Graphs

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Contents

Chapter 1

Hierarchical Index

1.1 Class Hierarchy

This inheritance list is sorted roughly, but not completely, alphabetically:

Chapter 2

Class Index

2.1 Class List

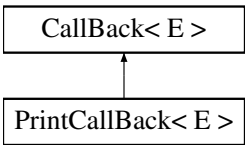
Here are the classes, structs, unions and interfaces with brief descriptions:

Chapter 3

Class Documentation

3.1 CallBack< E > Interface Reference

Inheritance diagram for CallBack< E >:



3.1.1 Detailed Description

Represents the processing we apply to a vertex of a graph.

The documentation for this interface was generated from the following file:

- CallBack.java

3.2 Graph< E > Class Reference

Public Member Functions

- Graph ()
- void addVertex (String vertexName, E data)
- void addDirectedEdge (String startVertexName, String endVertexName, int cost)
- String toString ()
- Map< String, Integer > getAdjacentVertices (String vertexName)
- int getCost (String startVertexName, String endVertexName)
- Set< String > getVertices ()
- E getData (String vertex)
- void doDepthFirstSearch (String startVertexName, CallBack< E > callback)
- void doBreadthFirstSearch (String startVertexName, CallBack< E > callback)
- int doDijkstras (String startVertexName, String endVertexName, ArrayList< String > shortestPath)

3.2.1 Detailed Description

Implements a graph. We use two maps: one map for adjacency properties (adjancencyMap) and one map (dataMap) to keep track of the data associated with a vertex.

Author

cmsc132

Parameters

<E>	

3.2.2 Constructor & Destructor Documentation

3.2.2.1 Graph ( )

Initializes the adjacency and data maps.

3.2.3 Member Function Documentation

3.2.3.1 void addDirectedEdge (String *startVertexName,* String *endVertexName,* int *cost*)

Adds or updates a directed edge with the specified cost.

Parameters

startVertexName	
endVertexName	
cost	

Exceptions

IllegalArgumentException	If any of the vertices are not part of the graph. Use any error message.

3.2.3.2 void addVertex (String *vertexName,* E *data*)

Adds a vertex to the graph by adding to the adjacency map an entry for the vertex. This entry will be an empty map. An entry in the dataMap will store the provided data.

Parameters

vertexName	vertex's name
data	data associated with the vertex

Exceptions

IllegalArgumentException	If the vertex already exists in the graph. Use any error message.

3.2.3.3 void doBreadthFirstSearch (String *startVertexName,* CallBack< E > *callback*)

Computes Breadth-First Search of the specified graph.

Parameters

startVertexName	
callback	Represents the processing to apply to each vertex

Exceptions

IllegalArgumentException	If the vertex is not part of the graph. Use any error message.

3.2.3.4 void doDepthFirstSearch (String *startVertexName,* CallBack< E > *callback*)

Computes Depth-First Search of the specified graph.

Parameters

startVertexName	
callback	Represents the processing to apply to each vertex

Exceptions

IllegalArgumentException	If the vertex is not part of the graph. Use any error message.

3.2.3.5 int doDijkstras (String *startVertexName,* String *endVertexName,* ArrayList< String > *shortestPath*)

Computes the shortest path and shortest path cost using Dijkstras's algorithm. It initializes shortestPath with the names of the vertices corresponding to the shortest path. If there is no shortest path, shortestPath will be have entry "None".

Parameters

startVertexName	
endVertexName	
shortestPath	Initialized by the method with the shortest path or "None".

Returns

Shortest path cost or -1 if no path exist.

Exceptions

IllegalArgumentException	If any of the vertices are not part of the graph. Use any error message.

3.2.3.6 Map<String, Integer> getAdjacentVertices (String *vertexName*)

Returns a map with information about vertices adjacent to vertexName. If the vertex has no adjacents, an empty map is returned.

Parameters

vertexName	

Returns

map

3.2.3.7 int getCost (String *startVertexName,* String *endVertexName*)

Returns the cost associated with the specified edge.

Parameters

startVertexName	
endVertexName	

Returns

edge cost

Exceptions

IllegalArgumentException	If any of the vertices are not part of the graph. Use any error message.

3.2.3.8 E getData (String *vertex*)

Returns the data component associated with the specified vertex.

Parameters

vertex	

Returns

data

Exceptions

IllegalArgumentException	If the vertex is not part of the graph. Use any error message.

3.2.3.9 Set<String> getVertices ( )

Returns a Set with all the graph vertices.

Returns

set with vertices.

3.2.3.10 String toString ( )

Returns a string with information about the Graph. Notice that vertices are printed in sorted order and information about adjacent edges is printed in sorted order (by vertex name). You may not use Collections.sort or Arrays.sort in order to implement this method. See the sample output for formatting details.

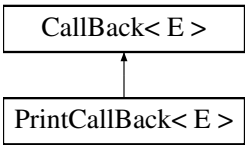
return string with graph information

The documentation for this class was generated from the following file:

- Graph.java

3.3 PrintCallBack< E > Class Reference

Inheritance diagram for PrintCallBack< E >:



3.3.1 Detailed Description

Implements a processor that appends the name of a vertex to a result string. It is used to generate the string associated with a BFS or DFS traversal. We append the data of the vertex to the vertex's name.

The documentation for this class was generated from the following file:

- PrintCallBack.java

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