Blockseer Technical Exercise

Instructions

1. Read the questions below.
2. Submit your code, along with instructions for how to run it.

Question

Here is a standard telephone keypad:

```
1 2 3
4 5 6
7 8 9
* 0 #
```

Write a program to calculate the number of n-digit numbers that simultaneously:

- exclude * and #
- start with 0
- are formed by cycling through three moves: a "tall L" (*two* steps in one direction followed by *one* step in the perpendicular direction) followed by two "short L"s (*one* step in one direction followed by *one* step in the perpendicular direction).

For example, the qualifying 2-digit numbers are {04, 06}, the qualifying 3-digit numbers are {042, 048, 062, 068}, and the qualifying 4-digit numbers are {0424, 0426, 0484, 0486, 0624, 0626, 0684, 0686}.

How many qualifying 7-digit numbers are there? How many qualifying 100-digit numbers are there?

Bonus Question

Ethereum is a blockchain that can run arbitrary programs. Write an ethereum program (i.e. contract) that will send 0.1 ETH (a bounty) to the first person who gets the correct answer to the above "100-digit" question.

Bonus Bonus Question

Because Ethereum smart contracts are deployed publicly, anyone with the right tooling can read their contents. Furthermore, people can access any state the contract specifies. Knowing that people have access to your validation code, how do you write the contract so that somebody *must solve the problem. (*it should be near impossible or significantly computationally expensive to derive the answer from your contract code)