

Name _____ Student ID _____

Dynamic Programming

Coin Change Problem: find a number of ways of making changes for a particular amount of money, N , using a given set of denominations $d_1 \dots d_m$ (value of coin)

For example, for $N=4$, $D=\{1,2,3\}$, there are four solutions: $\{1,1,1,1\}$, $\{1,1,2\}$, $\{2,2\}$, $\{1,3\}$

Show recurrence equation and write a program using dynamic programming approach to solve this problem.

```
Amount = 5
coins [] = {1,2,3}
Ways to make change = 5
{1,1,1,1,1} {1,1,1,2}, {1,2,2}, {1,1,3} {2,3}
```

The Minimum Coin Change Problem:

From the above problem, extend the solution to find the “minimum” number of coins to make change.

Show recurrence equation and write a program using dynamic programming approach to solve this problem.

```
Amount = 5
coins [] = {1,2,3}
Minimum of Coin is 2
{2,3}
```