**Week 5 Studio**

**Assessed Preparation**

Problem 1

a)

import math

def min\_coins(coins,V):

    coins\_needed = [math.inf] \* (V+1)

    coins\_needed[0] = 0

    for i in range(1,V+1):

        if i>= min(coins):

            best\_so\_far = math.inf

        for c in coins:

            if c<=i:

                best\_so\_far = min(best\_so\_far,1+coins\_needed[i-c])

        coins\_needed[i] = best\_so\_far

    return coins\_needed[V]

b)

def min\_coins\_TopDown(coins,V):

    coins\_needed = [math.inf] \* (V+1)

    output = min\_coins\_aux(coins,V,coins\_needed)

    return output

def min\_coins\_aux(coins,V,coins\_needed):

    if V ==0 :

        coins\_needed[V] = 0

        return 0

    if coins\_needed[V] == None:

        best\_so\_far = math.inf

        for c in coins:

            if c<=V:

                best\_so\_far = min(best\_so\_far,1+min\_coins\_aux(c,V-c,coins\_needed))

        coins\_needed[V] = best\_so\_far

    return coins\_needed[V]

Problem 2:

1. Sell to house i, cant sell to house i-1 so best money is gotten from house 1… i-2 + amount of house i , since we cant sell to (i-1).

Sell to house i-1, cant sell to house i so the best money gotten is from house 1… i-1

1. Subproblem[i] = {the amount of money that you can get by selling to houses 1…i}