Final Review

1. Demonstrate that the Graph-Coloring Optimization problem is in NP.

2. Draw the entire pruned state space tree that is generated by the backtracking algorithm for the Sum of Subsets problem on the following instance. (15 points)

- W = 15
- $w_1 = 3$ $w_2 = 5$ $w_3 = 6$ $w_4 = 7$

Final Review

3. Given the following cost adjacency matrix, use Floyd's Algorithm to compute $D^{(4)}$, thus finding the shortest distance from every vertex to every other vertex.

	1	2	3	4
1	0	8	∞	1
2	∞	0	1	∞
3	4	∞	0	∞
4	∞	2	9	0

Final Review

4. Consider the following instance of the 0-1 knapsack problem. Solve it with the branch-and-bound solution discussed in class. Show the state space tree and the priority queue after each step.

W = 5

	w_i	p_i
1	2	12
2	1	10
3	3	21
4	2	14

Final Review

5. Draw the recursion tree formed by QuickSort on the following array. You may assume that the first element is selected as the pivot:

[5, 2, 8, 7, 6, 1, 2, 3, 9, 10, 5]