**Exercise 1.14.**  Draw the tree illustrating the process generated by the count-change procedure of section [1.2.2](http://mitpress.mit.edu/sicp/full-text/book/book-Z-H-11.html#%_sec_1.2.2) in making change for 11 cents. What are the orders of growth of the space and number of steps used by this process as the amount to be changed increases?

**Part 2**

Take n as the amount of money, k as the number of the kinds of coins, and dk as the first denomination of the k kinds of coins. is the mathematical function of the procedure (cc n k).

The order of growth of the space is .

Because the longest path in the tree is where is the smallest denomination of all the kinds of coins.

The order of growth of the number of steps is .

When

where is the denomination of the coin.

For each iteration, three steps are calculated:

(cc a 1)

(cc a 0)

(cc a 0)+(cc a-d1 1)where a is the amount of money left.

So , and the order of growth is

When

Since , so

So the order of growth of is .

Similarly, when

So the order of growth of is .

When , the order of growth is .

More generally, the order of growth of the number of steps is , where k is number of kinds of coins.