

CSD2181/2183 – Data Structure

Exercises

Nisha Jain

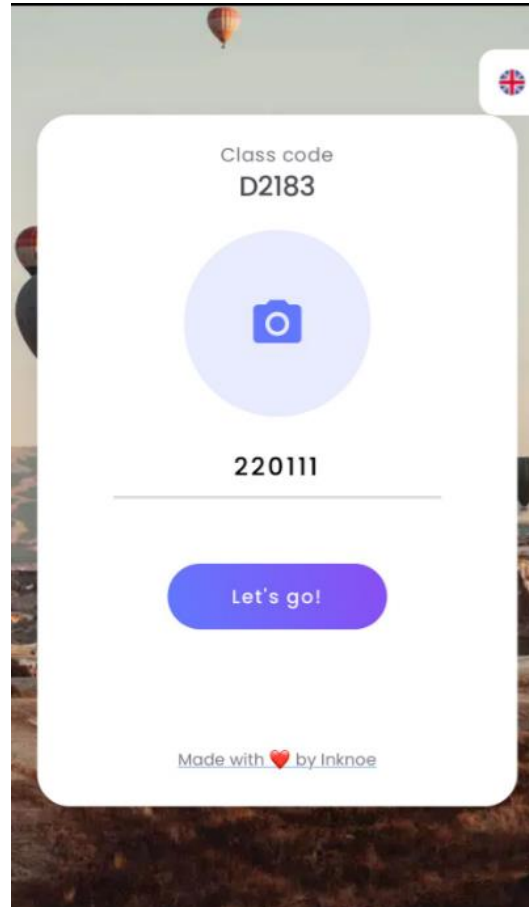
Assistant Professor

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Introduction – Data Structure Exercises

<https://www.classpoint.app/>



OR



Introduction – Data Structure Exercises

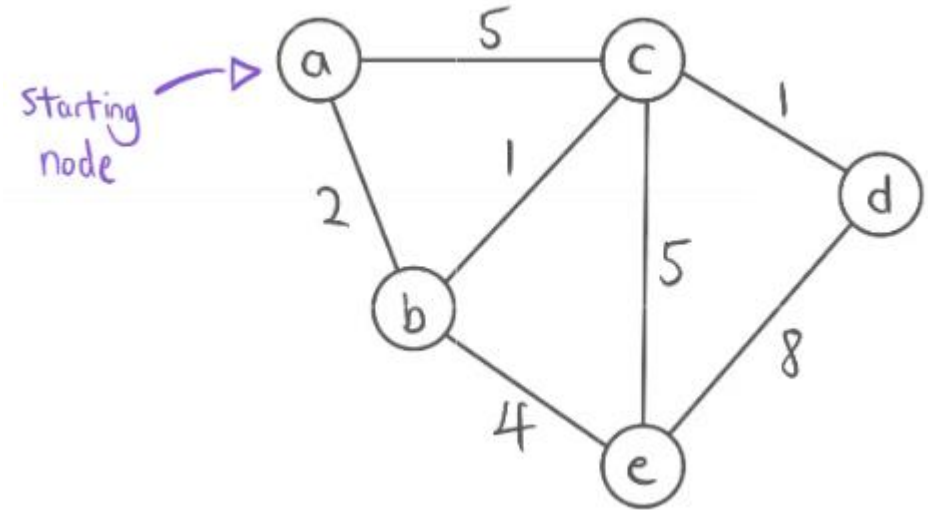
- Purpose: to reinforce what you have learned and practiced in lectures.
- The exercise session is conducted face to face in class.
- It consists of a few MCQs to be solved within class.
- Limited time is given for each question (answer will be discussed afterwards).
- You are required to login to ClassPoint with your student ID.
- So, bring along your laptop or devices with Internet access.
- Attendance is compulsory and there is no make up.
- Exercises are marked considering your overall performance in the module.

Exercise Graphs

Exercise 10 – Shortest Path

10.1 What are the initial cost values? (source node is a)

- A. a:0, b:0, c:0, d:0, e:0
- B. a:inf, b:inf, c:inf, d:inf, e:inf
- C. a:0, b:inf, c:inf, d:inf, e:inf
- D. a:0, b:2, c:5, d:1, e:4
- E. a:2, b:1, c:1, d:8, e:0

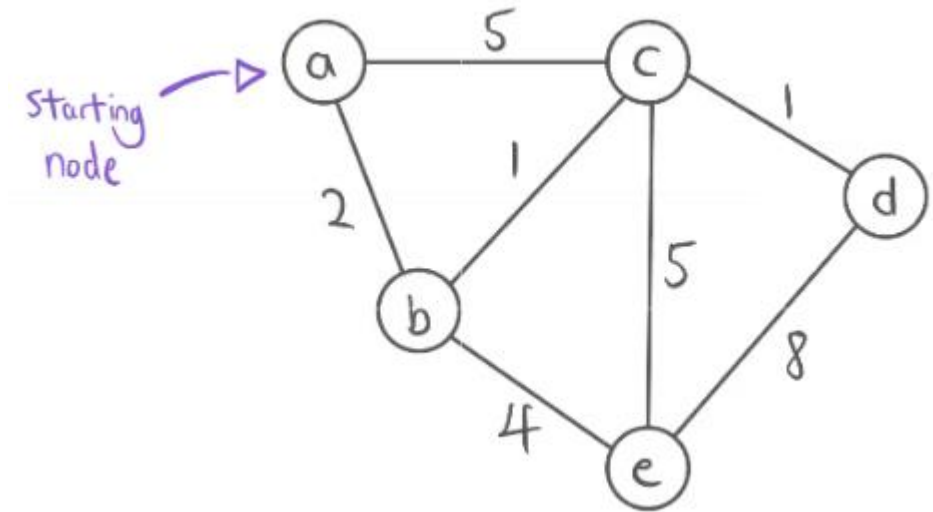


 Multiple Choice

Exercise 10 – Shortest Path

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- A. a:0, b:0, c:0, d:0, e:0
- B. a:inf, b:inf, c:inf, d:inf, e:inf
- C. a:0, b:inf, c:inf, d:inf, e:inf
- D. a:0, b:2, c:5, d:1, e:4
- E. a:2, b:1, c:1, d:8, e:0

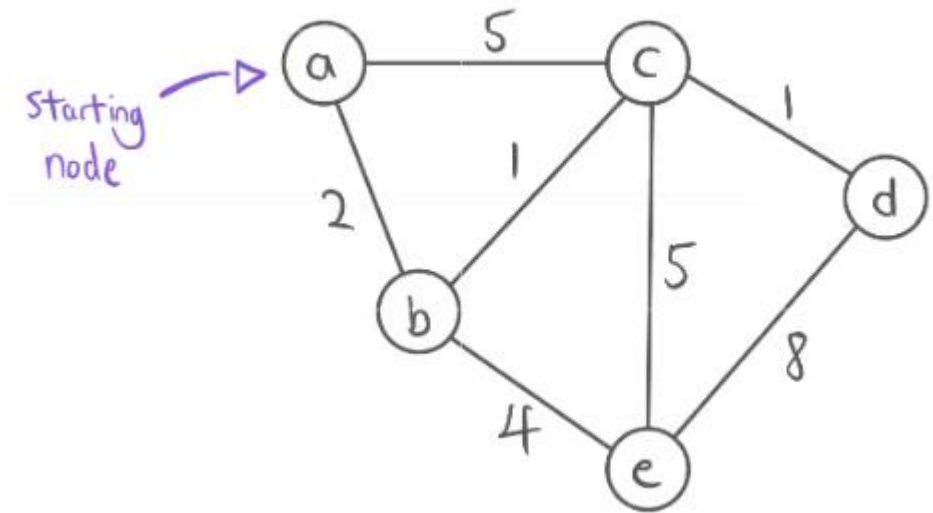


 Multiple Choice

Exercise 10 – Shortest Path

10.2 Show the order of nodes processed by the end of Dijkstra's algorithm.

- A. a,b,c,d,e
- B. e,d,c,b,a
- C. a,b,e,c,d
- D. a,c,d,e,b

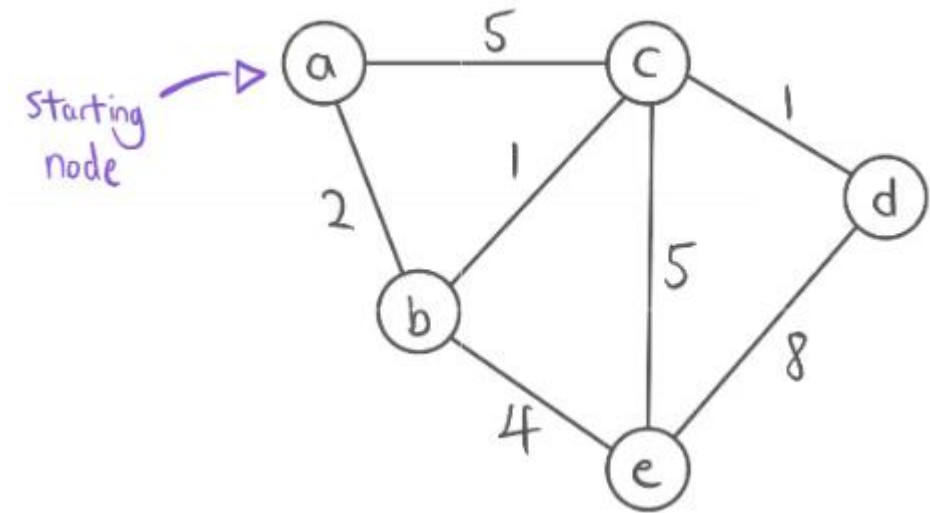


 Multiple Choice

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10.2 Show the order of nodes processed by the end of Dijkstra's algorithm.

- A. a,b,c,d,e
- B. e,d,c,b,a
- C. a,b,e,c,d
- D. a,c,d,e,b



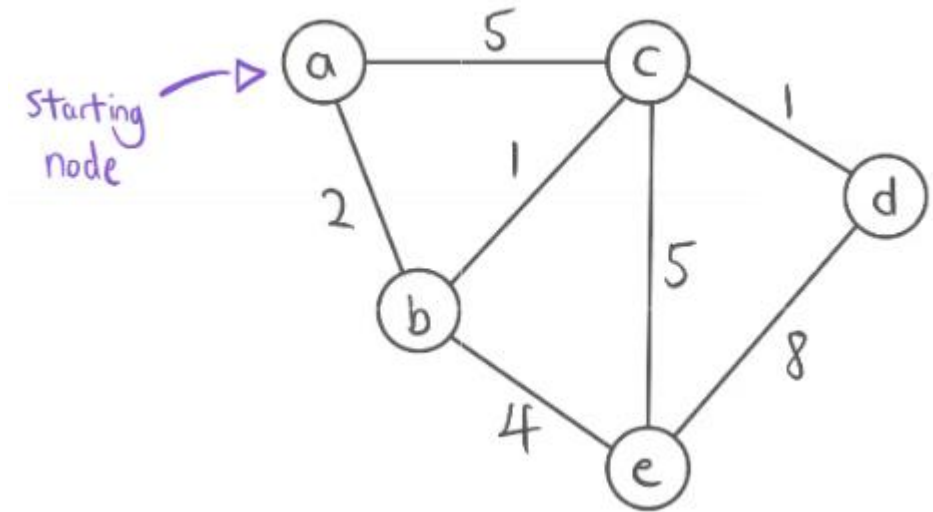
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 Multiple Choice

Exercise 10 – Shortest Path

10.3 What is d->prev by the end of Dijkstra's algorithm?

- A. a
- B. b
- C. c
- D. d
- E. e

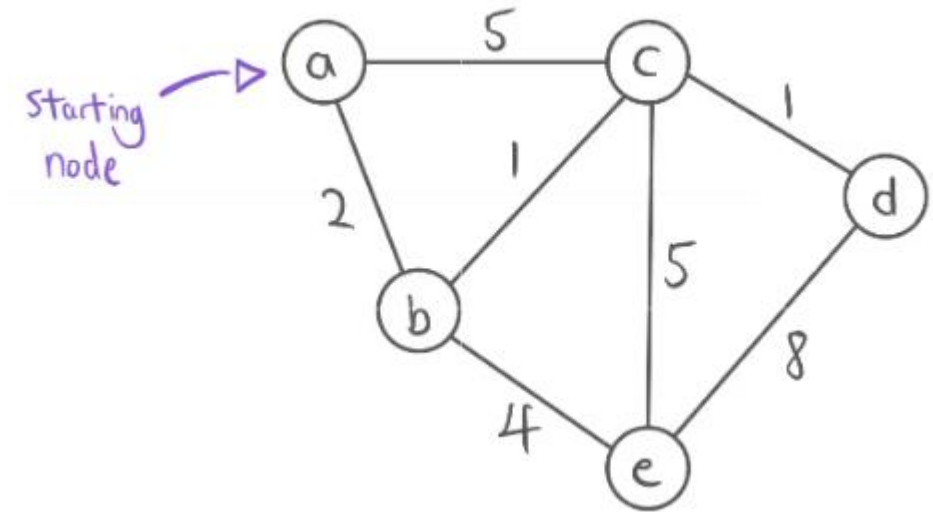


 Multiple Choice

Exercise 10 – Shortest Path

10.3 What is d->prev by the end of Dijkstra's algorithm?

- A. a
- B. b
- C. **c**
- D. d
- E. e

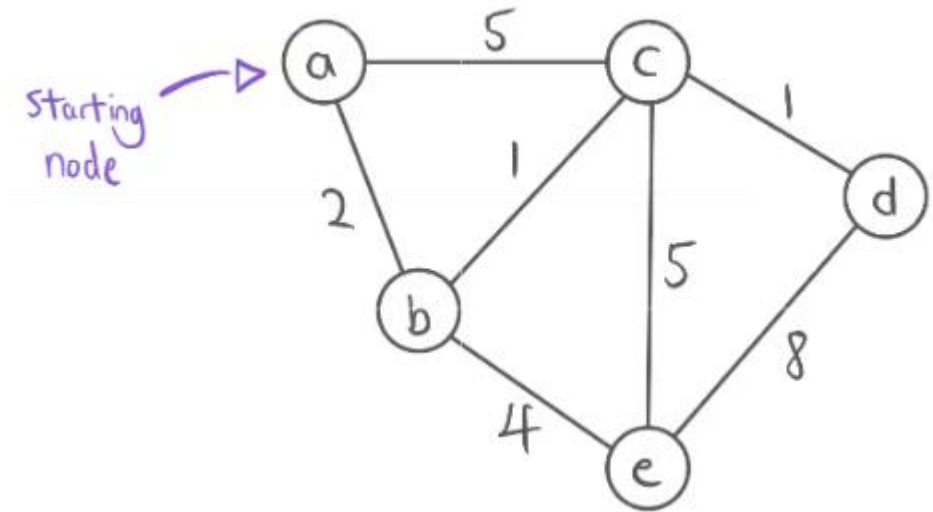


 Multiple Choice

Exercise 10 – Shortest Path

10.4 What is $c \rightarrow \text{prev}$ by the end of Dijkstra's algorithm?

- A. a
- B. b
- C. c
- D. d
- E. e

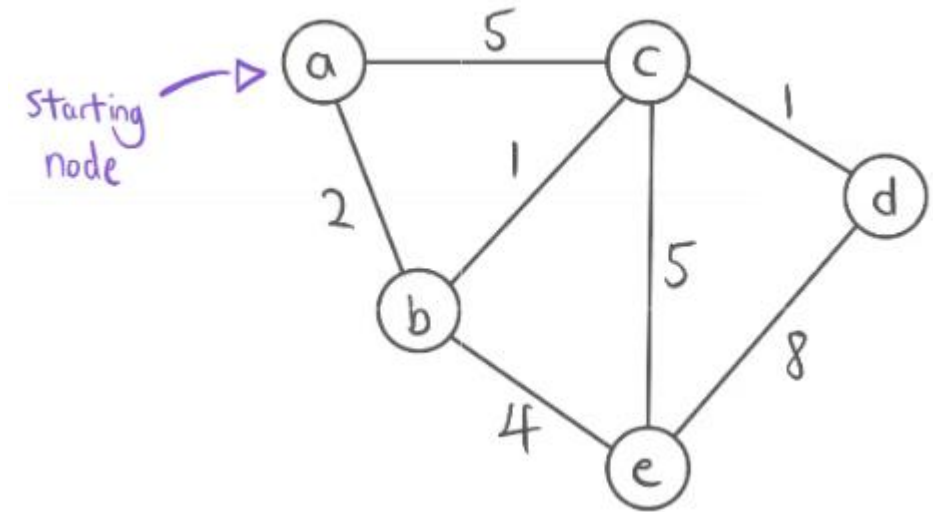


 Multiple Choice

Exercise 10 – Shortest Path

10.4 What is c->prev by the end of Dijkstra's algorithm?

- A. a
- B. **b**
- C. c
- D. d
- E. e

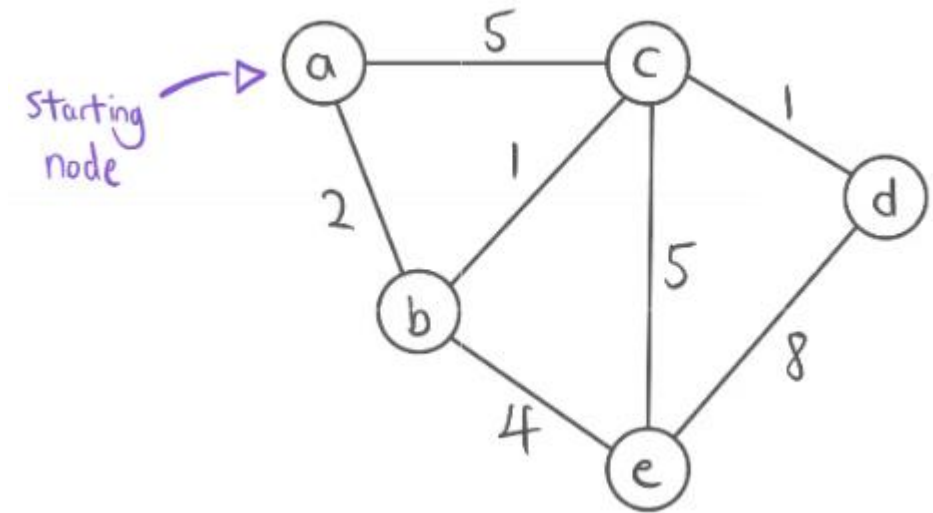


 Multiple Choice

Exercise 10 – Shortest Path

10.5 How many times was $c \rightarrow \text{cost}$ updated after initialization to the end of Dijkstra's algorithm?

- A. 0
- B. 1
- C. 2
- D. 3
- E. 4

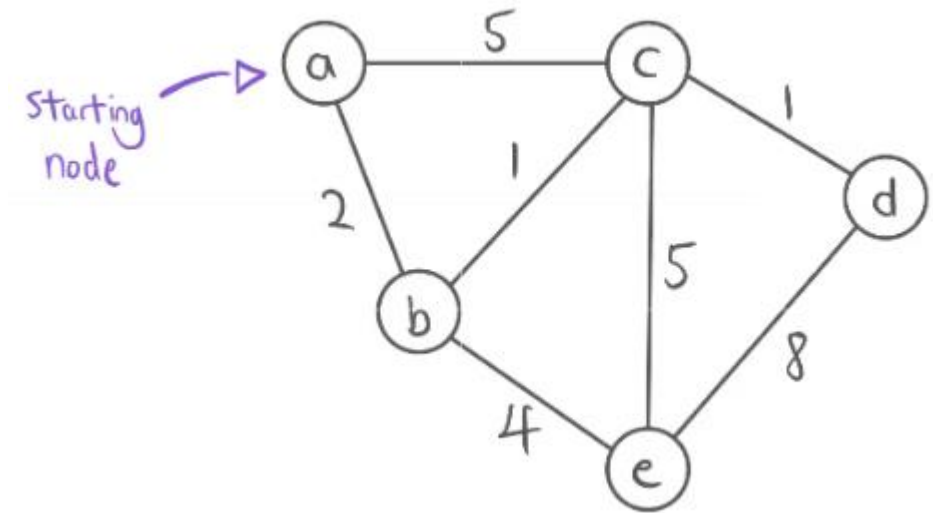


 Multiple Choice

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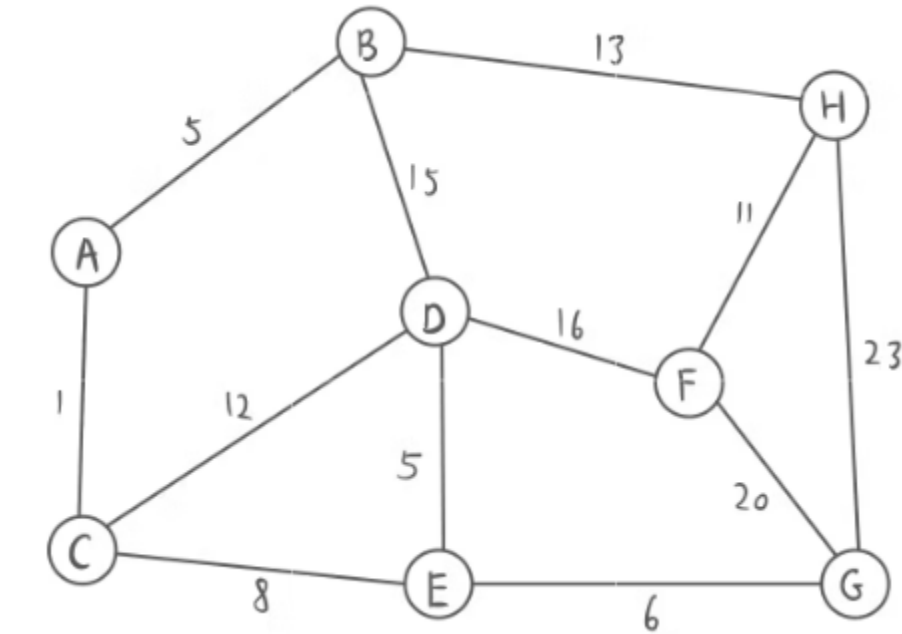


 Multiple Choice

Exercise 10 – Minimum Spanning Tree

10.6 Show the order of nodes processed using Prim's algorithm starting at G

- A. A, C, B, E, D, G, H, F
- B. G, A, C, B, E, D, H, F
- C. G, E, D, C, A, B, H, F
- D. G, E, D, C, A, F, B, H
- E. G, E, F, H, C, D, A, B

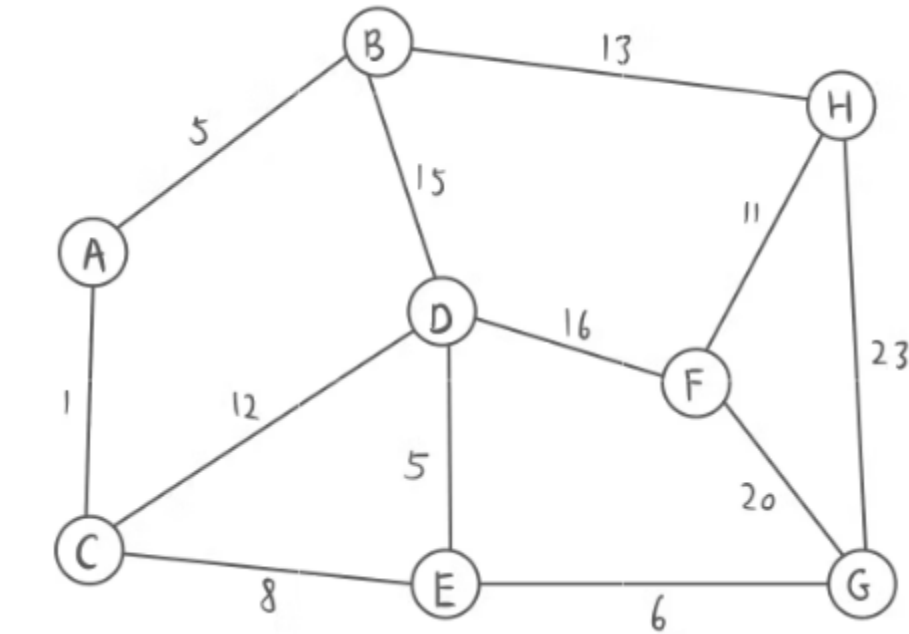


 Multiple Choice

Exercise 10 – Minimum Spanning Tree

10.6 Show the order of nodes processed using Prim's algorithm starting at G

- A. A, C, B, E, D, G, H, F
- B. G, A, C, B, E, D, H, F
- C. **G, E, D, C, A, B, H, F**
- D. G, E, D, C, A, F, B, H
- E. G, E, F, H, C, D, A, B

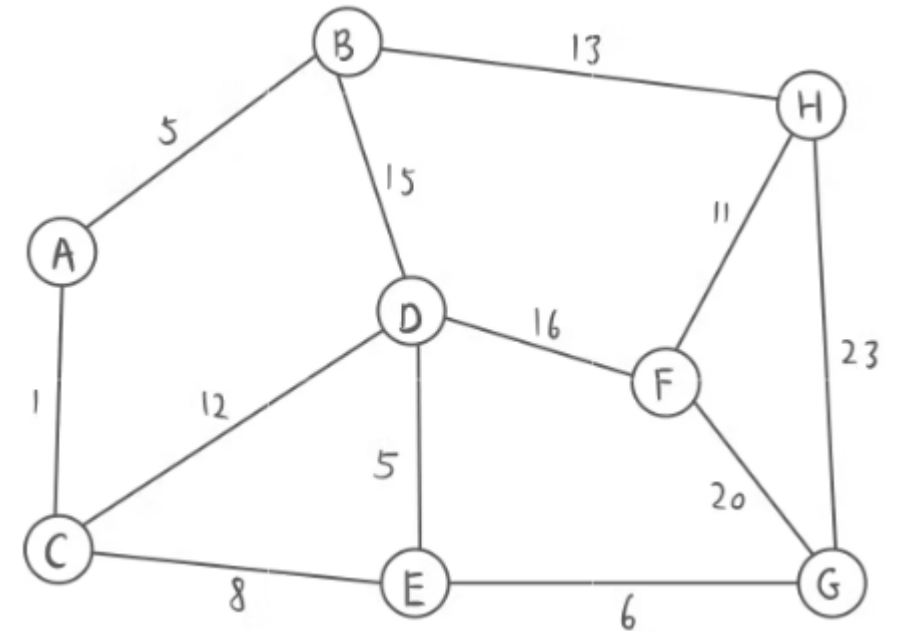


 Multiple Choice

Exercise 10 – Minimum Spanning Tree

10.7 What are the edges spanned using Kruskal's algorithm

- A. BD, DE, FH, BH, AC, CE, EG
- B. AB, DE, FH, BH, AC, CE, EG
- C. AB, CD, FH, BH, AC, CE, EG
- D. AB, CD, DE, FH, BH, AC, EG

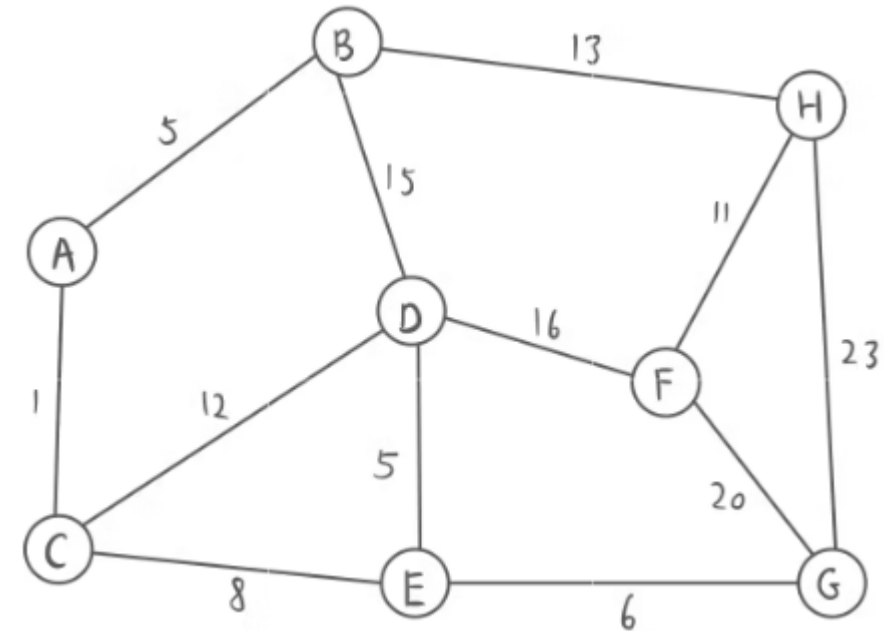


 Multiple Choice

Exercise 10 – Minimum Spanning Tree

10.7 What are the edges spanned using Kruskal's algorithm

- A. BD, DE, FH, BH, AC, CE, EG
- B. AB, DE, FH, BH, AC, CE, EG
- C. AB, CD, FH, BH, AC, CE, EG
- D. AB, CD, DE, FH, BH, AC, EG



 Multiple Choice

Exercise Hashing

Exercise 10 – Hashing

10.8 Which hash function results in lesser collisions for a set of data of the following numbers?

A. $h(k) = (\text{int}) k/10000$

B. $h(k) = k \% 10000$

⋮
2569881232
2569881233
—
2569881234
2569881235
2569881236
⋮



Multiple Choice

Exercise 10 – Hashing

10.8 Which hash function results in lesser collisions for a set of data of the following numbers?

A. $h(k) = (\text{int}) k/10000$

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⋮
2569881232
2569881233
—
2569881234
2569881235
2569881236
⋮



Multiple Choice

Exercise 10 – Hashing

10.9 Determine the load factor of the given open addressing hash table.

- A. 1
- B. $1/7$
- C. $1/6$
- D. $6/7$
- E. 2

| | | | | | | |
|---|---|---|----|----|----|---|
| | 1 | 2 | 17 | 24 | 13 | 8 |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 |



Multiple Choice

Exercise 10 – Hashing

10.9 Determine the load factor of the given open addressing hash table.

- A. 1
- B. $1/7$
- C. $1/6$
- D. $6/7$
- E. 2

| | | | | | | |
|---|---|---|----|----|----|---|
| | 1 | 2 | 17 | 24 | 13 | 8 |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 |

 Multiple Choice

Exercise 10 – Hashing

10.10 Determine the load factor of the given open addressing hash table.

- A. $7/9$
- B. $3/9$
- C. $1/9$
- D. 1
- E. $4/9$

| | | | | | | | | |
|---|---|----|----|---|---|---|---|---|
| 9 | | 21 | 39 | | | | | |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |



Multiple Choice

Exercise 10 – Hashing

10.10 Determine the load factor of the given open addressing hash table.

- A. $7/9$
- B. $3/9$
- C. $1/9$
- D. 1
- E. $4/9$

| | | | | | | | | |
|---|---|----|----|---|---|---|---|---|
| 9 | | 21 | 39 | | | | | |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |



Multiple Choice

Exercise 10 – Hashing

10.11 Consider the hash function below in an open addressing hash table

$$h(k) = k \% 7$$

Assuming linear probing. Determine number of probes after inserting 24

- A. 0
- B. 1
- C. 2
- D. 3
- E. 4
- F. 5

| | | | | | | |
|---|---|---|----|---|----|---|
| | | 2 | 17 | | 13 | |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 |



Multiple Choice

Exercise 10 – Hashing

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Assuming linear probing. Determine number of probes after inserting 24

- A. 0
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- C. 2
- D. 3
- E. 4
- F. 5

| | | | | | | |
|---|---|---|----|---|----|---|
| | | 2 | 17 | | 13 | |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 |



Multiple Choice

Exercise 10 – Hashing

10.12 Consider the hash function below in an open addressing hash table
 $h(k) = k \% 7$

Assuming linear probing. Determine number of probes after inserting 72

- A. 0
- B. 1
- C. 2
- D. 3
- E. 4
- F. 5

| | | | | | | |
|---|---|---|----|----|----|---|
| | | 2 | 17 | 24 | 13 | |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 |



Multiple Choice

Exercise 10 – Hashing

10.12 Consider the hash function below in an open addressing hash table
 $h(k) = k \% 7$

Assuming linear probing. Determine number of probes after inserting 72

- A. 0
- B. 1
- C. 2
- D. 3
- E. 4
- F. 5

| | | | | | | |
|---|---|---|----|----|----|---|
| | | 2 | 17 | 24 | 13 | |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 |



Multiple Choice

Exercise 10 – Hashing

10.13 Consider the hash function below in an open addressing hash table

$$h(k) = k \% 9$$

Assuming quadratic probing. Where will 18 be stored?

- A. 4
- B. 1
- C. 5
- D. 6
- E. 7

| | | | | | | | | |
|---|---|----|----|---|---|---|---|---|
| 9 | | 21 | 39 | | | | | |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |



Multiple Choice

Exercise 10 – Hashing

10.13 Consider the hash function below in an open addressing hash table

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Assuming quadratic probing. Where will 18 be stored?

- A. 4
- B. 1
- C. 5
- D. 6
- E. 7

| | | | | | | | | |
|---|---|----|----|---|---|---|---|---|
| 9 | | 21 | 39 | | | | | |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |



Multiple Choice

Exercise 10 – Hashing

10.14 Consider the hash function below in an open addressing hash table

$$h(k) = k \% 9$$

Assuming quadratic probing. Determine number of probes after inserting 3

- A. 0
- B. 1
- C. 2
- D. 3
- E. 4
- F. 5

| | | | | | | | | |
|---|---|----|----|---|---|---|---|---|
| 9 | | 21 | 39 | | | | | |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |



Multiple Choice

Exercise 10 – Hashing

10.14 Consider the hash function below in an open addressing hash table

$$h(k) = k \% 9$$

Assuming quadratic probing. Determine number of probes after inserting 3

- A. 0
- B. 1
- C. 2
- D. 3
- E. 4
- F. 5

| | | | | | | | | |
|---|---|----|----|---|---|---|---|---|
| 9 | | 21 | 39 | | | | | |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |



Multiple Choice

The End