

Homework M13: Graphs

Due May 16 at 11:59pm **Points** 100 **Questions** 24
Available until May 30 at 11:59pm **Time Limit** None

Instructions

Review the [Homework FAQ](#) page for details about submitting homework. In this homework, you will:

- evaluate characteristics of graphs
- trace breadth-first and depth-first traversals
- specify adjacency matrices and lists
- draw graphs based on matrices and lists

Notes

Image File Submission

- For the questions that ask you to draw a graph, you can create your answer in whatever way is easiest, but only submit an image file, word processing file, or PDF.
 - **Accepted file types: gif, jpg, jpeg, png, doc, docx, rtf, and pdf**
 - Do **not** submit a .txt, .xml, or .heic file
 - You can draw the answer on paper and then scan the answer or take a picture of it with a phone- however you can capture it is fine!
 - Just make sure the picture is clear enough for us to grade.
- If you want to submit digital answers, I recommend a free program called draw io: <https://www.draw.io/> (<https://www.draw.io/>).
 - This is the program I use to create the trees for the online notes. I find it very user-friendly.
 - If you do use this site, be sure to submit an exported image file or pdf of your results. Do **not** submit a .xml file.

This quiz was locked May 30 at 11:59pm.

Attempt History

	Attempt	Time	Score
LATEST	Attempt 1	1,559 minutes	97 out of 100

Score for this quiz: **97** out of 100

Submitted May 10 at 1:19pm

This attempt took 1,559 minutes.

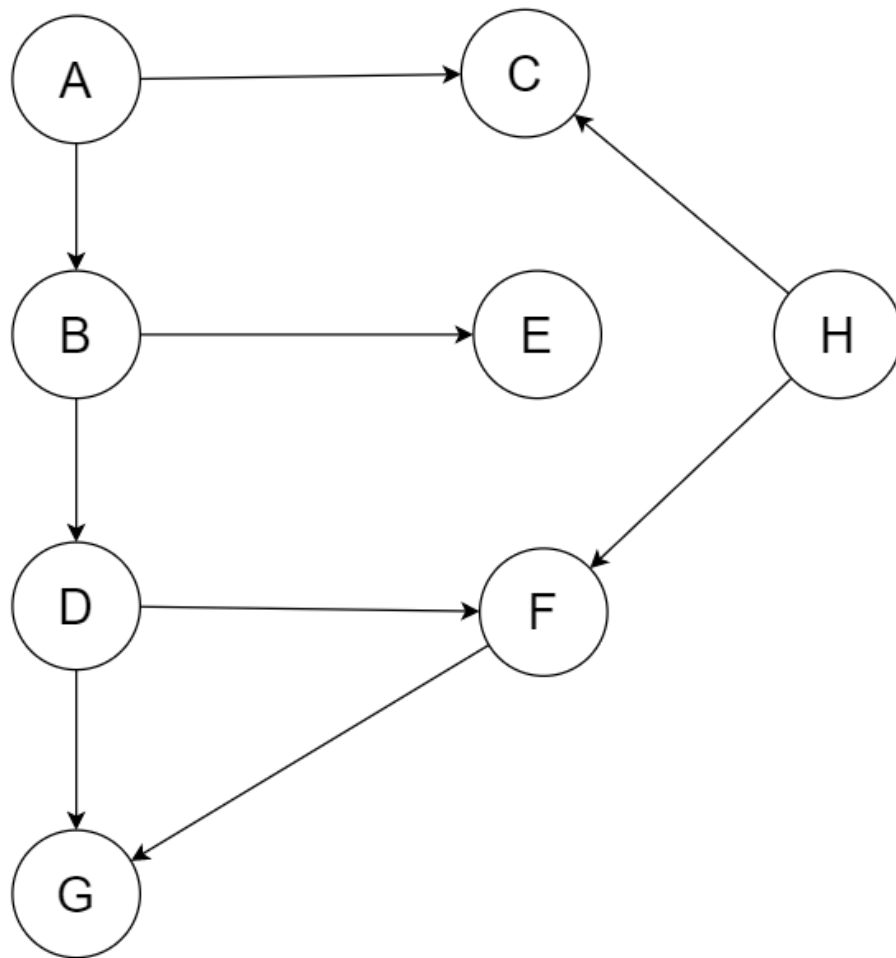
Short Answer Questions

Question 1

23 / 25 pts

Find the following traversals/orderings.

- Use alphabetic ordering for the order in which neighbors are visited. For example, if the choices of neighbors are A and E, you would visit A first.
- To write your answer, write the vertices in the traversal order separated by a single space (e.g., A B C D E F G). Include no other characters.



Trace a breadth-first traversal starting at vertex A.

ABCDEF G

Trace a breadth-first traversal starting at vertex H.

HCFG

Trace a depth-first traversal starting at vertex A.

ABDFGEC

Trace a depth-first traversal starting at vertex H.

HCFG

Trace a topological ordering.

CGFHDEBA

Answer 1:

Correct!

ABCDEF G

Correct Answer

ABCDEF G

Incorrect Answer ABCEDFG

Incorrect Answer ABCEDGF

Incorrect Answer ACBDEFG

Incorrect Answer ACBDEGF

Incorrect Answer ACBEDFG

Incorrect Answer ACBEDGF

Answer 2:

Correct! HCFG

Incorrect Answer HFCG

Answer 3:

Correct! ABDFGEC

Incorrect Answer ABEDFGC

Incorrect Answer ABEDGFC

Incorrect Answer ABDGFEC

Incorrect Answer ACBEDFG

Incorrect Answer ACBEDGF

Incorrect Answer ACBDFGE

Incorrect Answer ACBDGFE

Answer 4:

Correct! HCFG

Incorrect Answer HFGC

Answer 5:

You Answered

C G F H D E B A

Incorrect Answer

A H B C D E F G

Incorrect Answer

A H B C E D F G

Incorrect Answer

A H C B D E F G

Incorrect Answer

A H C B E D F G

Incorrect Answer

H A B C D E F G

Incorrect Answer

H A B C E D F G

Incorrect Answer

H A C B D E F G

Incorrect Answer

H A C B E D F G

Incorrect Answer

A B H C D E F G

Incorrect Answer

A B H C E D F G

Incorrect Answer

A H C B D E F G

Incorrect Answer

A H C B E D F G

Incorrect Answer

H A B D F G E C

Incorrect Answer

A B D E H C F G

Incorrect Answer

A B H C D F G E

Incorrect Answer

H A B D F G E C

Incorrect Answer

H A B D F C E G

Incorrect Answer

A B D E H C F G

Incorrect Answer

A B E D H C F G

Incorrect Answer

A B H D F G E C

Incorrect Answer

A B D H F C G E

Incorrect Answer ABEDHCFG

Incorrect Answer ABEHCD FG

Incorrect Answer ABHDFCEG

Incorrect Answer ABDHFGEC

Incorrect Answer AHBD FGEC

-2 Q5 this is the reverse of a topological order

Question 2

5 / 5 pts

Assume you are not asked to use alphabetic ordering, but are allowed to visit neighbors in any order. Under that scenario, is each of the traversals/orderings above unique? In other words, is the traversal/ordering the **only possible correct** answer?

Correct!

breadth-first starting at A

no, there are other possibil

Correct!

breadth-first starting at H

no, there are other possibil

Correct!

depth-first starting at A

no, there are other possibil

Correct!

depth-first starting at H

no, there are other possibil

Correct!

topological ordering

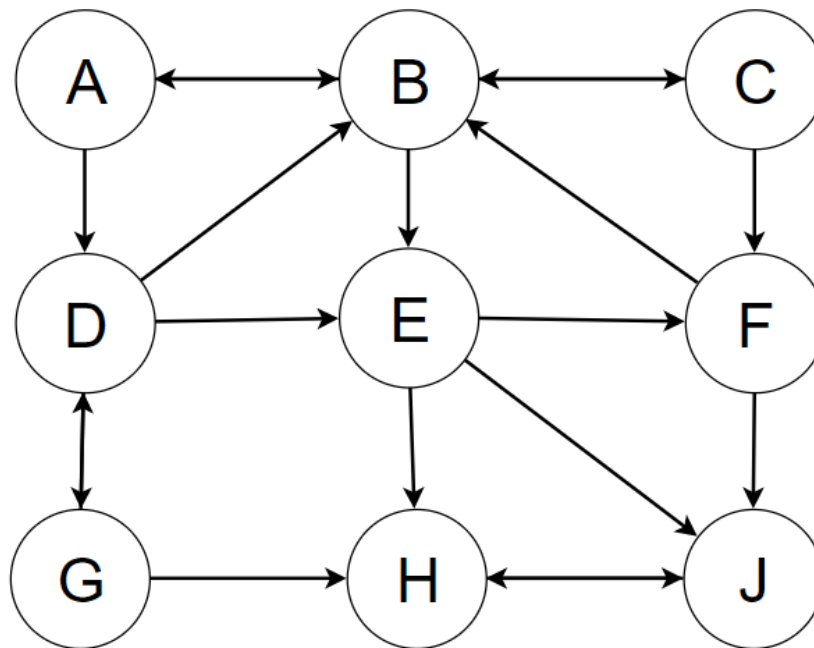
no, there are other possibil

Other Incorrect Match Options:

- yes, this is the only correct traversal/ordering

Question 3**6 / 6 pts**

What is a shortest path from A to J? Write the vertices without spaces or commas.

**Correct!**

A D E J

Correct Answers

ABEJ

ADEJ

A B E J

A, B, E, J

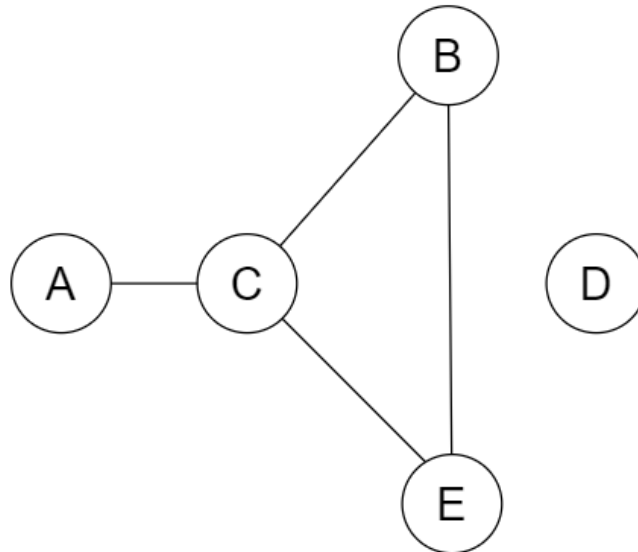
A D E J

A, D, E, J

Question 4**6 / 6 pts**

What is the **adjacency list** that represents the graph?

List the vertices in alphabetic order.



Your Answer:

A -> C

B -> C E

C -> A B E

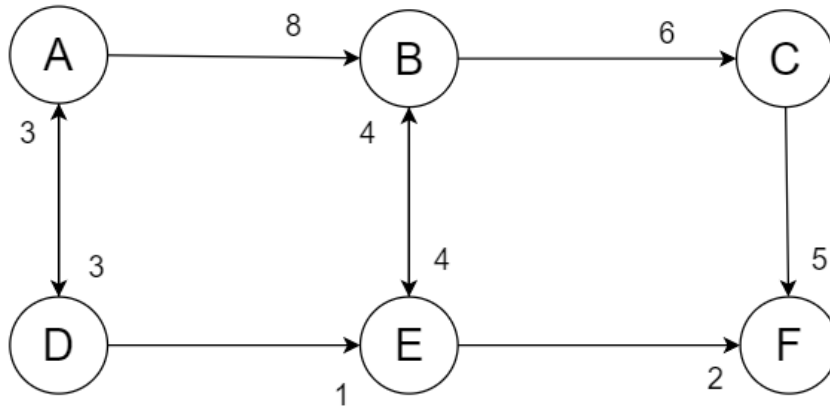
D ->

E -> B C

Question 5**6 / 6 pts**

What is the **adjacency matrix** that represents the graph?

List the vertices in the rows and columns in alphabetic order.



Your Answer:

	A	B	C	D	E	F
A		8		3		
B			6		4	
C						5
D	3				1	
E		4				2
F						

Question 6

6 / 6 pts

Draw the **undirected graph** represented by the following adjacency list.

A -> B, R

B -> A, K

E ->

K -> B, R

R -> A, K

↓ [hw13Question6.PNG \(https://ccsf.instructure.com/files/7823966/download\)](https://ccsf.instructure.com/files/7823966/download)

Question 7

6 / 6 pts

Draw the **directed graph** represented by the following adjacency matrix.

	A	E	M	Y
A		4		3
E			2	
M		2		5
Y	3			

↓ [hw13Question7.PNG \(https://ccsf.instructure.com/files/7823906/download\)](https://ccsf.instructure.com/files/7823906/download)

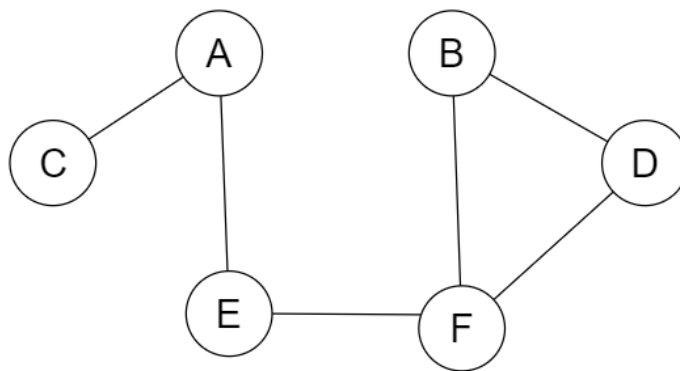
Multiple Choice Questions

Question 8

5 / 5 pts

Describe the characteristics of the graph below.

Note: Canvas mixes up the order of a and b in the drop-down. Check your answers carefully.



Correct!

a) directed b) undirected

b

Correct!

a) weighted b) unweighted

b

Correct!

a) disconnected b) connected (for digraphs, this means strongly connected)

b

Correct!

a) not complete b) complete

a

Correct!**a) acyclic b) cyclic**

b

**Question 9****1 / 1 pts**

How many vertices are in the graph above?

Correct!

6

Correct Answers

6 (with margin: 0)

Question 10**1 / 1 pts**

How many edges are in the graph above?

Correct!

6

Correct Answers

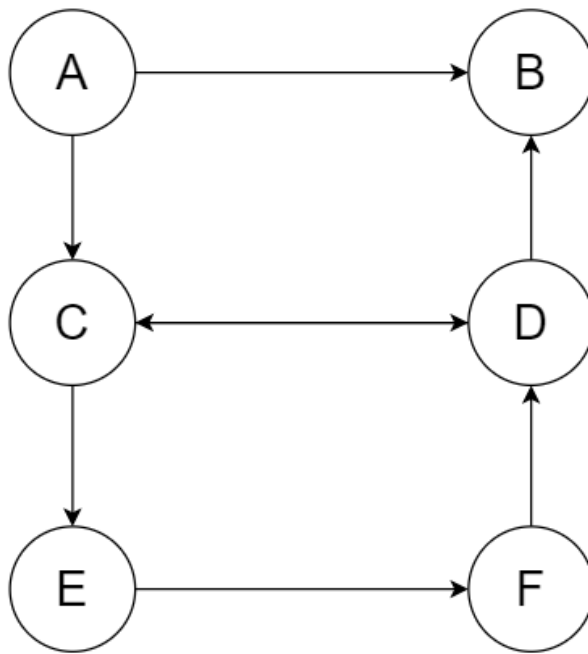
6 (with margin: 0)

12 (with margin: 0)

Question 11**5 / 5 pts**

Describe the characteristics of the graph below.

Note: Canvas mixes up the order of a and b in the drop-down. Check your answers carefully.

**Correct!****a) directed b) undirected**

a

**Correct!****a) weighted b) unweighted**

b

**Correct!****a) disconnected b) connected (for digraphs, this means strongly connected)**

a

**Correct!****a) not complete b) complete**

a

**Correct!****a) acyclic b) cyclic**

b

**Question 12****1 / 1 pts**

How many vertices are in the graph above?

Correct!

Correct Answers

6 (with margin: 0)

Question 13

0 / 1 pts

How many edges are in the graph above?

You Answered

Correct Answers

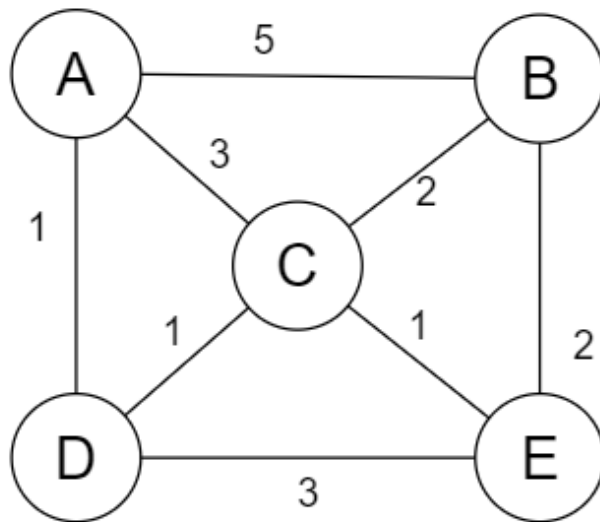
8 (with margin: 0)

Question 14

5 / 5 pts

Describe the characteristics of the graph below.

Note: Canvas mixes up the order of a and b in the drop-down. Check your answers carefully.

**Correct!****a) directed b) undirected**

b

**Correct!****a) weighted b) unweighted**

a

**Correct!****a) disconnected b) connected (for digraphs, this means strongly connected)**

b

**Correct!****a) not complete b) complete**

a

**Correct!****a) acyclic b) cyclic**

b

**Question 15****1 / 1 pts**

How many vertices are in the graph above?

Correct!**Correct Answers**

5 (with margin: 0)

Question 16**1 / 1 pts**

How many edges are in the graph above?

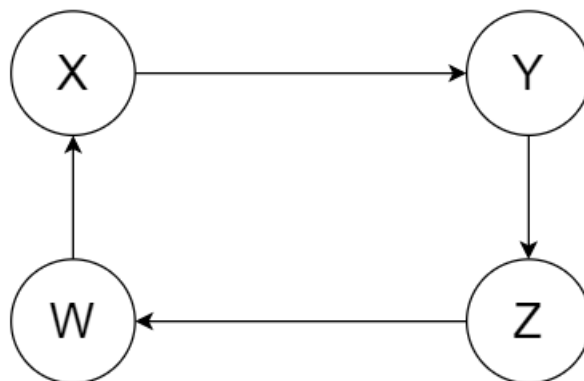
Correct!**Correct Answers**

8 (with margin: 0)

16 (with margin: 0)

Question 17**5 / 5 pts**

Describe the characteristics of the graph below.

Note: Canvas mixes up the order of a and b in the drop-down. Check your answers carefully.**Correct!**

a) directed b) undirected

	<input type="text" value="a"/>	
Correct!	a) weighted b) unweighted	<input type="text" value="b"/>
Correct!	a) disconnected b) connected (for digraphs, this means strongly connected)	<input type="text" value="b"/>
Correct!	a) not complete b) complete	<input type="text" value="a"/>
Correct!	a) acyclic b) cyclic	<input type="text" value="b"/>

Question 18**1 / 1 pts**

How many vertices are in the graph above?

Correct!**Correct Answers**

4 (with margin: 0)

Question 19**1 / 1 pts**

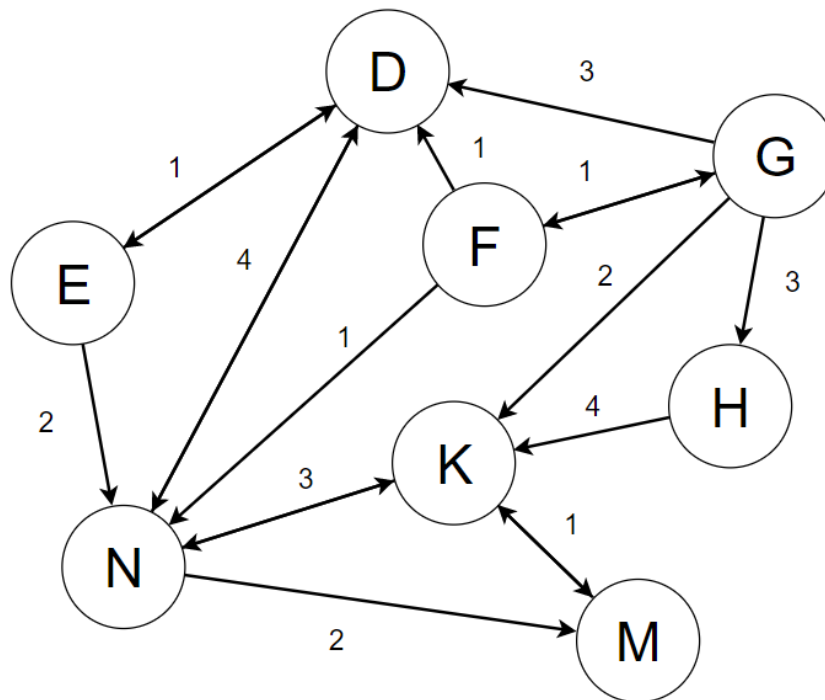
How many edges are in the graph above?

Correct!

Correct Answers

4 (with margin: 0)

Review the Shortest Path in a Weighted Graph algorithm (from the notes/videos and in Section 21 of the textbook). Use the graph below to find the cost of the cheapest path (meaning the smallest edge-weight sum) between two vertices.

**Question 20****1 / 1 pts**

What is the cost of the cheapest path from vertex D to K?

Correct!

Correct Answers

6 (with margin: 0)

Question 21**1 / 1 pts**

What is the cost of the cheapest path from vertex G to D?

Correct!**Correct Answers**

2 (with margin: 0)

Question 22**6 / 6 pts**

For all graphs, is each of the following true or false?

Correct!

There is always only one possible depth-first traversal for each origin vertex.

**Correct!**

There is always only one possible breadth-first traversal for each origin vertex.

**Correct!**

There is only one depth-first traversal for every graph.

**Correct!**

There is only one breadth-first traversal for every graph.

**Correct!**

Every directed, acyclic

	graph has only one possible topological ordering.	false ▾
Correct!	There is one unique shortest path between any two vertices.	false ▾
	Other Incorrect Match Options: <ul style="list-style-type: none">• true	

Question 23**3 / 3 pts**

Is every vertex of a graph included in each of the following?

Correct!	depth first traversal	no- some vertices might not be ▾
Correct!	breadth first traversal	no- some vertices might not be ▾
Correct!	topological ordering	yes- ALL vertices are included ▾

Question 24**1 / 1 pts**

Assume you were creating a directed graph to represent data in the real world. In this graph, the vertices represent cities in the United States. The edges represent **direct** flights between cities. In other words, if there is an edge from Vertex A to Vertex B, that means there is a **direct** flight that goes from City A to City B. If there is no direct edge from Vertex M to Vertex N, that means there is no **direct** flight that goes from

City M to City N.

Think about what this graph would look like if it used real-world data.
Would the graph be complete?

☐ Yes, the graph would be complete.

☒ No, the graph would NOT be complete.

Correct!

The graph could be connected- there might be a *path* between every two cities, but the graph is not complete- there is not a direct flight between every two cities.

Quiz Score: **97** out of 100