

Laboratory 12: Cover Sheet

Name: Saharath Kleips

Date: 11/21/2014

Section: 1001

Place a check mark in the *Assigned* column next to the exercises your instructor has assigned to you. Attach this cover sheet to the front of the packet of materials you submit following the laboratory.

Activities	Assigned: Check or list exercise numbers	Completed
Implementation Testing	✓	
Programming Exercise 1	✓	
Programming Exercise 2	✓	
Programming Exercise 3	✓	
Analysis Exercise 1	✓	
Analysis Exercise 2	✓	
	Total	

Laboratory 12: Implementation Testing

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Check with your instructor whether you are to complete this exercise prior to your lab period or during lab.

Test Plan 12-1 (Weighted Graph ADT operations)			
Test case	Commands	Expected result	Checked
+	Insert	Inserted Vertex	
-	Remove Vertex	Removed Vertex	
=	Insert Edge Weight	Inserted Weight	
?	Retrieve Vertex	Retrieved Vertex	
!	Remove Edge	Removed Edge	

Laboratory 12: Programming Exercise 1

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Test Plan 12-2 (showShortestPaths operation)			
Test case	Commands	Expected result	Checked
+ C 1 + D 2 + E 3 = C E 10 = C D 2 = D E 2	Insert Vertices, Set Edges	Path from C to E changed to 4	

Laboratory 12: Programming Exercise 2

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Test Plan 12-3 (hasProperColoring operation)			
Test case	Commands	Expected result	Checked
+ C 2 + D 2 = C D 1	Insert two verticies, same color, set edge	Not proper coloring	

Laboratory 12: Programming Exercise 3

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Test Plan 12-4 (areAllEven operation)			
Test case	Commands	Expected result	Checked
+ C 1 + D 1 + E 1 = C E 1 = C D 1 = D E 1	Insert three vertices, connect them	Even number of edges	

Laboratory 12: Analysis Exercise 1

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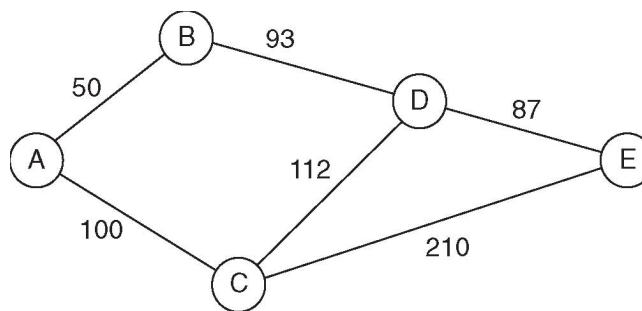
Laboratory 12: Weighted Graph ADT

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[Please reference the lab book for the full description of this problem.] The following graph, for example,



yields the augmented path matrix shown below.

Vertex list		Path matrix (cost/second vertex on shortest path)					
Index	Label	From/To	0	1	2	3	4
0	A	0	0 0	50 1	100 2	143 1	230 1
1	B	1	50 0	0 1	150 0	93 3	180 3
2	C	2	100 0	150 0	0 2	112 3	199 3
3	D	3	143 1	93 1	112 2	0 3	87 4
4	E	4	230 3	180 3	199 3	87 3	0 4

Entry (0,4) in this path matrix indicates that the cost of the shortest path from vertex A to vertex E is 230. It further indicates that vertex B (the vertex with index 1) is the second vertex on the shortest path. Thus the shortest path is of the form AB...E.

Explain how you can use this augmented path matrix to list the vertices that lie along the shortest path between a given pair of vertices.

Use the second number as the row, and the index as the column to travel to that point. Repeat until the path is traversed.

Laboratory 12: Analysis Exercise 2

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Give an example of a graph for which no proper coloring can be created using less than five colors (see Programming Exercise 2). Does your example contradict the Four-Color Theorem?

A 3-D graph would have to have more than four colors but does not contradict the four-color theorem.