Project 7: Dynamic Programming: Coin Change Problem

Due: November 8, 2018: by 11.30 AM (in Canvas)

In this project, you will implement the dynamic programming-based solution for the coin change problem.

You are given an array (CD) of N coins (for simplicity, coin index of 0 corresponds to a coin of $0; the valid coin indexes are 1...N) each with a unique positive integer value and a target value (S) for the sum of the coin values picked. You will input the array as a text file (format, as shown in the sample screenshot below) and the target sum value as an integer input.

You are given a startup code (in C++/Java) that inputs the coin values from a text file and the target sum value. The code also initializes the three arrays for respectively storing the coin values, the minimum number of coins (MNC) picked for each value of the target sum in the range 1...S, and the last coin value picked (LCP) for the target sum in the range of 1...S.

You would extend the given code to implement the dynamic programming algorithm and print the output (the target sum values from 1...S and the contents of the two arrays MNC and LCP for each target sum value) as shown in the sample screenshot. You are also required to print the coins to be picked for the targeted sum S (as shown in the sample screenshot).

Sample screenshot

1	5
2	1
3	2
4	4

coinInfo.txt

```
Enter filename: coinInfo.txt
Enter the number of coin values: 4
Enter the target sum of the coin values: 17
Sum    1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
MNC    1 1 2 1 1 2 2 2 2  2  3  3  3  3  3  4  4
LCP    1 2 2 4 5 1 2 4 4  5  1  2  4  4  5  1  2
Coins to be picked for targeted sum 17
2 5 5 5
```

Values assigned

	Coin Denomination Array (CD)	Sum of the Coin Values (S)
Clark, Lavaskie	1 4 5 6	20
Epps, Justin	2 3 7 6	18
Harris, James	2 5 7 4	22
Hester, Larriel	3 6 1 7	16
Hopson, Shanice	1 5 6 3	22
Jackson, Martice	2 5 6 7	23
Jones, Demarius	5 7 2 4	23
Kang, Ning	2 1 5 6	22

Kirk, Damon	1 4 7 2	19
Manuel, Jackie	7 6 2 3	19
McIntosh, Blair	5 6 7 4	25
Sheffey, Varlin	2 7 3 6	25
Simmons, Jetnya	1 6 2 5	21
Thomas, Eriana	7 6 5 3	25
Walker, Brandon	7 5 1 2	24
Wynn, Marcus	4 1 6 3	20
Zimmerman, Taba	5 2 6 1	21

What to submit?

(1) The entire code (in C++ or Java) of the project
(2) Screenshot (as shown in the sample) of the output of the code for the coin and target sum values assigned.