1. 2 Sum:
Given an array of integers, return indices of the two numbers such that they add up to a specific target.
You may assume that each input would have exactly one solution, and you may not use the same element twice.

- naive O(n^2) can pass, be careful for test case like 6 [3, 3] and 6 [3, 2, 4] when using set for speed up.
- Use dictionary to make it become O(n)
  (O(1) amortized lookup time since dict is implemented with hash table)
  if key in dic: (instead of if key in dic.keys(), this is more efficient)

2. Add two Numbers:
You are given two non-empty linked lists representing two non-negative integers. The digits are stored in reverse order and each of their nodes contain a single digit. Add the two numbers and return it as a linked list.
You may assume the two numbers do not contain any leading zero, except the number 0 itself.

- list -> str -> int (sum them) -> str -> list could work, not slow but ugly
- create the linked list directly, a bit ugly -> use a dummy head to make it more concise https://leetcode.com/problems/add-two-numbers/discuss/1016/Clear-python-code-straight-forward

3.Longest substring without repeating characters:
Given a string, find the length of the longest substring without repeating characters.

- for i, ch in enumerate(string) instead of for i in range(len(s))
- use a dictionary to store the last occurrence. a variable start to save the start point of string

4. Median of two Sorted Array
There are two sorted arrays nums1 and nums2 of size m and n respectively.
Find the median of the two sorted arrays. The overall run time complexity should be O(log (m+n)).
You may assume nums1 and nums2 cannot be both empty.

- first make sure one's length greater than the other
- second, do binary search. l=0, r=m, i = (l+r)/2, j=halfLen-i
- compare A[i-1] and B[j]; compare A[i] and B[j-1] to adjust l and r
- else: (found good partition), determine the largest left and smallest right, calculate

5.Longest Palindromic Substring
Given a string s, find the longest palindromic substring in s. You may assume that the maximum length of s is 1000.

- naive O(n^3) will TLE (checking all pairs substrings)
- can AC using naive solution : for each i or i&i+1, try their best O(n^2)
- O(n) manaxxx algo https://articles.leetcode.com/longest-palindromic-substring-part-ii/

6.Zigzag conversion:
The string "PAYPALISHIRING" is written in a zigzag pattern on a given number of rows like this: (you may want to display this pattern in a fixed font for better legibility)
P A H N
A P L S I I G
Y I R
And then read line by line: "PAHNAPLSIIGYIR"
Write the code that will take a string and make this conversion given a number of rows:
string convert(string s, int numRows);

- 87 question. just simulate. be careful when row == 1 (I was using a 2d list)
- g = [[0] * rowNums for i in range(x)], care the [0] part
- 100 votes solution : use string for each row, and finally join them. much more concise.

7.Reverse Integer:
Given a 32-bit signed integer, reverse digits of an integer.

- EZ
- testcase : 0, 120

8. String To Integer:
mplement atoi which converts a string to an integer.
The function first discards as many whitespace characters as necessary until the first non-whitespace character is found. Then, starting from this character, takes an optional initial plus or minus sign followed by as many numerical digits as possible, and interprets them as a numerical value.
The string can contain additional characters after those that form the integral number, which are ignored and have no effect on the behavior of this function.
If the first sequence of non-whitespace characters in str is not a valid integral number, or if no such sequence exists because either str is empty or it contains only whitespace characters, no conversion is performed.
If no valid conversion could be performed, a zero value is returned.
Note:
Only the space character ' ' is considered as whitespace character.
Assume we are dealing with an environment which could only store integers within the 32-bit signed integer range: [−231, 231 − 1]. If the numerical value is out of the range of representable values, INT_MAX (231 − 1) or INT_MIN (−231) is returned.

- str.isdigit()
- 87 question

9. Palindrome Number:
Determine whether an integer is a palindrome. An integer is a palindrome when it reads the same backward as forward.

- convert to string too trivial
- use a int variable ‘reverse’ to compare with x, only compare the half
- testcase: negative, x>0 and x % 10 == 0

10. Regular Expression Matching
Given an input string (s) and a pattern (p), implement regular expression matching with support for '.' and '*'.
'.' Matches any single character.
'*' Matches zero or more of the preceding element.

The matching should cover the entire input string (not partial).
Note:
s could be empty and contains only lowercase letters a-z.
p could be empty and contains only lowercase letters a-z, and characters like . or *.

- sol1 : recursive.
- if p empty -> s should be empty.
- compare the first ch in s and p, p[0] in [s[0], '.']
- if p contains '*', we may ignore or duplicate
- sol2 : dp.
- initialize : len(s)+1 * len(p)+1