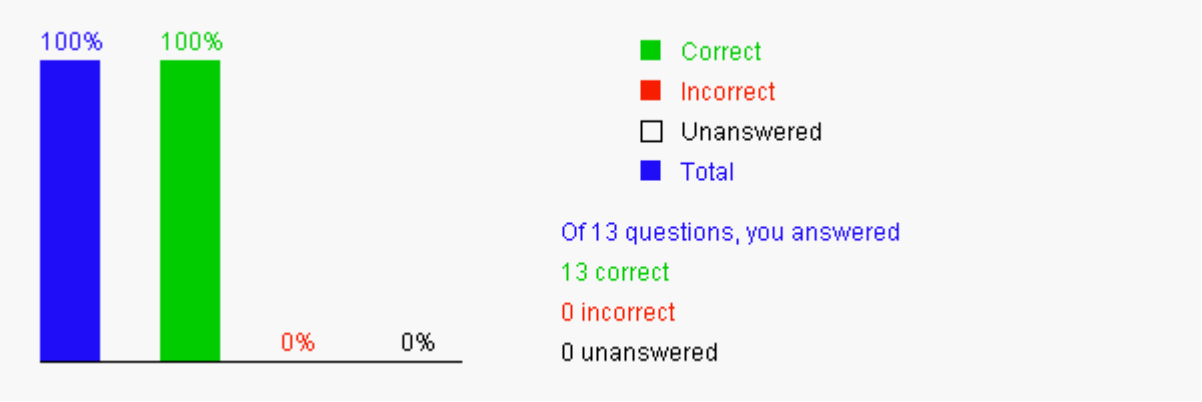
This quiz is for students to practice. A large number of additional quiz is available for instructors using Quiz Generator from the Instructor's Resource Website. Videos for Java, Python, and C++ can be found at https://yongdanielliang.github.io/revelvideos.html.

Chapter 29 Weighted Graphs and Applications



Please send suggestions and errata to Dr. Liang at y.daniel.liang@gmail.com. Indicate which book and edition you are using. Thanks!

Section 29.2 Representing Weighted Graphs

29.1 True or False? The WeightedEdge class extends AbstractGraph.Edge.

- (•) A. True
- ( ) B. False

Your answer is correct ✓

29.2 A WeightedEdge object contains the public data fields _____.

- [x] A. u
- [x] B. v
- [x] C. weight
- [ ] D. length

Your answer is correct ✓

29.3 The adjacent edge for each vertex in the WeightedGraph class is stored in _____.

- (•) A. an ArrayList
- ( ) B. a LinkedList
- ( ) C. a PriorityQueue
- ( ) D. a Stack

Your answer is correct ✓

Section 29.3 The WeightedGraph Class

29.4 The WeightedGraph is a subtype of _____.

- [ ] A. UnweightedGraph
- [x] B. AbstractGraph
- [x] C. Graph
- [ ] D. WeightedEdge

Your answer is correct ✓

29.5 The addEdge(u, v, w) method performs the following operations:

- [x] A. Invokes super.add(u, v) to add an edge.
- [x] B. Adds a weighed edge to the adjacent list for vertex u.
- [x] C. Adds a weighed edge to the adjacent list for vertex v.

Your answer is correct ✓

Section 29.4 Minimum Spanning Trees

29.6 Suppose a weighted graph is created in the following code. What is total weight of a minimum spanning tree?

```
Integer[] vertices = {0, 1, 2, 3, 4};

int[][] edges = {
```

```
    {0, 1, 9}, {0, 2, 5},
    {1, 0, 9}, {1, 2, 6}, {1, 3, 4}, {1, 4, 7},
    {2, 0, 5}, {2, 1, 6}, {2, 3, 3},
    {3, 1, 4}, {3, 2, 3}, {3, 4, 1},
    {4, 1, 7}, {4, 3, 1}
  };

  WeightedGraph<Integer> graph1 =
    new WeightedGraph<>(vertices, edges);
  WeightedGraph<Integer>.MST tree1 = graph1.getMinimumSpanningTree();
  System.out.println("Total weight is " + tree1.getTotalWeight());
```

- ○ A. 10
- ○ B. 11
- ○ C. 12
- ◉ D. 13
- ○ E. 14

Your answer is correct 

29.7 The MST class is subtype of _____.

- ○ A. BST
- ○ B. AVLTree
- ◉ C. AbstractGraph.Tree
- ○ D. Tree

Your answer is correct 

29.8 The getMinimumSpanningTree() method returns _____.

- ○ A. an ArrayList
- ○ B. a LinkedList
- ○ C. a queue
- ◉ D. a MST

Your answer is correct 

29.9 A graph may have several minimum spanning tree.

- ◉ A. True
- ○ B. False

Your answer is correct 

Section 29.5 Finding Shortest Paths

29.10 Suppose a weighted graph is created in the following code. What is the shortest path from vertex 4 to 0?

```
  Integer[] vertices = {0, 1, 2, 3, 4};

  int[][] edges = {
    {0, 1, 9}, {0, 2, 5},
    {1, 0, 9}, {1, 2, 6}, {1, 3, 4}, {1, 4, 7},
    {2, 0, 5}, {2, 1, 6}, {2, 3, 3},
    {3, 1, 4}, {3, 2, 3}, {3, 4, 1},
    {4, 1, 7}, {4, 3, 1}
  };

  WeightedGraph<Integer> graph1 =
    new WeightedGraph<>(vertices, edges);
  WeightedGraph<Integer>.ShortestPathTree tree1 =
    graph1.getShortestPath(graph1.getIndex(0));

  System.out.println("Shortest path from 4 to 0 is " +
    tree1.getPath(4));
```

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

Your answer is correct 

29.11 The ShortestPathTree class is subtype of _____.

- ○ A. BST

B. AVLTree
C. AbstractGraph.Tree
D. Tree

Your answer is correct 

29.12 The getShortestPath() method returns _____.

A. an ArrayList
B. a LinkedList
C. a ShortestPathTree
D. a MST

Your answer is correct 

29.13 A _____ of a graph is a subgraph that is a tree and connects all vertices in the graph.

A. spanning tree
B. shortest path

Your answer is correct