

Homework Assignment: 3

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1. Job Optimization

	Solution	Time Slot 1	Time Slot 2	profit
	1	Job 1	Job 3	55
	2	Job 3	Job 1	55
	3	Job 2	Job 1	65
	4	Job 2	Job 3	60
(a)	5	Job 4	Job 1	70
	6	Job 4	Job 3	65
	7	Job 1	N/A	30
	8	Job 2	N/A	35
	9	Job 3	N/A	25
	10	Job 4	N/A	40

(b) The optimal schedule has Job 4 in timeslot 1 and Job 1 in timeslot 2 for a profit of \$70.

(c) A high level greedy algorithm would choose the largest profit with a deadline of 1 or 2, then choose the largest profit with a deadline of 1. In this case, it would choose Job 4, then Job 1.

2. Dynamic Programming: Change Making

(a) The minimum number of coins needed to meet the amount is 3.

(b) Minimum coin combinations include {1, 2, 5} and {3, 3, 3}

(c)
$$\begin{array}{c|c|c|c|c|c|c|c|c|c|c|c} n & 0 & 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 \\ \hline f(n) & 0 & 1 & 2 & 1 & 2 & 1 & 2 & 3 & 2 & 3 \end{array}$$

(d) Change-making($D[j]$, n):

```

f[0] = 0
for i = 1 to n do
    temp = ∞
    j = 1
    while j ≤ m and i ≥ D[j] do
        temp = min(f(i-D[j]), temp)
        j = j + 1
    f[i] = temp + 1
return f(n)

```

3. Dyanmic Programming: Knapsack Problem

(a) 0 1 2 3 4 5 6 7 8 9 10

(b)

(c)

4. Greedy Algorithm

(a)

(b)

(c)