Review Test Submission: Quiz 8

User	Matthew McKague
Unit	Discrete Structures
Test	Quiz 8
Started	31/05/17 8:57 PM
Submitted	31/05/17 8:57 PM
Status	Completed
Attempt Score	0 out of 100 points
Time Elapsed	132 hours, 22 minutes
Instructions	You will have 2 attempts. The higher score will count to your mark. The deadline is Friday June 2, at 11:59pm. Choose the best answer for each question.
Results Displayed	All Answers, Correct Answers

Question 1

0 out of 5 points

A topological ordering of $G = (V, E)$ is:

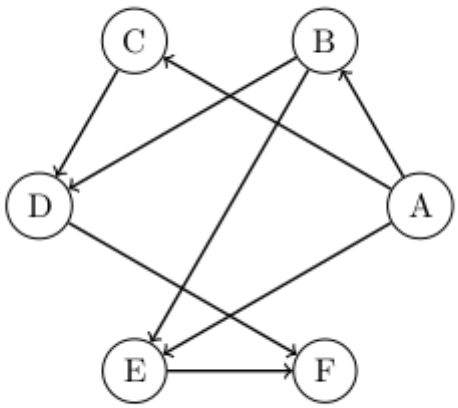
Answers:

- A partial ordering on V such that $E \subseteq R$.
- An irrefelexive, transitive, anti-symmetric binary relation on V such that $E \subseteq R$
- A refelexive, transitive, symmetric binary relation on V such that $E \subseteq R$
- A total ordering on V such that $E \subseteq R$.

Question 2

0 out of 5 points

Which of the following is a topological ordering for the graph:



Answers:

a, b, c, d, e, f

b, c, a, d, f, e

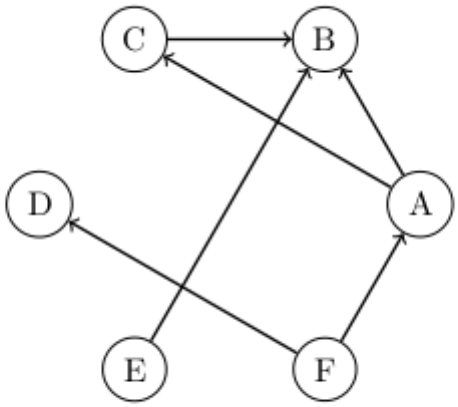
a, b, c, f, d, e

f, a, d, e, b, c

Question 3

0 out of 5 points

Which of the following is *not* a topological ordering for the graph:



Answers:

- ✓ f, a, b, d, e, c
- f, a, c, e, d, b
- e, f, a, d, c, b
- f, e, d, a, c, b

Question 4

0 out of 5 points

Which of the following is *not* part of the definition of a flow?

Answers:

- The flow into a vertex (not the source or drain) equals the flow out of that vertex.
- ✓ The flow out of the source is 0.
- The flow out of the drain is 0.
- The flow on an edge is between 0 and the capacity of the edge (inclusive.)

Question 5

0 out of 5 points

The maximal flow on a graph is always equal to:

Answers:

- The sum of the capacities of the edges going into the drain.
- The capacity of a maximal edge cut on the graph.

The sum of the capacities of the edges coming out of the source.

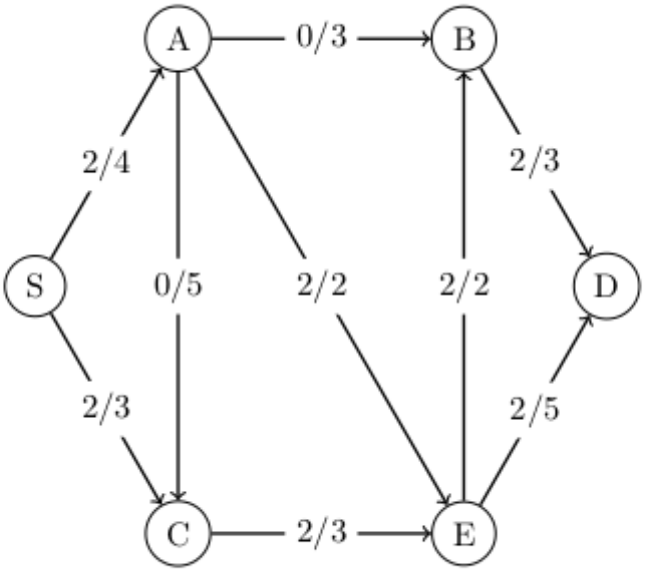
The capacity of a minimal edge cut on the graph.

Question 6

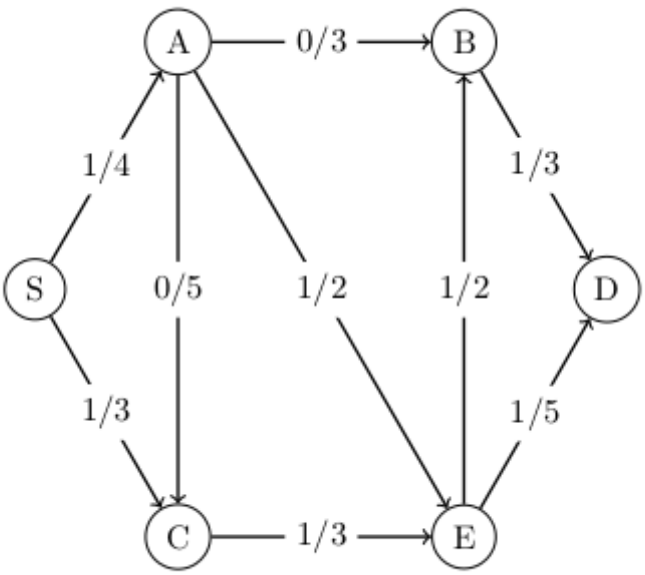
0 out of 5 points

Which of the following is not a valid flow?

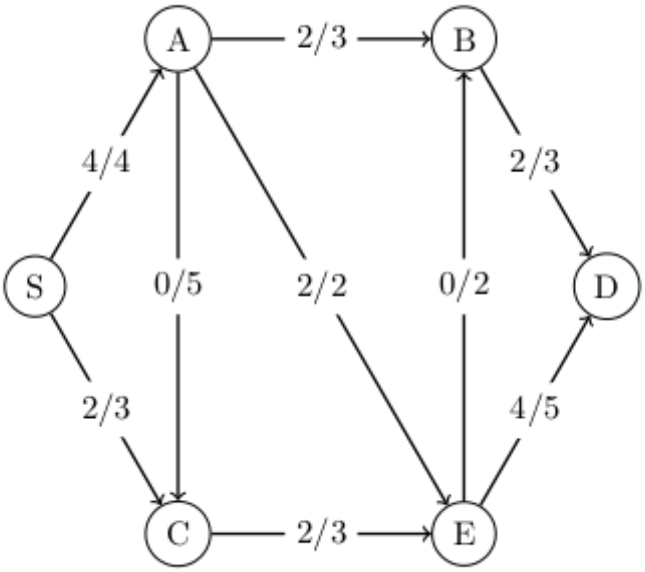
Answers: Graph



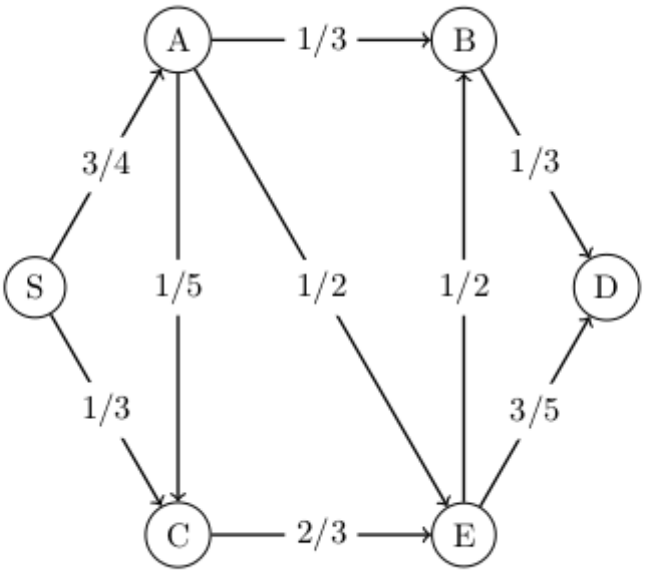
Graph



Graph



Graph

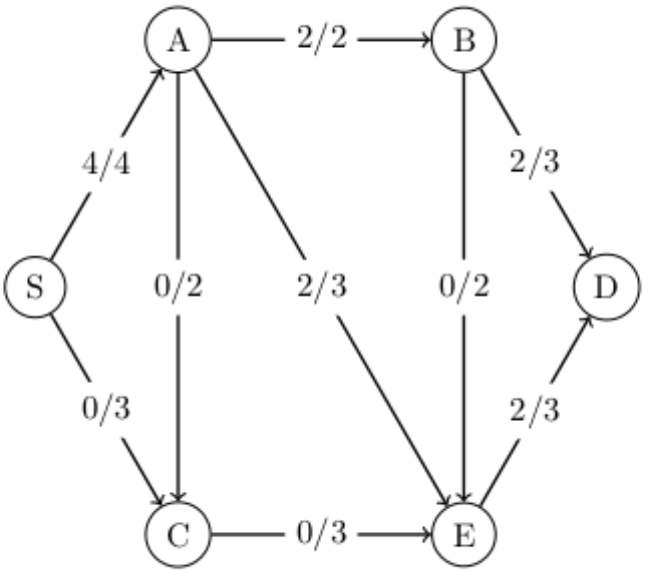


Question 7

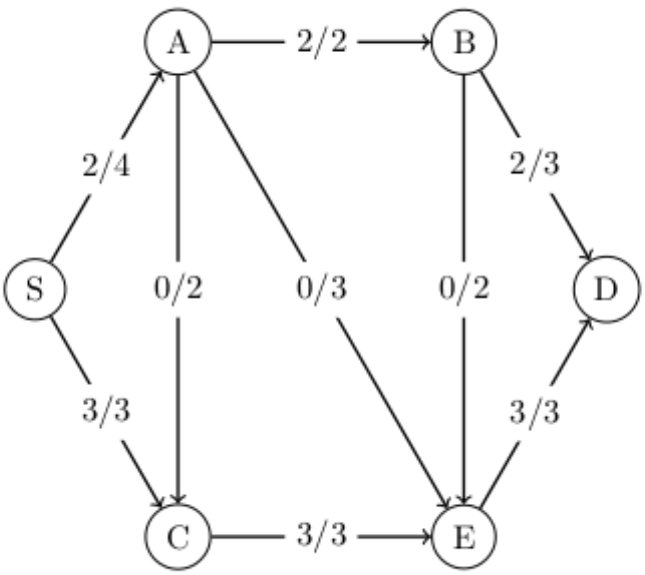
0 out of 5 points

Which of the following is a maximal flow?

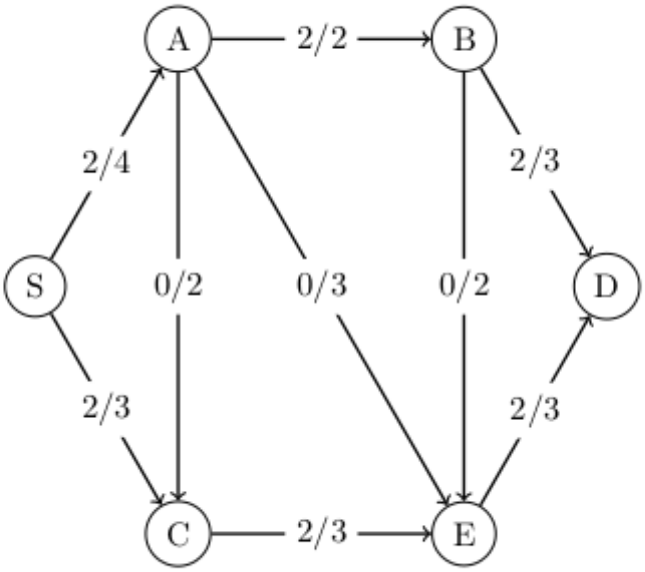
Answers: Flow



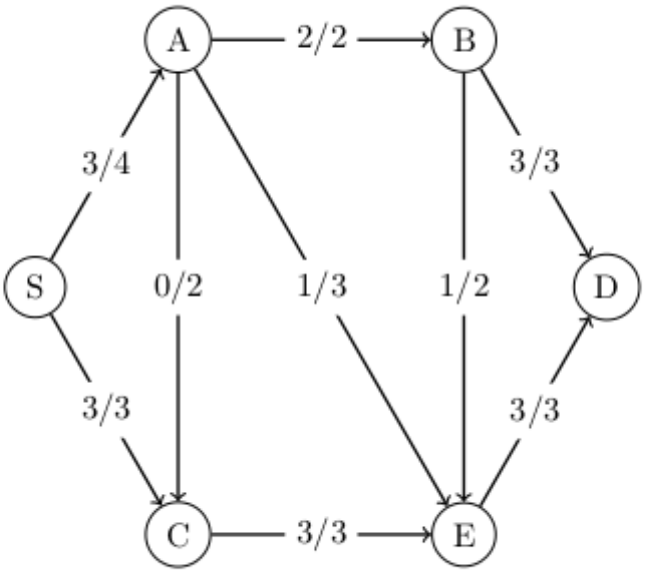
Flow



Flow



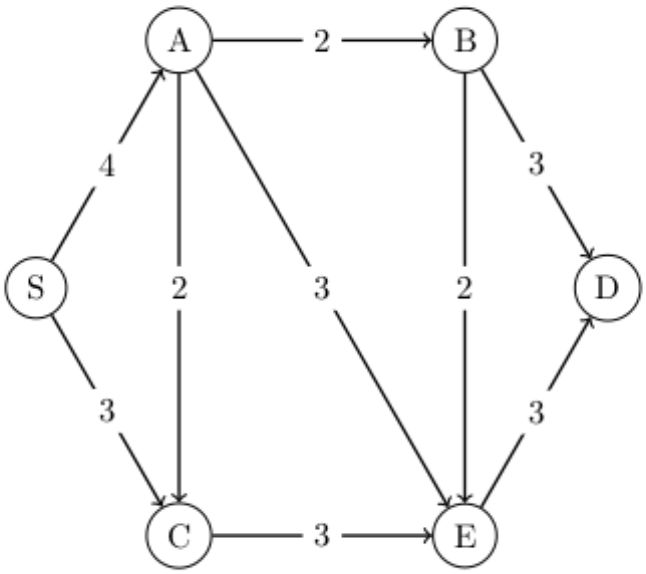
Flow



Question 8

0 out of 5 points

Which of the following sets of edges is a minimal edge cut on the following graph?



Answers: $\{(S, A), (S, C)\}$

$\{(A, B), (A, E), (C, E)\}$

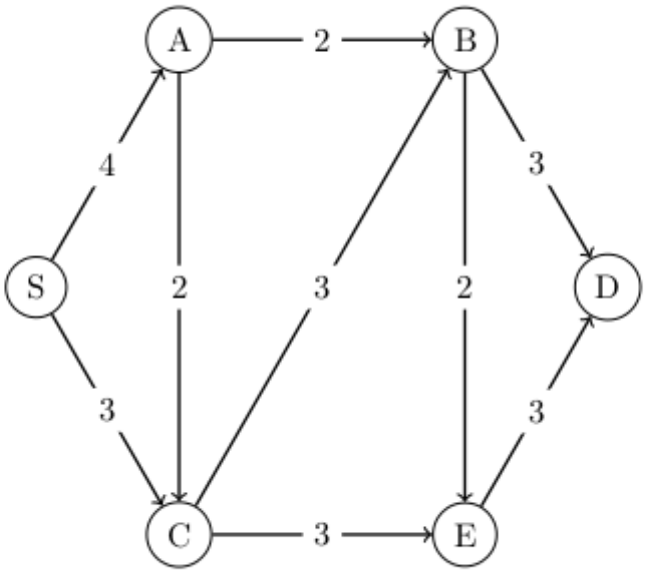
$\{(A, B), (E, D)\}$

$\{(A, B), (E, D), (B, E)\}$

Question 9

0 out of 5 points

Which of the following is *not* an edge cut on the following graph?



Answers: $\{(B, D), (E, D)\}$

$\{(A, B), (C, B), (E, D)\}$

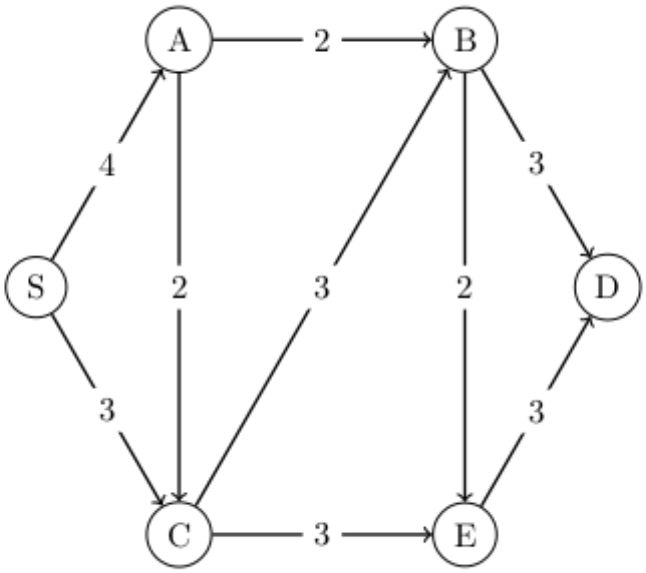
$\{(A, B), (C, E)\}$

$\{(S, A), (C, B), (E, D)\}$

Question 10

0 out of 5 points

What is the maximal flow on this graph?



Answers:

3

4

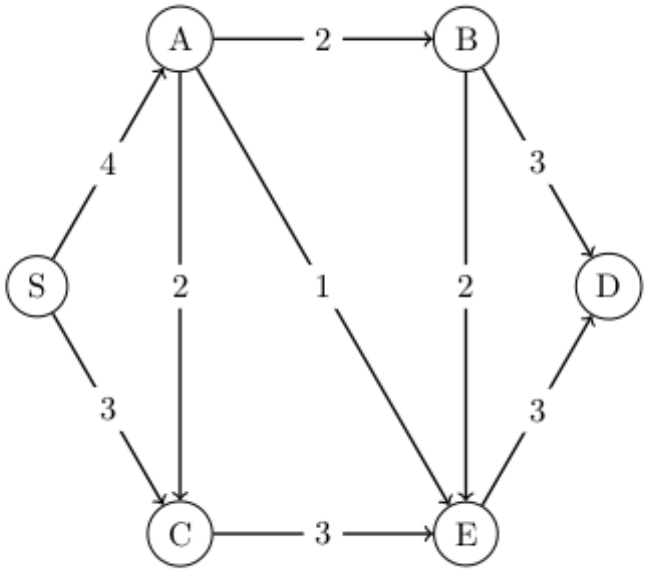
5

6

Question 11

0 out of 5 points

What is the maximal flow on this graph?



Answers:

3

4

✔ 5

6

Question 12

0 out of 5 points

A matching on a bipartite graph $G = (A \cup B, E)$ is:

Answers:

A subset $M \subseteq E$ such that no two edges in M are incident with a common vertex and every vertex in A is incident with at least one edge is M.

A subset $M \subseteq E$ such that every edge in M goes between two vertices of A or two vertices of B

A subset $M \subseteq E$ such that no two vertices in M are incident with a common edge.

✔ A subset $M \subseteq E$ such that no two edges in M are incident with a common vertex.

Question 13

0 out of 5 points

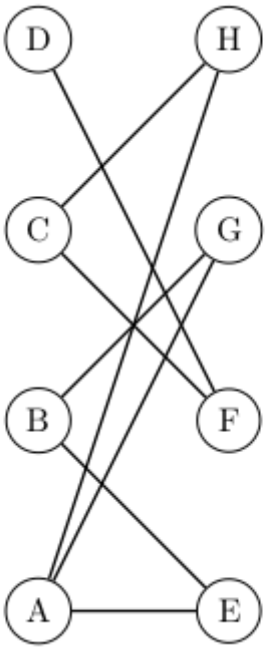
A matching on a bipartite graph can be found by:

Answers:
- Transforming the problem into a maximal flow problem.
- Transforming the problem into a topological ordering problem.
- Identifying a spanning tree and taking every second edge.
- Transforming the problem into a maximal edge cut problem.

Question 14

0 out of 5 points

Which of the following sets is a maximal matching on the following graph?

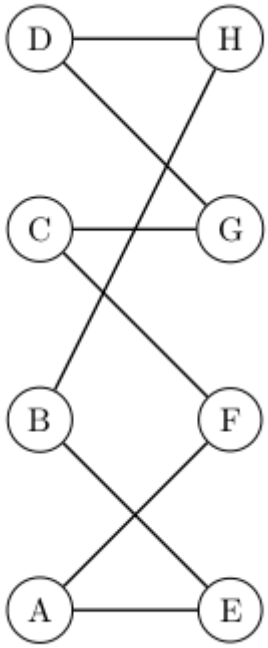


Answers:
- $\{(C,F),(B,F),(A,E),(D,G)\}$
- $\{(C,F),(D,F),(A,E),(B,G)\}$
- $\{(C,H),(B,G),(A,E),(D,F)\}$
- $\{(C,H),(B,G),(A,E)\}$

Question 15

0 out of 5 points

Which of the following sets is a maximal matching on the following graph?



Answers:

- ✓ $\{(D,G),(C,F),(A,E),(B,H)\}$
- $\{(D,G),(C,F),(A,E)\}$
- $\{(A,E),(C,F),(B,G),(D,H)\}$
- $\{(A,E),(B,F),(C,G),(D,H)\}$

Question 16

0 out of 5 points

Which of the following is *not* true about cuts and flows?

Answers:

- Assigning 0 to every edge is always a valid flow.
- For an edge e in a minimal edge cut, in any maximal flow the flow on e will be equal to the capacity of e.
- The set of edges leaving the source is always an edge cut, but it is not necessarily minimal.
- ✓ A minimal edge cut will always contain at least one edge.

Question 17

0 out of 5 points

In an augmenting path $v_1, v_2, \ldots, v_j$, we must have:

Answers:

An edge in the path must currently have its flow less than its capacity if it is a ``backwards'' edge.

The source and the drain do not appear in the path

✓ (v_k, v_{k+1}) or (v_{k+1}, v_k) is an edge for every $k = 1 \ldots j-1$

(v_k, v_{k+1}) is an edge for every $k = 1 \ldots j-1$

Question 18

0 out of 5 points

Suppose we start with a rooted tree, and add a direction to every edge, so that it points from parent to child. So, the root has no edges going into it, and a leaf has no edges going out of it. Then for this directed graph that we have created:

Answers:

The graph will always uniquely determine a topological ordering.

There will always be a directed path from any vertex to any other.

The number of edges will be smaller than that in the original tree.

✓ There will never be a directed cycle.

Question 19

0 out of 5 points

A *strongly connected* graph is a directed graph where for any vertices u, v there is a directed path from u to v. Then:

Answers:

✓ A strongly connected graph with more than one vertex will never by acyclic.

A directed acyclic graph is always strongly connected.

We can always define a topological ordering on a strongly connected graph.

If a graph is not strongly connected then we cannot define a topological ordering.

Question 20

0 out of 5 points

If there is a directed path from u to v and from v to w then:

Answers:

✓ There will be a directed path from u to w, but it might not go through v

There will be a directed path from u to w, and it will always go through v

There will be a cycle in the graph which goes through u and w

There will be a cycle in the graph but it might not go through u or w

Tuesday, 6 June 2017 9:20:21 AM AEST

← **OK**