

Assignment 12-1: Network routing - Dijkstra

Due Nov 29, 2020 at 11:59pm **Points** 20 **Questions** 9
Available until Dec 1, 2020 at 11:59pm **Time Limit** None
Allowed Attempts 2

Instructions

Objectives of this activity:

- Apply **Dijkstra's** algorithm to a network to determine the **shortest path** from a given source node to all other nodes in the network.

You may attempt this exercise **twice**. To avoid errors, work out your answers on paper first and then enter your answers into this quiz.

This quiz is no longer available as the course has been concluded.

Attempt History

	Attempt	Time	Score
LATEST	Attempt 1	8,628 minutes	19.92 out of 20

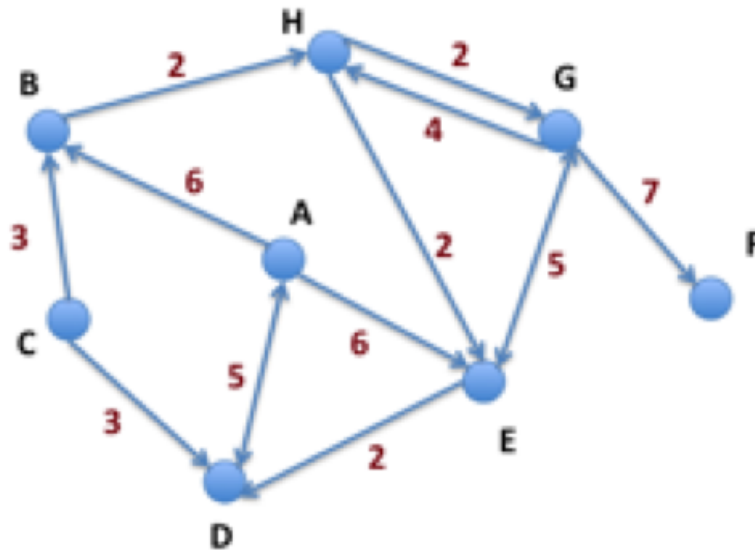
❗ Correct answers are hidden.

Score for this attempt: **19.92** out of 20

Submitted Nov 29, 2020 at 8:53pm

This attempt took 8,628 minutes.

Consider the network shown below (note that edges are **directed**).



Calculate the shortest paths to **all** nodes from **source node A** using **Dijkstra's** algorithm. Record your solutions through the next few questions.

Note:

- When choosing the node to explore next, if there is more than one node that has the shortest known path so far, choose the node which is alphabetically earlier first.
- A few entries for Iteration 1 (i.e., row 1) have already been filled in for you. Use a similar format for the remaining answers.

Question 1

2 / 2 pts

Iteration 1

Node being explored: A

Shortest known distance from **A to A**: 0

From: A

Finalized: Yes

Shortest known distance from **A to B**: 6

From: A

Finalized: No

Shortest known distance from **A to C**: inf

From: A

Finalized: No

Shortest known distance from **A to D**:

From:

Finalized:

Shortest known distance from **A to E**:

From:

Finalized:

Shortest known distance from **A to F**:

From:

Finalized:

Shortest known distance from **A to G**:

From:

Finalized:

Shortest known distance from **A to H**:

From:

Finalized:

Answer 1:

5

Answer 2:

A

Answer 3:

No

Answer 4:

6

Answer 5:

A

Answer 6:

No

Answer 7:

inf

Answer 8:

A

Answer 9:

No

Answer 10:

inf

Answer 11:

A

Answer 12:

No

Answer 13:

inf

Answer 14:

A

Answer 15:

No

Question 2

2 / 2 pts

Iteration 2 (Row 2)

Node being explored:

D

Shortest known distance from A to A:

0

From:

A

Finalized:

Yes

Shortest known distance from A to B:

6

From:

A

Finalized:

No

Shortest known distance from A to C:

inf

From:

A

Finalized:

No

Shortest known distance from A to D:

5

From:

A

Finalized:

Yes

Shortest known distance from **A to E**:

6

From: A

Finalized: No

Shortest known distance from **A to F**:

inf

From: A

Finalized: No

Shortest known distance from **A to G**:

inf

From: A

Finalized: No

Shortest known distance from **A to H**:

inf

From: A

Finalized: No

Answer 1:

D

Answer 2:

0

Answer 3:

A

Answer 4:

Yes

Answer 5:

6

Answer 6:

A

Answer 7:

No

Answer 8:

inf

Answer 9:

A

Answer 10:

No

Answer 11:

5

Answer 12:

A

Answer 13:

Yes

Answer 14:

6

Answer 15:

A

Answer 16:

No

Answer 17:

inf

Answer 18:

A

Answer 19:

No

Answer 20:

inf

Answer 21:

A

Answer 22:

No

Answer 23:

inf

Answer 24:

A

Answer 25:

No

Question 3**2 / 2 pts****Iteration 3 (Row 3)****Node being explored:**Shortest known distance from **A to A**:

From:

Finalized:

Shortest known distance from **A to B**:

From:

Finalized:

Shortest known distance from **A to C**:

From:

Finalized:

Shortest known distance from **A to D**:

From:

A

Finalized:

Yes

Shortest known distance from **A to E**:

6

From:

A

Finalized:

No

Shortest known distance from **A to F**:

inf

From:

A

Finalized:

No

Shortest known distance from **A to G**:

inf

From:

A

Finalized:

No

Shortest known distance from **A to H**:

8

From:

B

Finalized:

No

Answer 1:

B

Answer 2:

0

Answer 3:

A

Answer 4:

Yes

Answer 5:

6

Answer 6:

A

Answer 7:

Yes

Answer 8:

inf

Answer 9:

A

Answer 10:

No

Answer 11:

5

Answer 12:

A

Answer 13:

Yes

Answer 14:

6

Answer 15:

A

Answer 16:

No

Answer 17:

inf

Answer 18:

A

Answer 19:

No

Answer 20:

inf

Answer 21:

A

Answer 22:

No

Answer 23:

8

Answer 24:

B

Answer 25:

No

Question 4

2 / 2 pts

Iteration 4 (Row 4)

Node being explored:

Shortest known distance from **A to A**:

From:

Finalized:

Shortest known distance from **A to B**:

From:

Finalized:

Shortest known distance from **A to C**:

From:

Finalized:

Shortest known distance from **A to D**:

From:

Finalized:

Shortest known distance from **A to E**:

From:

Finalized:

Shortest known distance from **A to F**:

From:

Finalized:

Shortest known distance from **A to G**:

From:

Finalized:

Shortest known distance from **A to H**:

From:

Finalized:

Answer 1:

E

Answer 2:

0

Answer 3:

A

Answer 4:

Yes

Answer 5:

6

Answer 6:

A

Answer 7:

Yes

Answer 8:

inf

Answer 9:

A

Answer 10:

No

Answer 11:

5

Answer 12:

A

Answer 13:

Yes

Answer 14:

6

Answer 15:

A

Answer 16:

Yes

Answer 17:

inf

Answer 18:

A

Answer 19:

No

Answer 20:

11

Answer 21:

E

Answer 22:

No

Answer 23:

8

Answer 24:

B

Answer 25:

No

Question 5

2 / 2 pts

Iteration 5 (Row 5)

Node being explored:

H

Shortest known distance from **A to A**:

0

From:

A

Finalized:

Yes

Shortest known distance from **A to B**:

6

From:

A

Finalized:

Yes

Shortest known distance from **A to C**:

inf

From:

A

Finalized:

No

Shortest known distance from **A to D**:

5

From:

A

Finalized:

Yes

Shortest known distance from **A to E**:

6

From:

A

Finalized:

Yes

Shortest known distance from **A to F**:

inf

From:

A

Finalized:

No

Shortest known distance from **A to G**:

10

From:

Finalized:

Shortest known distance from **A to H**:

From:

Finalized:

Answer 1:

Answer 2:

Answer 3:

Answer 4:

Answer 5:

Answer 6:

Answer 7:

Answer 8:

inf

Answer 9:

A

Answer 10:

No

Answer 11:

5

Answer 12:

A

Answer 13:

Yes

Answer 14:

6

Answer 15:

A

Answer 16:

Yes

Answer 17:

inf

Answer 18:

A

Answer 19:

No

Answer 20:

10

Answer 21:

H

Answer 22:

No

Answer 23:

8

Answer 24:

B

Answer 25:

Yes

Partial

Question 6

1.92 / 2 pts

Iteration 6 (Row 6)

Node being explored:

Shortest known distance from **A to A**:

From:

Finalized:

Shortest known distance from **A to B**:

From:

Finalized:

Shortest known distance from **A to C**:

From:

Finalized:

Shortest known distance from **A to D**:

From:

Finalized:

Shortest known distance from **A to E**:

From:

Finalized:

Shortest known distance from **A to F**:

From:

Finalized:

Shortest known distance from **A to G**:

From:

Finalized:

Shortest known distance from **A to H**:

From:

Finalized:

Answer 1:

C

Answer 2:

0

Answer 3:

A

Answer 4:

Yes

Answer 5:

6

Answer 6:

A

Answer 7:

Yes

Answer 8:

inf

Answer 9:

A

Answer 10:

No

Answer 11:

5

Answer 12:

A

Answer 13:

Yes

Answer 14:

6

Answer 15:

A

Answer 16:

Yes

Answer 17:

17

Answer 18:

G

Answer 19:

No

Answer 20:

10

Answer 21:

H

Answer 22:

Yes

Answer 23:

8

Answer 24:

B

Answer 25:

Yes

Question 7

2 / 2 pts

Iteration 7 (Row 7)

Node being explored:

F

Shortest known distance from **A to A:**

0

From:

A

Finalized:

Yes

Shortest known distance from **A to B**:

6

From:

A

Finalized:

Yes

Shortest known distance from **A to C**:

inf

From:

A

Finalized:

No

Shortest known distance from **A to D**:

5

From:

A

Finalized:

Yes

Shortest known distance from **A to E**:

6

From:

A

Finalized:

Yes

Shortest known distance from **A to F**:

17

From:

G

Finalized: Yes

Shortest known distance from **A to G**:

10

From:

H

Finalized: Yes

Shortest known distance from **A to H**:

8

From:

B

Finalized: Yes

Answer 1:

F

Answer 2:

0

Answer 3:

A

Answer 4:

Yes

Answer 5:

6

Answer 6:

A

Answer 7:

Yes

Answer 8:

inf

Answer 9:

A

Answer 10:

No

Answer 11:

5

Answer 12:

A

Answer 13:

Yes

Answer 14:

6

Answer 15:

A

Answer 16:

Yes

Answer 17:

17

Answer 18:

G

Answer 19:

Yes

Answer 20:

10

Answer 21:

H

Answer 22:

Yes

Answer 23:

8

Answer 24:

B

Answer 25:

Yes

Question 8

2 / 2 pts

Iteration 8 (Row 8)

Node being explored:

Shortest known distance from **A to A**:

From:

Finalized:

Shortest known distance from **A to B**:

From:

Finalized:

Shortest known distance from **A to C**:

From:

Finalized:

Shortest known distance from **A to D**:

From:

Finalized:

Shortest known distance from **A to E**:

6

From: A

Finalized: Yes

Shortest known distance from **A to F**:

17

From: G

Finalized: Yes

Shortest known distance from **A to G**:

10

From: H

Finalized: Yes

Shortest known distance from **A to H**:

8

From: B

Finalized: Yes

Answer 1:

C

Answer 2:

0

Answer 3:

A

Answer 4:

Yes

Answer 5:

6

Answer 6:

A

Answer 7:

Yes

Answer 8:

inf

Answer 9:

A

Answer 10:

Yes

Answer 11:

5

Answer 12:

A

Answer 13:

Yes

Answer 14:

6

Answer 15:

A

Answer 16:

Yes

Answer 17:

17

Answer 18:

G

Answer 19:

Yes

Answer 20:

10

Answer 21:

H

Answer 22:

Yes

Answer 23:

8

Answer 24:

B

Answer 25:

Yes

Question 9**4 / 4 pts**

Summarize your final answers in the table below.

For the "Shortest path" column, specify each node in the path, in order of their occurrence within the path, separated by dashes (e.g., A-B-C). Do not include any spaces in your answers.

For the "Length of shortest path" column, use digits (e.g., 5) and not strings to represent the total length of the shortest path.

If no path exists to a given node, your entry in the "Shortest path" column must be "no path" and your entry in the "Length of shortest path" column must be inf.

The first row is filled in for you as a reference.

Nodes	Shortest path	Length of shortest path
A -> B	A-B	6
A -> C	no path	inf
A -> D	A-D	5
A -> E	A-E	6
A -> F	A-B-H-G-F	17
A -> G	A-B-H-G	10
A -> H	A-B-H	8

Answer 1:

no path

Answer 2:

inf

Answer 3:

A-D

Answer 4:

5

Answer 5:

A-E

Answer 6:

6

Answer 7:

A-B-H-G-F

Answer 8:

17

Answer 9:

A-B-H-G

Answer 10:

10

Answer 11:

A-B-H

Answer 12:

8

Quiz Score: **19.92** out of 20