



Lab: Cryptol Functions

Exercise 1:

Given some number of coins X and a sum S , with coin denominations 1, 5, 10, 25. Write one or more functions which will find all the ways to make a sum of X coins equal to S . For example, if X is 30 and S is 109 (cents) one way to get the amount S is using 19 pennies, 7 nickels, 3 dimes and 1 quarter.

Exercise 2:

The riddle of the Bitcoin and the Tigers. There are nine rooms, each with a sign on its door. A Bitcoin is in one room and one room only. Other rooms may be empty or have tigers. A prisoner has been tasked to open the door to the room containing the Bitcoin. If that happens the prisoner takes the Bitcoin and is released from prison. If a door containing a Tiger opened, the prisoner is eaten. If a door to an empty room is opened the prisoner is not eaten but remains in prison. The signs are:

ROOM 1: THE BITCOIN IS IN A ROOM WITH AN UNEVEN NUMBER

ROOM 2: THIS ROOM IS EMPTY

ROOM 3: EITHER SIGN 5 TELLS THE TRUTH, OR SIGN 7 IS LYING

ROOM 4: SIGN 1 IS LYING

ROOM 5: SIGN 2 IS LYING OR SIGN 4 TELLS THE TRUTH

ROOM 6: SIGN 3 IS LYING

ROOM 7: THE BITCOIN IS NOT IN ROOM 1

ROOM 8: THIS ROOM HOSTS A TIGER, AND ROOM 9 IS EMPTY

ROOM 9: THIS ROOM HOSTS A TIGER, AND SIGN 6 IS LYING

A sign on the door to a room containing the BITCOIN is True

A sign on the door to a room containing a TIGER is False

A sign on the door to an empty room could be True or False

If you know whether room 8 is empty, you uniquely know what room the Bitcoin is in

Write a function that enables finding the Bitcoin.

Note: If your function is called `FindBitcoin` then `:prove FindBitcoin` will confirm that the Bitcoin is found