

What is the first edge chosen by Prim's algorithm?	<input type="text" value="1 - 2"/>
What edge is chosen in the second step?	<input type="text" value="2 - 3"/>
What edge is chosen in the third step?	<input type="text" value="3 - 5"/>
What edge is chosen in the fourth step?	<input type="text" value="3 - 4"/>

Your answer is correct.

The correct answer is: What is the first edge chosen by Prim's algorithm? → 1 - 2, What edge is chosen in the second step? → 2 - 3, What edge is chosen in the third step? → 3 - 5, What edge is chosen in the fourth step? → 3 - 4

Correct

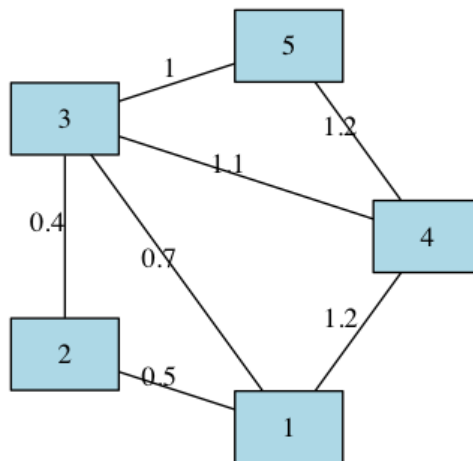
Marks for this submission: 4.00/4.00.

Question 3

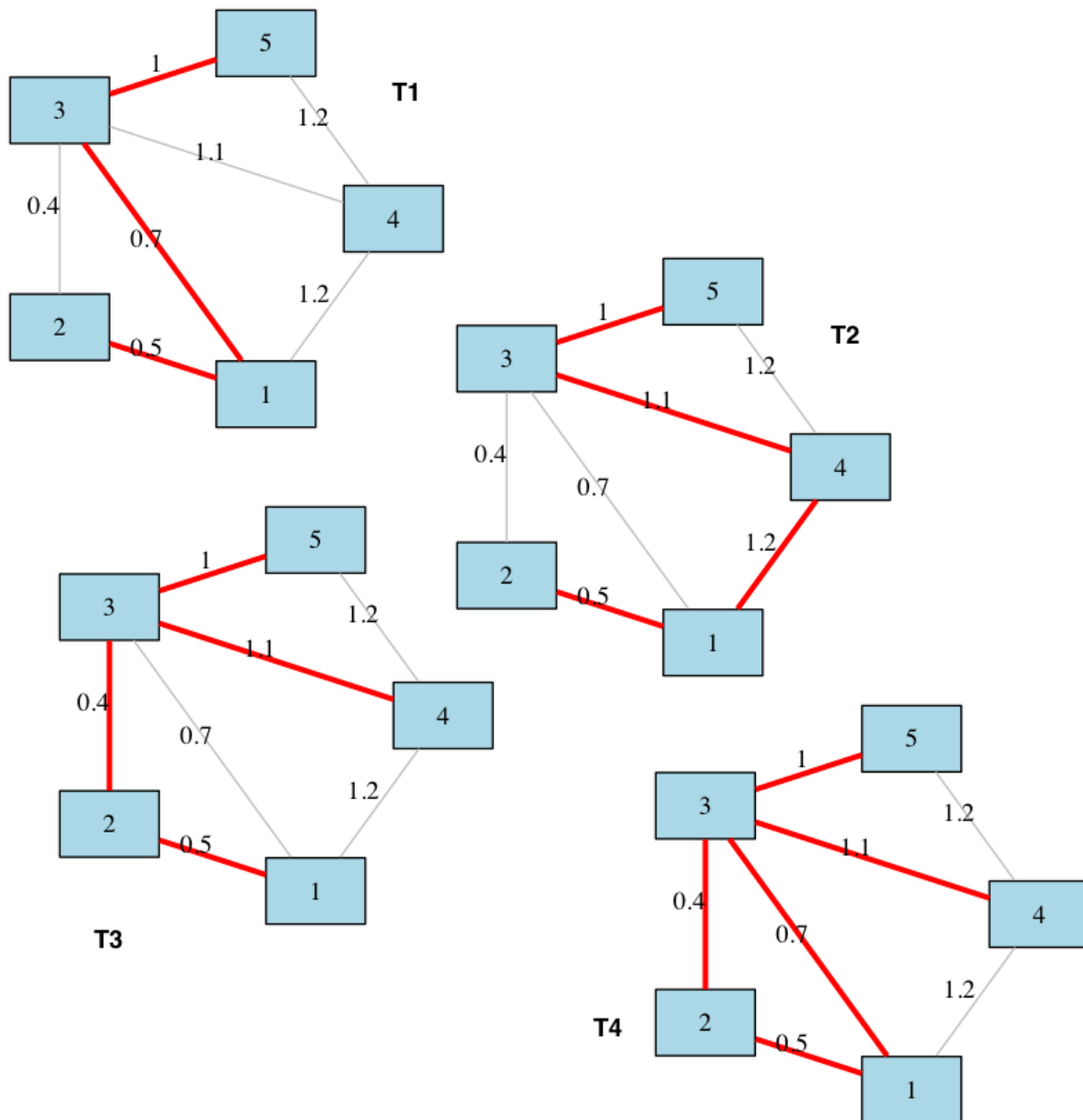
Correct

Mark 5.00 out of 5.00

Consider the graph G shown below with 5 nodes.



Consider four subgraphs of G (T_1, T_2, T_3, T_4) shown below with the chosen edges shown in red and deleted edges in gray:



For each of the statements below, write TRUE if it is valid and FALSE other wise.

1. Both **T1** and **T2** are spanning trees of the graph G.

FALSE

2. **T3** is a spanning tree

TRUE

3. **T3** is a minimum spanning tree

TRUE

4. **T4** is a minimum spanning tree.

FALSE

5. None of the subgraphs shown is a minimum spanning tree.

FALSE

Correct

Marks for this submission: 5.00/5.00.