

# Test Cases Using this Table method

$\{1, 2, 3\}$ , sum = 6

①

|                | sum | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
|----------------|-----|---|---|---|---|---|---|---|
| pence-type     |     |   |   |   |   |   |   |   |
| (skip 1 steps) | 1   | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| (skip 2 steps) | 2   | 1 | 1 | 2 | 2 | 3 | 3 | 4 |
| (skip 3 steps) | 3   | 1 | 1 | 2 | 3 | 4 | 5 | 7 |

Answer: 7

① Initialize this col. all to 1.

② Add up for each other cell the value of the cell above and the value of the cell (pence-type) # of cells to the left of it. If any of the cells lie outside the table, add a default value of 0.

③ Continue doing this for each cell. The value of the cell in the last column and last row represents the number of ways to make sum 6 using an infinite set of  $\{1, 2, 3\}$  values.

\* This case was tested correctly and matched with the program.

② Test Case 2:  $\{1, 2, 5, 10\}$ , sum = 10

\* This is correct according to program  
Ans = 11

|            | sum | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9  | 10 |
|------------|-----|---|---|---|---|---|---|---|---|---|----|----|
| pence-type |     |   |   |   |   |   |   |   |   |   |    |    |
| 1          | 1   | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1  | 1  |
| 2          | 1   | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | 5 | 6  | 6  |
| 5          | 1   | 1 | 2 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 10 | 10 |
| 10         | 1   | 1 | 2 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 11 | 11 |

The (a+b) on the top of each cell represents the calculation to find tot. # of ways.

(a) is the ways to do it excluding the current row's pence type.

(b) is the ways to do it including at least one instance of that pence type → to find b, use value of cell pence-types shifted to the left of each cell.