CS214 – Lab11 (Week13 & Week14)

Backtracking and Branch-and-Bound

Objective:

- To develop working knowledge of the concepts learned from Lectures
- To appreciate algorithm design with Backtracking and Branch-and-Bound approaches
- To develop algorithmic thinking in programming simple algorithms

Activities:

Consider a bag with 17LB capacity and 4 items below

A weights 4LB has profit $60
B weights 6LB has profit $30
C weights 11LB has profit $55
D weights 6LB has profit $12

1. Use backtracking approach to draw a pruned state space tree to solve the above 0-1 knapsack problem. Show actions step by step.
2. Use branch-and-bound approach to draw a pruned state space tree to solve the above 0-1 knapsack problem. Show actions step by step.
3. Compare the results for Activity 1 and Activity 2 (above)

Optional:

Consider the adjacency matrix below

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

a. Use backtracking approach to draw a pruned state space tree for the TSP of the graph given by the matrix above
b. Use branch-and-bound approach to draw a pruned state space tree for the TSP of the graph given by the matrix above
c. Compare the results from a&b (above)