Greedy

a. You can choose ***FOUR*** from problems 1-7.

b. For problems 1-7, you should do at least the following things:

(1) Describe your algorithm in natural language AND pseudo-code;

(2) Prove the correctness of your algorithm;

Question1

The given string S is represented by "x" and ".", "x" represents a pit, "." represents a normal road.
The cost of filling k consecutive pits is k+1, please obtain the maximum normal road (It can be non-continuous.) with budget M.

Input: S = "xxx…xxxx….xxxxx", M = 11

Output: 16

Question2

nums is an array consisting of non-negative integers, please concatenate them in certain permutation such that they can form a smallest new integer number.

Input: nums = [1, 4, 13, 2, 25]

Output: 1132254

Question3

There are n meetings, and the start time and end time of i-th meeting are s_i and e_i. Please design a greedy algorithm to find the minimum number of meeting rooms required to arrange all meetings.

Input: [[0, 20], [15, 20], [20, 23], [25, 30], [15, 25]]

Output: 3

Question4

N is a non-negative integer, remove k digits from it to obtain a new number. Find the biggest possible output number.

Input: N= 147128, k = 3

Output: 728

Question5

You are given an integer array nums. You are initially positioned at the array's first index, and each element in the array represents your maximum jump length at that position.

Return "yes" if you can reach the last index, or "no" otherwise.

Input: nums = [2,3,1,1,4]

Output: "yes"

Question6

There is a number k and you can swap two digits at most once.

Please design a greedy algorithm to find the maximum value you can get.

Input: k = 39748

Output: 93748

Question7

Given an array of integers nums, divide them to k subsets, find a division scheme to maximize the sum of the ranges (极差) (i.e., max - min) of all subsets.

Input: nums=[1, 2, 3, 4, 5], k = 3

Output: 6 (Optimal division scheme: {1, 5}, {2, 4}, {3},   sum of ranges: 4 + 2 + 0 = 6)