Homework Assignment: 3 Name: Jonathan Gaines

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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.

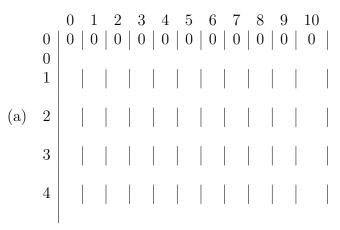
2. Dynamic Programming: Change Making

- (a) The minimum number of coins needed to meet the amount is 3.
- (b) Minimum coin combinations include $\{1, 2, 5\}$ and $\{3, 3, 3\}$

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

$$\begin{split} f[0] &= 0 \\ \text{for } i &= 1 \text{ to n do} \\ &\quad temp = \infty \\ &\quad j &= 1 \\ &\quad while \ j \leq m \ \text{and } i \geq D[j] \ \text{do} \\ &\quad temp = \min(f(i\text{-}D[j]), \ temp) \\ &\quad j &= j+1 \\ &\quad f[1] &= temp + 1 \\ \text{return } f(n) \end{split}$$

3. Dyanmic Programming: Knapsack Problem



- (b)
- (c)
- 4. Greedy Algorithm
 - (a)
 - (b)
 - (c)