



Review Test Submission: Quiz 7

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Unit Discrete Structures

Test Quiz 7

Started 6/06/17 9:19 AM

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Status Completed

Attempt Score 0 out of 100 points

Time Elapsed 0 minute

Instructions

You will have 2 attempts. The higher score will count to your mark. The deadline is Friday May 26, at 11:59pm. Choose the best answer for each question.

Results All Answers, Correct Answers
Displayed

Question 1

0 out of 5 points

Which of the following relations is *not* a graph?Answers: The relation $\{(a, b) \in \mathbb{Z}^2 : a - b \equiv 3 \pmod{6}\}$. The relation \emptyset on any set S The relation \neq on the set $\{0, 1, 2, 3, 4, 5\}$ (where $a \neq b$ means $\neg(a = b)$). The relation \leq on the set $\{0, 1, 2, 3, 4, 5\}$.

Question 2

0 out of 5 points

Which of the following is a graph?

Answers:



(V, E) with $V = \{a, b, c, d\}$ and
 $E = \{(a, c), (c, a), (b, d), (d, b), (c, d), (d, c), (b, c), (c, b)\}$

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Question 3

0 out of 5 points

Which of these is a graph?

Answers: (V, E) with $V = \{0, 1, 2, 3, 4, 5, 6\}$ where
 $E = \{(a, b) \in V^2 : a - b \equiv 2 \pmod{7}\}$

(V, E) with $V = \{0, 1, 2, 3, 4, 5, 6, 7\}$ where
 $E = \{(a, b) \in V^2 : a \equiv b \pmod{8}\}$



(V, E) with $V = \{0, 1, 2, 3, 4, 5, 6, 7\}$ where
 $E = \{(a, b) \in V^2 : a - b \equiv 4 \pmod{8}\}$

Question 4

0 out of 5 points

Which of the following is *not* a graph? (hint: they are all symmetric relations)

Answers:



(V, E) where V = the set of all cities in Australia, and E contains all pairs (u, v) , where u is at most 100km away from v (measured to some standard location, such as the main post office in each city).

(V, E) where V = the set of all cities in Australia, and E contains all pairs of cities (u, v) , where there is a train track from u to v

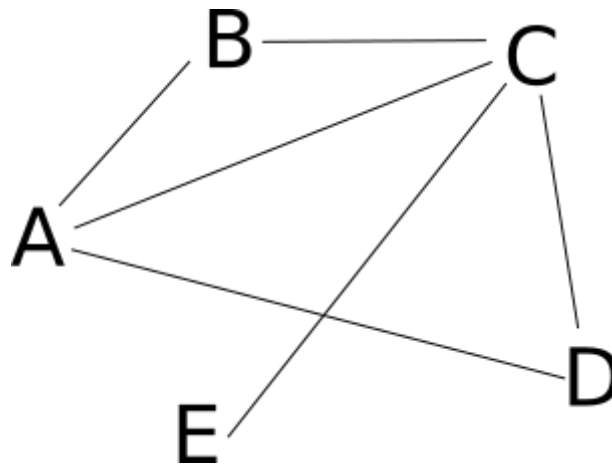
(V, E) where V = the set of all people and E contains all pairs of people (u, v) , where u is a sibling (i.e. brother, sister) of v .

(V, E) where V = the set of all actors and actresses, and E contains all pairs of actors/actresses (u, v) , such that $u \neq v$ and u has appeared in a

Question 5

0 out of 5 points

The following graph applies for the next 5 questions.



Which of the following is a path?

Answers: ADABC

BECD

☒ ABCD

ABCD A

Question 6

0 out of 5 points

What is the distance from A to E?

Answers: ☒ 2

1

0

3

Question 7

0 out of 5 points

Which of these is *not* a cycle in the previous graph?

Answers: ☒ ABCEA

ABCA

ABCD A

CABC

Question 8

0 out of 5 points

The graph is:

Answers: Disconnected

A tree

A forrest

☒ Connected

Question 9

0 out of 5 points

The neighbours of A are:

Answers: {E }

{A,B,C,D }

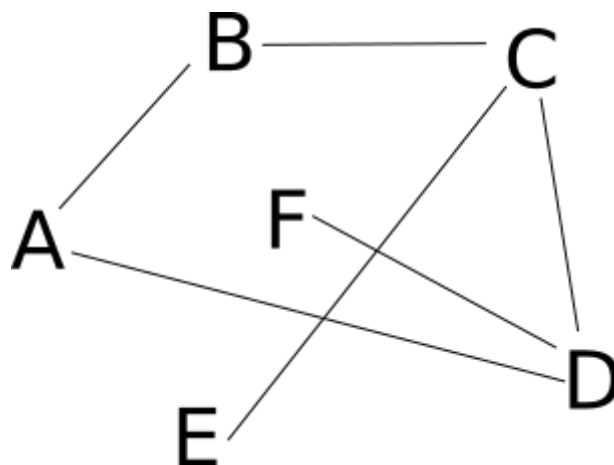
{A,B,C,D,E }

☒ {B,C,D }

Question 10

0 out of 5 points

The following graph applies for the next 5 questions:



The longest path in the graph has length:

Answers: ☒ 5

2

3

4

Question 11

0 out of 5 points

The distance from A to B is:

Answers: 0

☒ 1

2

3

Question 12

0 out of 5 points

The distance from A to E is:

Answers: 0

1

2

☒ 3

Question 13

0 out of 5 points

The distance from A to F is:

Answers: 0

1

☒ 2

3

Question 14

0 out of 5 points

Any spanning tree for the above graph:

Answers: ☒ Must contain the edge (E, C) .

Will have 6 edges.

will have A as a root.

Will contain the cycle A,B,C,D,A

Question 15

0 out of 5 points

In a rooted tree:

Answers: The ancestors of any vertex will include at least one leaf.

The intersection of the ancestors and descendants of a vertex v will be $\{v\}$.

✓ There is a unique path between any two vertices.

Every vertex will have at least one descendant.

Question 16

0 out of 5 points

A network administrator is having trouble with a network. Some links are down and some computers don't seem to be able to communicate to each other. The administrator has determined that the spanning tree finding algorithm has failed. The network administrator has modeled the network as a graph where the vertices are computers and routers, and edges represent physical network links which are currently up (working). A reasonable explanation for the situation in terms of graph theory is:

Answers: ✓ The graph is disconnected.

Some vertices in the graph are too distant from others to form the spanning tree.

The algorithm has produced a spanning tree with too many cycles.

The spanning tree algorithm was not able to find any cycles.

Question 17

0 out of 5 points

For each $n \in \mathbb{N}$, define the *hypercube graph*, to have vertices $\{0, 1\}^n$ (the n -bit strings) and edges between bit-strings u and v if they differ in only one bit (for example, 010 and 000 are adjacent, but 110 and 011 are not). Then the distance between two strings x, y in the hypercube graph is *not*:

Answers: ✓ The difference between the number of 1's in x and the number of 1's in y . ⚙

The number of bits that we need to change to transform x into y . ⚙

Always less than or equal to n . ⚙

The number of 1's in the string $x \oplus y$. ⚙

Question 18

0 out of 5 points

In a connected graph, a *bridge* is an edge such that if we remove the edge then the graph becomes disconnected. Which of the following is *not* true about bridges?

Answers: Every spanning tree must contain every bridge.

☒ Every graph contains at least one bridge.

in both of the previous graphs in this quiz, the edge (E,C) is a bridge.

There are no cycles that go through bridges.

Question 19


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
Choose a graph $G = (V, E)$ and a vertex u in G . Define $D(x, y)$ to be the distance from x to y in G . Further define the sets


$$G_j = \{v \in V : D(u, v) = j\}$$

Which of the following is *false*?

Answers: For every G and u , no vertex in G_2 is adjacent to a vertex in G_0 . 

For every G and u , every vertex in G_j is adjacent to at least one vertex in G_{j-1} for $j \geq 1$. 

☒ For every G and u , every vertex in G_j is adjacent to at least one vertex in G_{j+1} for $j \geq 1$. 

It is possible for two vertices in G_j to be adjacent to each other. 

Question 20

0 out of 5 points

A spanning tree:

Answers: Is a subtree of a rooted tree that contains all of its edges.

☒ Is a subgraph of a graph that contains all of its vertices and is also a tree.

Is any tree on the vertices of a graph.

Exists for every graph.

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