

Homework Assignment: 3

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Date: 4/19/2017

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)	n	0	1	2	3	4	5	6	7	8	9
	$f(n)$	0	1	2	1	2	1	2	3	2	3

(d)

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

$f[0] = 0$

for $i = 1$ to n do

temp = ∞

$j = 1$

while $j \leq m$ and $i \geq D[j]$

temp = $\min(f(i - D[j]),$

$j = j + 1$

$f[i] = \text{temp} + 1$

return $f(n)$

3. Dynamic Programming: Knapsack Problem

(a)

(b)

(c)

4. Greedy Algorithm

(a)

(b)

(c)