Laboratory 12: Cover Sheet

Name ___Henry Huffman _____ Date __11/20/14_____

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	x	
Analysis Exercise 2	x	
	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**

Laboratory 12: Programming Exercise 1

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Test Plan 12-2 (showShortestPaths operation)			
Test case	**Commands**	**Expected result**	**Checked**

Laboratory 12: Programming Exercise 2

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Test Plan 12-3 (hasProperColoring operation)			
Test case	**Commands**	**Expected result**	**Checked**

Laboratory 12: Programming Exercise 3

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Test Plan 12-4 (areAllEven operation)			
Test case	**Commands**	**Expected result**	**Checked**

Laboratory 12: Analysis Exercise 1

Name ___Henry Huffman_____ Date ___11/18/14_____

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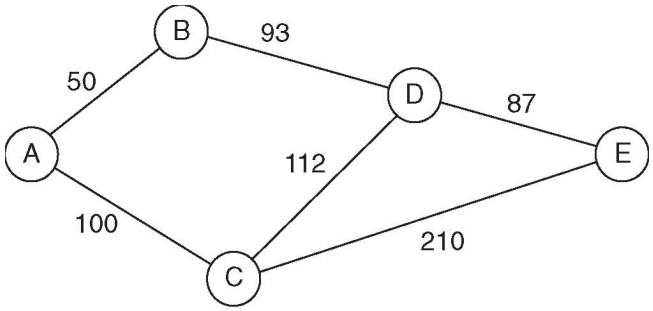
[Please reference the lab book for the full description of this problem.] The following graph, for example,



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.
One can simply look at the vertex they wish to travel from and the vertex they want to travel to and see the sum of the edge weights needed for the shortest path. For instance, if one wishes to travel from C to B, one simply needs to look at the location, ([row, column]), [2,1]. There it is stated that if one wishes to travel from vertex C to vertex B, the minimal edge weight in doing so is 150.

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?

Proper coloring can not be created using less than five colors when there are intersections of edges existing in the graph. This does not contradict the Four-Color Theorem because the Four-Color Theorem only applies to planar graphs where there are no intersections.