# 算法设计与应用基础: Homework No 2

## Deadline: May 9, 2018

Note: Please label your work with **homeworkID \_classID\_studentID\_name**(eg, 1\_1\_1433XXXX\_张三). In B. Programming, ‘#num’ is the number of problem in leetcode. You can do your homework in leetcode and send it to [algo2017@163.com](mailto:algo2017@163.com) when you submit all the solutions correctly.

#### House Robber II (#213)

After robbing those houses on that street, the thief has found himself a new place for his thievery so that he will not get too much attention. This time, all houses at this place are arranged in a circle. That means the first house is the neighbor of the last one. Meanwhile, the security system for these houses remain the same as for those in the previous street.

Given a list of non-negative integers representing the amount of money of each house, determine the maximum amount of money you can rob tonight without alerting the police.

#### Triangle (#120)

Given a triangle, find the minimum path sum from top to bottom. Each step you may move to adjacent numbers on the row below.

For example, given the following triangle

[

[2],

[3,4],

[6,5,7],

[4,1,8,3]

]

The minimum path sum from top to bottom is 11 (i.e., 2 + 3 + 5 + 1 = 11).

**Note**: Bonus point if you are able to do this using only O(n) extra space, where n is the total number of rows in the triangle.

#### Jump Game (#55)

Given an array of non-negative integers, you are initially positioned at the first index of the array.

Each element in the array represents your maximum jump length at that position.

Determine if you are able to reach the last index.

For example:

A = [2,3,1,1,4], return true.

A = [3,2,1,0,4], return false.

#### Gas Station (#134)

There are N gas stations along a circular route, where the amount of gas at station i is gas[i].

You have a car with an unlimited gas tank and it costs cost[i] of gas to travel from station i to its next station (i+1). You begin the journey with an empty tank at one of the gas stations.

Return the starting gas station's index if you can travel around the circuit once, otherwise return -1.

**Note**: The solution is guaranteed to be unique.

#### Sort List (#148)

Sort a linked list in O(n log n) time using constant space complexity.

**Example 1:**

**Input:** 4->2->1->3

**Output:** 1->2->3->4

**Example 2:**

**Input:** -1->5->3->4->0

**Output:** -1->0->3->4->5

#### Kth Largest Element in an Array (#215)

Find the **k**th largest element in an unsorted array. Note that it is the kth largest element in the sorted order, not the kth distinct element.

For example, given [3,2,1,5,6,4] and k = 2, return 5.

**Note:** You may assume k is always valid, 1 ≤ k ≤ array's length.

#### Merge K Sorted Lists (#23)

Merge k sorted linked lists and return it as one sorted list. Analyze and describe its complexity.

**Example:**

**Input:**

[

  1->4->5,

  1->3->4,

  2->6

]

**Output:** 1->1->2->3->4->4->5->6

#### Median of Two Sorted Arrays (#4)

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)).

**Example 1:**

nums1 = [1, 3]

nums2 = [2]

The median is 2.0

**Example 2:**

nums1 = [1, 2]

nums2 = [3, 4]

The median is (2 + 3)/2 = 2.5