2020-08-08 - Handout – Dynamic Programming

UNBOUNDED KNAPSACK

Q1. 0-1 Rod cutting problem

Link: https://www.geeksforgeeks.org/cutting-a-rod-dp-13/

Given a rod of length n inches and an array of prices that contains prices of all pieces of size smaller than n. Determine the maximum value obtainable by cutting up the rod and selling the pieces.

For example, if length of the rod is 8 and the values of different pieces are given as following, then the maximum obtainable value is 22 (by cutting in two pieces of lengths 2 and 6)

```
length   | 1   2   3   4   5   6   7   8
--------------------------------------------
price    | 1   5   8   9  10  17  17  20
```

Q2. Number of ways – coin change problem

Link:https://www.geeksforgeeks.org/coin-change-dp-7/#:~:text=Given%20a%20value%20N%2C%20if,%2C%7B1%2C3%7D.

Given a value N, if we want to make change for N cents, and we have infinite supply of each of S = { S1, S2, .. , Sm} valued coins, how many ways can we make the change? The order of coins doesn't matter.

For example, for N = 4 and S = {1,2,3}, there are four solutions: {1,1,1,1},{1,1,2},{2,2},{1,3}. So output should be 4. For N = 10 and S = {2, 5, 3, 6}, there are five solutions: {2,2,2,2,2}, {2,2,3,3}, {2,2,6}, {2,3,5} and {5,5}. So the output should be 5.