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607 – B

AP assignment 4

1. (1763) Longest Nice Substring

1763. Longest Nice Substring

A string is **nice** if, for every letter of the alphabet that it contains, it appears **both** in uppercase and lowercase. For example, "Yazaaay" is nice because 'y' and 'Y' appear, and 'a' and 'A' appear. However, "abZ" is not because 'b' appears but 'B' does not.

Given a string *s*, return the longest **substring** of *s* that is **nice**. If there are multiple, return the substring of the **earliest** occurrence. If there are none, return an empty string.

Example 1:

Input: *s* = "Yazaaay"

Output: "Yazaaay"

Submissions

Status	Language	Runtime	Memory	Notes
Accepted	C++	6 ms	14.2 MB	
Accepted	C++	6 ms	5.7 MB	

Code

```
class Solution {
public:
    string longestNiceSubstring(string s) {
        if(s.length() < 2)
            return "";

        unordered_set<char> seen(s.begin(), s.end());
        for(int i = 0; i < s.length(); i++)
            if(!seen.count(tolower(s[i])) || !seen.count(uppercase(s[i])))
                continue;

        string left = longestNiceSubstring(s.substr(0, i));
        string right = longestNiceSubstring(s.substr(i+1, s.length() - i - 1));
        return (left.length() > right.length()) ? left : right;
    }
};
```

Test Result

Accepted Runtime: 6 ms

Case 1 Case 2 Case 3

Input: "Yazaaay"

Output:

2. (190) Reverse Bits

190. Reverse Bits

Reverse bits of a given 32 bits unsigned integer.

Note:

- Note that in some languages, such as Java, there is no unsigned integer type. In this case, both input and output will be given as a signed integer type. They should not affect your implementation, as the integer's internal binary representation is the same, whether it is signed or unsigned.
- In Java, the compiler represents the signed integers using two's complement notation. Therefore, in Example 2 above, the input represents the signed integer -43261596 and the output represents the signed integer -964176192.

Submissions

Status	Language	Runtime	Memory	Notes
Accepted	C++	0 ms	7.7 MB	

Code

```
class Solution {
public:
    uint32_t reverseBits(uint32_t n) {
        uint32_t result = 0;
        for (int i = 0; i < 32; i++) {
            result = (result << 1) | (n & 1);
            n >>= 1;
        }
        return result;
    }
};
```

Test Result

Accepted Runtime: 0 ms

Case 1 Case 2

Input: 43261596

Output: 964176192

3. (191) Number of 1 Bits

The screenshot displays a coding problem interface for "191. Number of 1 Bits". The problem description states: "Given a positive integer n , write a function that returns the number of 1 bits in its binary representation (also known as the **Hamming weight**)." An example is provided: "Input: $n = 11$ " and "Output: 3". The code editor shows a C++ solution using a while loop to count the number of 1 bits by checking the least significant bit and right-shifting the number. The solution is marked as "Accepted" with a runtime of 0 ms and memory usage of 8.1 MB. The test result section shows the input "11" and the output "3".

191. Number of 1 Bits

Given a positive integer n , write a function that returns the number of 1 bits in its binary representation (also known as the **Hamming weight**).

Example 1:

Input: $n = 11$

Output: 3

Solution:

```
class Solution {
public:
    int hammingWeight(int n) {
        int count = 0;
        while (n > 0) {
            count += n & 1;
            n = n >> 1;
        }
        return count;
    }
};
```

Test Result: Accepted

Case 1: Case 2: Case 3:

Input: 11

Output: 3

4. (53) Maximum Subarray

The screenshot displays a coding problem interface for "53. Maximum Subarray". The problem description states: "Given an integer array $nums$, find the **subarray** with the largest sum, and return its sum." An example is provided: "Input: $nums = [-2, 1, -3, 4, -1, 2, 1, -5, 4]$ " and "Output: 6". The explanation states: "The subarray $[-1, 2, 1]$ has the largest sum 6." The code editor shows a C++ solution using Kadane's algorithm to find the maximum subarray sum. The solution is marked as "Accepted" with a runtime of 0 ms and memory usage of 71.3 MB. The test result section shows the input array "[-2, 1, -3, 4, -1, 2, 1, -5, 4]" and the output "6".

53. Maximum Subarray

Given an integer array $nums$, find the **subarray** with the largest sum, and return its sum.

Example 1:

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

Output: 6

Explanation: The subarray $[-1, 2, 1]$ has the largest sum 6.

Solution:

```
class Solution {
public:
    int maxSubarray(vector<int>& nums) {
        int maxSum = INT_MIN, curSum = 0;
        for(int val : nums){
            curSum += val;
            maxSum = max(curSum, maxSum);
            if(curSum < 0) curSum = 0;
        }
        return maxSum;
    }
};
```

Test Result: Accepted

Case 1: Case 2: Case 3:

Input: [-2, 1, -3, 4, -1, 2, 1, -5, 4]

Output: 6

5. (240) Search a 2D matrix II

Description

Solved

240. Search a 2D Matrix II

Medium

Write an efficient algorithm that searches for a value `target` in an $m \times n$ integer matrix `matrix`. The matrix has the following properties:

- Integers in each row are sorted in ascending from left to right.
- Integers in each column are sorted in ascending from top to bottom.

Example 1:

```
matrix = [
  [1, 4, 7, 11, 15],
  [2, 5, 8, 12, 19],
  [3, 6, 9, 16, 22],
  [10, 13, 14, 17, 24],
  [18, 21, 23, 26, 30]]
```

Submissions

Status	Language	Runtime	Memory	Notes
Accepted	C++	44 ms	10.5 MB	

Code

```

class Solution {
public:
    bool searchMatrix(vector<vector<int>>& matrix, int target) {
        int row = 0;
        int col = matrix[0].size() - 1;
        while (row < matrix.size() && col >= 0) {
            if (matrix[row][col] == target) {
                return true;
            } else if (matrix[row][col] > target) {
                col--;
            } else {
                row++;
            }
        }
        return false;
    }
};

```

Testcase

Test Result

Accepted

Runtime: 0 ms

Case 1

Case 2

Input

```
matrix =
[[1, 4, 7, 11, 15], [2, 5, 8, 12, 19], [3, 6, 9, 16, 22], [10, 13, 14, 17, 24], [18, 21, 23, 26, 30]]
```

target =

```
7
```

6. (372) Super Pow

Description

Solved

372. Super Pow

Medium

Your task is to calculate $a^b \bmod 1337$ where a is a positive integer and b is an extremely large positive integer given in the form of an array.

Example 1:

Inputs: $a = 2$, $b = [3]$

Submissions

Status	Language	Runtime	Memory	Notes
Accepted	C++	1 ms	15.4 MB	

Code

```

class Solution {
public:
    int superPow(int a, vector<int>& b) {
        int result = 1;
        for (int i = 0; i < b.size(); i++) {
            result = (result * pow(a, b[i])) % 1337;
        }
        return result;
    }
};

```

Testcase

Test Result

Accepted

Runtime: 0 ms

Case 1

Case 2

Case 3

Input

```
a =
2
b =
[3]
```

7. (932) Beautiful Array

932. Beautiful Array

An array $nums$ of length n is **beautiful** if:

- $nums$ is a permutation of the integers in the range $[1, n]$.
- For every $0 \leq i < j < n$, there is no index k with $i < k < j$ where $2 \times nums[i] == nums[k] == 2 \times nums[j]$.

Given the integer n , return any **beautiful** array $nums$ of length n . There will be at least one valid answer for the given n .

Code

```
class Solution {
public:
    vector<int> beautifulArray(int n) {
        vector<int> ans;
        unordered_map<int, int> mp;
        for (int i = 1; i <= n; i++) {
            if (i % 2 == 1) {
                int left = (i-1)/2, right = (i+1)/2;
                if (left < right) {
                    ans.push_back(left);
                    ans.push_back(right);
                }
            } else {
                int left = i/2, right = i/2+1;
                if (left < right) {
                    ans.push_back(left);
                    ans.push_back(right);
                }
            }
        }
        return ans;
    }
};
```

Submissions

Status	Language	Runtime	Memory	Note
Accepted	C++	0 ms	6.4 MB	

Test Result

Accepted Runtime: 0 ms

Case 1 Case 2

Input: 1

Output: [1]

8. (218) The Skyline Problem

218. The Skyline Problem

A city's **skyline** is the outer contour of the silhouette formed by all the buildings in that city when viewed from a distance. Given the locations and heights of all the buildings, return the **skyline** formed by these buildings collectively.

The geometric information of each building is given in the array $buildings$, where $buildings[i] = [left_i, right_i, height_i]$:

- $left_i$ is the x-coordinate of the left edge of the i th building.
- $right_i$ is the x-coordinate of the right edge of the i th building.
- $height_i$ is the height of the i th building.

Code

```
class Solution {
public:
    vector<vector<int>> getSkyline(vector<vector<int>>& buildings) {
        vector<vector<int>> ans;
        sort(buildings.begin(), buildings.end(), [](vector<int>& a, vector<int>& b) {
            return a[0] < b[0];
        });
        for (int i = 0; i < buildings.size(); i++) {
            int left = buildings[i][0], right = buildings[i][1], height = buildings[i][2];
            if (i > 0) {
                int prevRight = ans.back()[0];
                if (left < prevRight) {
                    ans.back()[1] = max(height, ans.back()[1]);
                } else if (left > prevRight) {
                    ans.push_back({left, height});
                } else if (left == prevRight) {
                    ans.back()[1] = max(height, ans.back()[1]);
                }
            }
        }
        return ans;
    }
};
```

Submissions

Status	Language	Runtime	Memory	Note
Accepted	C++	0 ms	27.3 MB	

Test Result

Accepted Runtime: 0 ms

Case 1 Case 2

Input: buildings = [[12, 9, 15], [10, 7, 13], [15, 12, 12], [18, 20, 10], [18, 2, 14], [4, 12, 22], [12, 16, 20], [1, 16, 20]]

Output: [[1, 22], [4, 20], [10, 15], [12, 20], [15, 12], [18, 10], [18, 14], [20, 10], [22, 0]]

9. (493) Reverse Pairs

493. Reverse Pairs

Given an integer array $nums$, return the number of **reverse pairs** in the array.

A **reverse pair** is a pair (i, j) where:

- $0 \leq i < j < nums.length$ and
- $nums[i] > 2 \times nums[j]$.

Code

```
class Solution {
public:
    int reversePairs(vector<int>& nums) {
        int n = nums.size();
        int left = 0, right = n-1;
        int count = 0;
        for (int i = 0; i < n; i++) {
            int left = 0, right = n-1;
            while (left < right) {
                int mid = (left + right) / 2;
                count += mergeSort(nums, left, mid, right);
            }
        }
        return count;
    }
};
```

Submissions

Status	Language	Runtime	Memory	Note
Accepted	C++	162 ms	90.2 MB	

Test Result

Accepted Runtime: 162 ms

Case 1 Case 2

Input: [1, 3, 2, 1, 5]

Output: 4

10.(2407) Longest Increasing Subsequence II

DescriptionAcceptedCommentsSolutions

2407. Longest Increasing Subsequence II

Solved

ReadTopicsCommentsHelp

You are given an integer array `nums` and an integer `k`.

Find the longest subsequence of `nums` that meets the following requirements:

- The subsequence is **strictly increasing** and
- The difference between adjacent elements in the subsequence is **at most** `k`.

Return the length of the **longest subsequence** that meets the requirements.

A **subsequence** is an array that can be derived from another array by deleting some or no elements without

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Submissions

Status	Language	Runtime	Memory	Notes
Accepted a few minutes ago	C++	102 ms	14.16 MB	
Time Limit Exceeded a minute ago	C++	14/1s	14/1s	

Code

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