

### ALGORITHMS HW 3

Imagine a thief entering a house. In the house, there are infinitely many items that can have only one of three different weights: 1 kg, 3 kgs, and 5 kgs. All of the items are discrete. The thief has a bag capacity of  $n$  kgs and strangely, he wants to steal the “smallest number of items”. You need to implement a mathematical recursive formulation for  $C(n)$  where  $C(n)$  denotes the smallest number of items the thief can steal using a bag capacity of  $n$ .

(a) Implement a recursive algorithm that returns the smallest number of items the thief can steal using a bag capacity of  $n$ .

(b) Implement a dynamic programming algorithm for finding the smallest number of items the thief can steal using a bag capacity of  $n$ .

(c) Compare your results.

Your submission should include the codes (python,c++,java are accepted.) and your report of findings.