CS 385, Homework 3: Graph Algorithms

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I pledge my honor that I have abided by the Stevens Honor System.

1. Adjacency Matrix:

	1	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***10***
1	0	1	0	1	0	0	0	0	0	0
2	0	0	0	0	1	0	0	0	0	0
3	0	0	0	0	1	0	0	0	0	0
4	0	1	0	0	0	0	0	0	0	0
5	0	0	0	1	0	0	0	0	1	0
6	0	0	0	0	0	1	0	1	0	0
7	0	0	0	0	1	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	1	0	0	1
10	0	0	1	0	1	0	0	0	0	0

2. Adjacency List:

From:	**To:**	
1	2	4
2	5	
4	2	
5	4	9
9	7	10
7	5	
10	3	5
3	5	
6	6	8

3. Breadth First Search order: **1, 2, 4, 5, 9, 7, 10, 3, 6, 8**

4. Depth First Search order: **1, 2, 5, 4, 9, 7, 10, 3, 6, 8**

5. a) Run time BFS on matrix: $\boldsymbol{\theta(n^2)}$
   b) Run time BFS on list: $\boldsymbol{\theta(n)}$

6. a) Run time DFS on matrix: $\boldsymbol{\theta(n^2)}$
   b) Run time DFS on list: $\boldsymbol{\theta(n)}$

7. Explain when an adjacency list is a better choice in efficiency of algorithm?
Better when there aren't as many edges, because it doesn't need as much memory. Fast to iterate through the edges, slow to determine the presence of an edge.

8. Explain why topological sort is not possible on the graph above.
Not possible because the 6 cycles back to itself.

9. Topological sort order: **1, 4, 2, 5, 6, 8, 9, 7, 10, 3**

1	2	3	4	5	6	7	8	9	10
0x	2	2	1	2	0x	1	1	1	2
	1	1	0x	1		0x	0x	0x	1
	0x	0x		0x					0x