EASY MISC

PART 1

NO. 292

NIM GAME

PROBLEM DESCRIPTION

- You are playing the following Nim Game with your friend: There is a heap of stones on the table, each time one of you take turns to remove 1 to 3 stones. The one who removes the last stone will be the winner. You will take the first turn to remove the stones.

- Both of you are very clever and have optimal strategies for the game. Write a function to determine whether you can win the game given the number of stones in the heap.

- For example, if there are 4 stones in the heap, then you will never win the game: no matter 1, 2, or 3 stones you remove, the last stone will always be removed by your friend.

IDEA

- Given 4 total, pick 1~3 per round
  - 1 + 3 // first player loses
  - 2 + 2 // first player loses
  - 3 + 1 // first player loses
  - if total % (max_you_can_pick + 1) == 0, then first player loses
  - otherwise the first player wins

SOLUTION

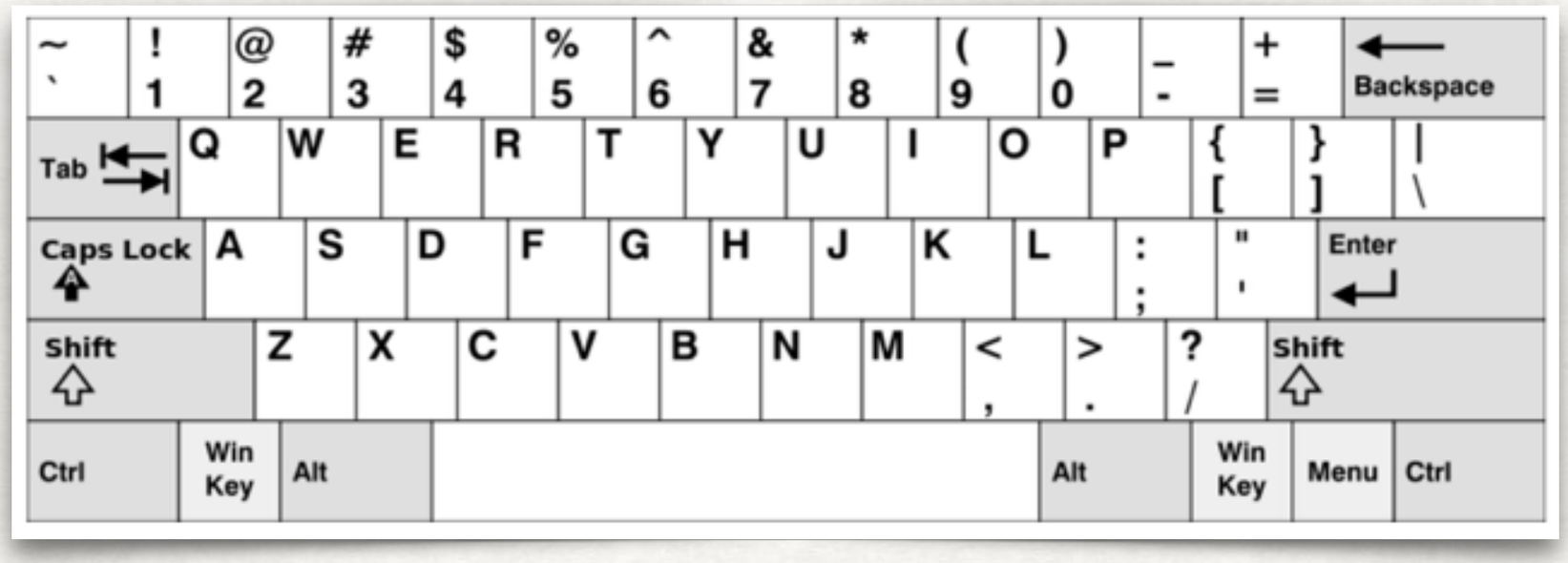
- https://github.com/Brady31027/leetcode/tree/master/292_Nim_Game

NO. 500

KEYBOARD ROW

PROBLEM DESCRIPTION

- Given a List of words, return the words that can be typed using letters of alphabet on only one row's of American keyboard



IDEA

- Use set to maintain each row
  - rows = [set('qwertyuiop'), set('asdfghjkl'), set('zxcvbnm')]
- For each input word, determine whether all the containing letters belong to one row

```
for word in words:
        line_cnt = 0
        for row_index in range(len(rows)):
            if set(word) & rows[row_index]:
                line_cnt += 1
```

SOLUTION

- https://github.com/Brady31027/leetcode/tree/master/500_Keyboard_Row

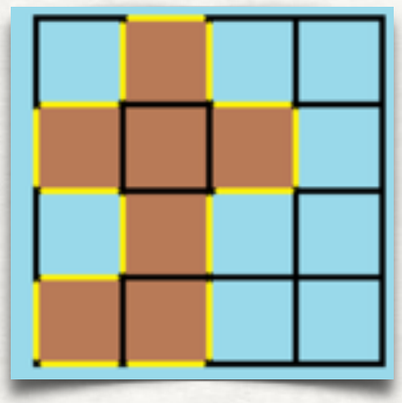
NO. 463

ISLAND PERIMETER

PROBLEM DESCRIPTION

- Given a map in form of a two-dimensional integer grid where 1 represents land and 0 represents water. Grid cells are connected horizontally/vertically (not diagonally). The grid is completely surrounded by water, and there is exactly one island. The island doesn't have "lakes". One cell is a square with side length 1. Determine the perimeter of the island.

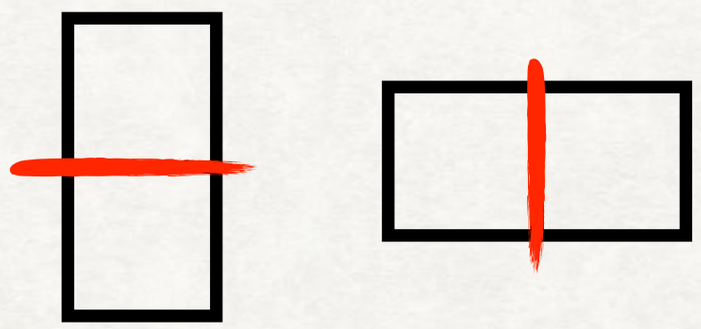
- Example



Answer: 16

IDEA

- Perimeter for every land cell is 4
- If a land cell has a upper neighbor, they will share an edge
  - Perimeter -= 2
- If a land cell has a left neighbor, they will share an edge
  - Perimeter -= 2



SOLUTION

- https://github.com/Brady31027/leetcode/tree/master/463_Island_Perimeter

NO. 448

FIND ALL NUMBERS DISAPPEARED IN AN ARRAY

PROBLEM DESCRIPTION

- Given an array of integers where 1 ≤ a[i] ≤ n (n = size of array), some elements appear twice and others appear once. Find all the elements of [1, n] inclusive that do not appear in this array.
- Example:
- Input: [4,3,2,7,8,2,3,1]
- Output: [5,6]

Could you do it without extra space and in O(n) runtime?

IDEA

- Use sets to maintain indices and values
  - Benefits that using set() is to remove redundant numbers
  - Indices set contains all numbers [1…n]
- Values set may lack of missing numbers
- Answer is the difference between these two sets

```
for i, v in enumerate(nums):
    indices.add(i+1)
    values.add(v)
return list(indices - values)
```

SOLUTION

- https://github.com/Brady31027/leetcode/tree/master/448_Find_All_Numbers_Disappeared_in_an_Array

NO. 520

DETECT CAPITAL

PROBLEM DESCRIPTION

- Given a word, you need to judge whether the usage of capitals in it is right or not. We define the usage of capitals in a word to be right when one of the following cases holds: All letters in this word are capitals, like “USA". All letters in this word are not capitals, like “leetcode". Only the first letter in this word is capital if it has more than one letter, like "Google".

IDEA

- Use Python built-in functions
  - isupper()
  - islower()
  - istitle()
- Use Regex
  - re.search("^[A-Z]*$", word) *# equal to isupper()*
  - re.search("^[A-Z]{0,1}[^A-Z]*$", word) *# equal to islower() or istitle()*

SOLUTION

- https://github.com/Brady31027/leetcode/tree/master/520_Detect_Capital