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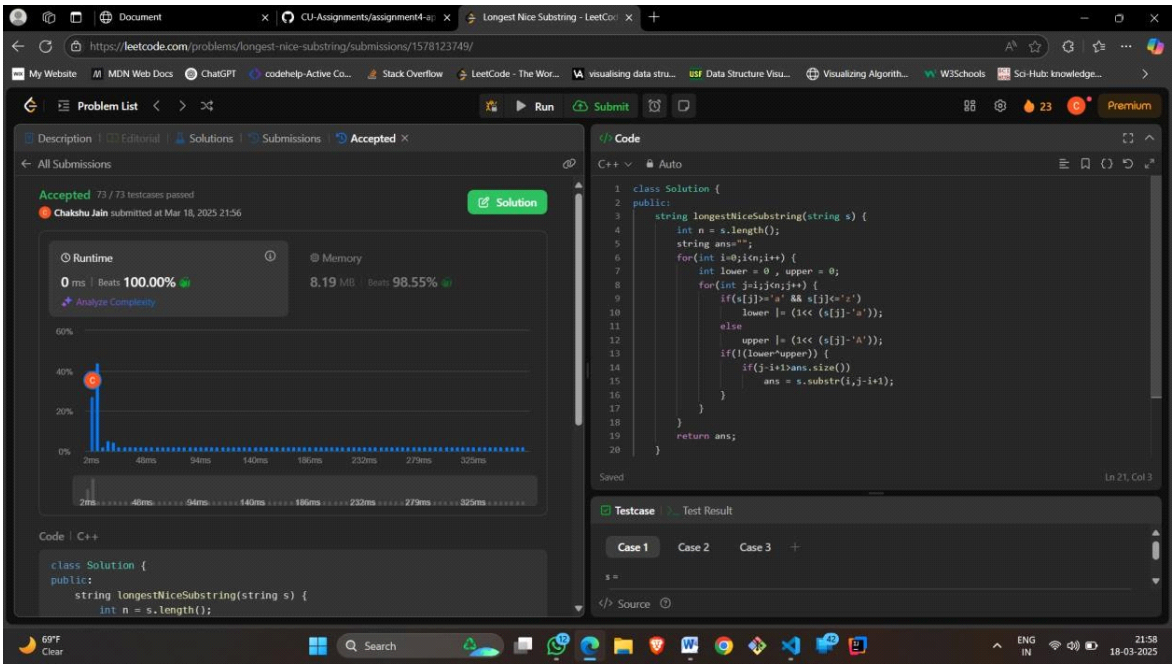
Section-608/B

AP ASSIGNMENT

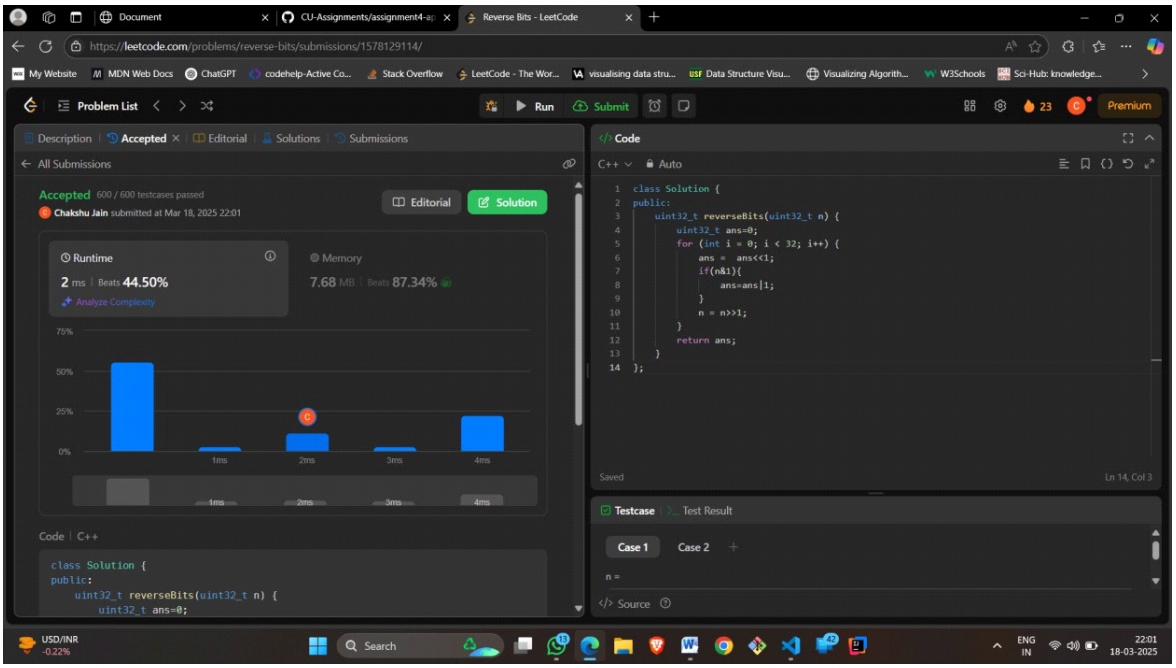
1. Longest Nice substring :

```
class Solution {

public:

string longestNiceSubstring(string s) { int n = s.length();

string ans=""; for(int i=0;i<n;i++) {

int lower = 0 , upper = 0; for(int j=i;j<n;j++) {

if(s[j]>='a' && s[j]<='z')

lower |= (1<< (s[j]-'a')); else

upper |= (1<< (s[j]-'A')); if(!(lower^upper)) {

if(j-i+1>ans.size())

ans = s.substr(i,j-i+1);

}

}

}

return ans;

}

};
```



2. Reverse bits :

```
class Solution { public:

uint32_t reverseBits(uint32_t n) { uint32_t ans=0;

for (int i = 0; i < 32; i++) { ans =  ans<<1;   if(n&1){

ans=ans|1;

}

n = n>>1;

}

return ans;

}

};
```



3. Number of 1-bits:

class Solution { public:

int hammingWeight(uint32_t n) { int res = 0;

for (int i = 0; i < 32; i++) { if ((n >> i) & 1) {

res += 1;

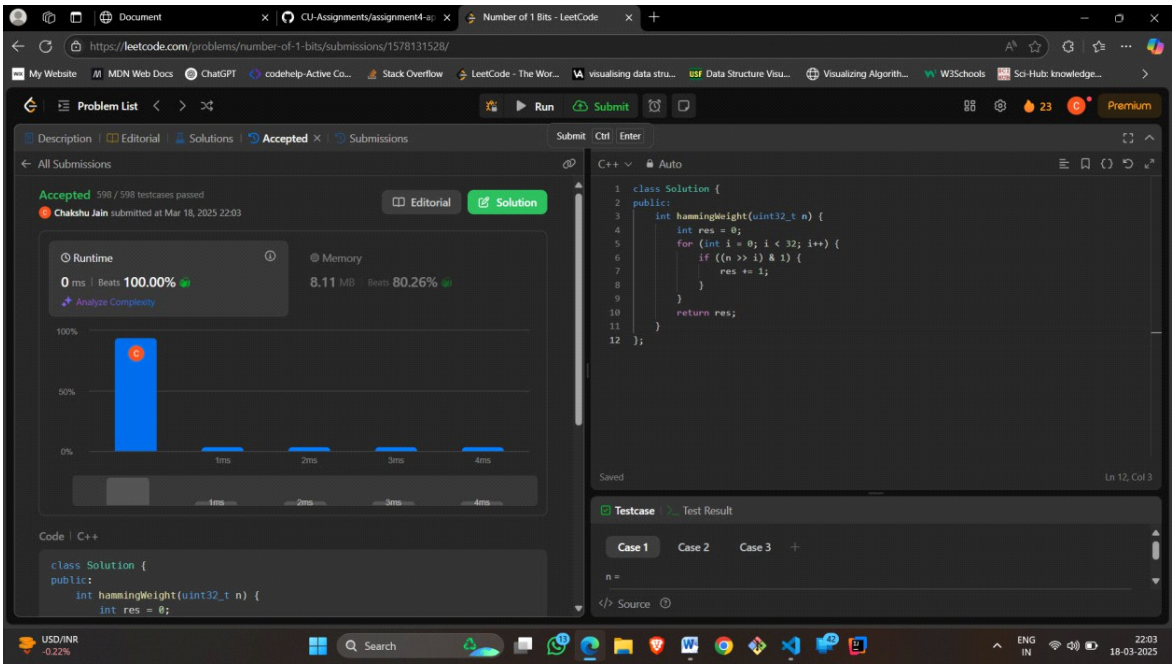
}

}

return res;

}

};



4. maximum of subbarray:

class Solution { public:

int maxSubArray(vector<int>& nums) { int res = nums[0];

int total = 0;

for (int n : nums) { if (total < 0) { total = 0;

}

total += n;

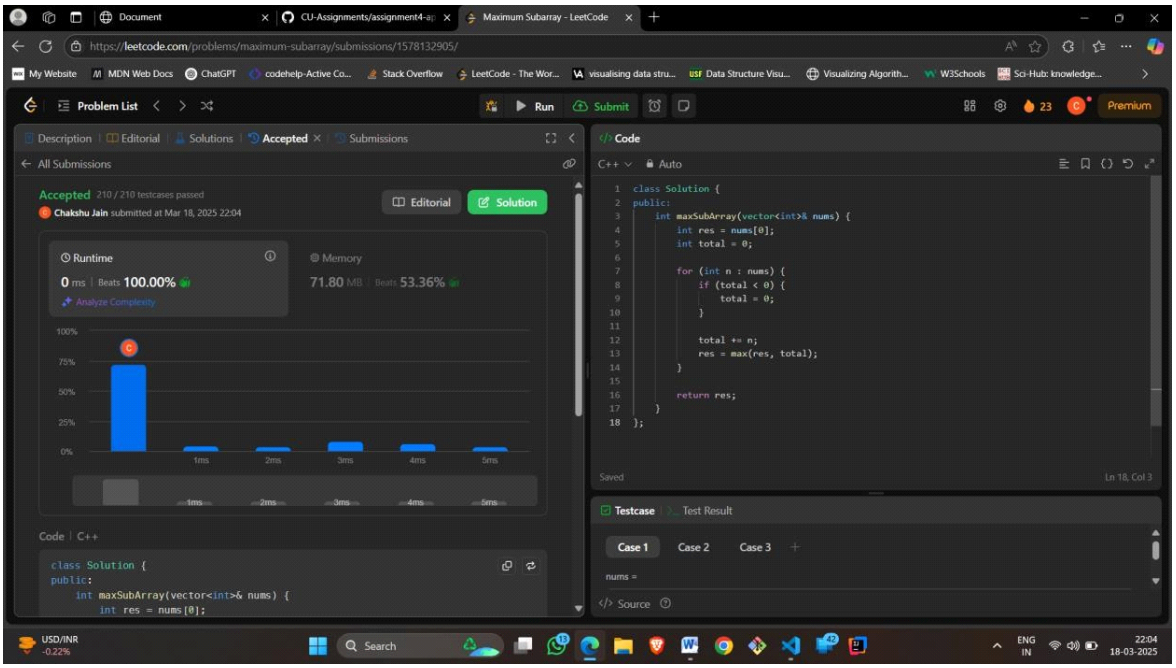
res = max(res, total);

}

return res;

}

};



5. Search a 2D matrix :

class Solution { public:

bool searchMatrix(vector<vector<int>>& matrix, int target) { for (int i = 0; i < matrix.size(); i++) {

for (int j = 0; j < matrix[i].size(); j++) { if (matrix[i][j] == target) {

return true;

}

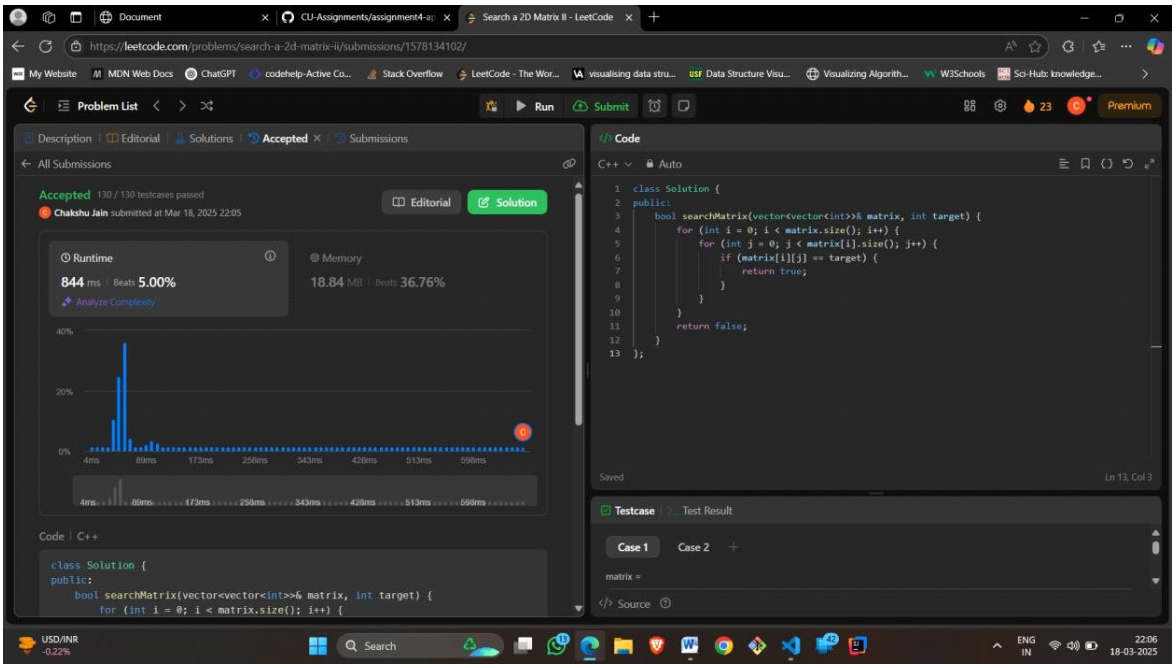
}

}

return false;

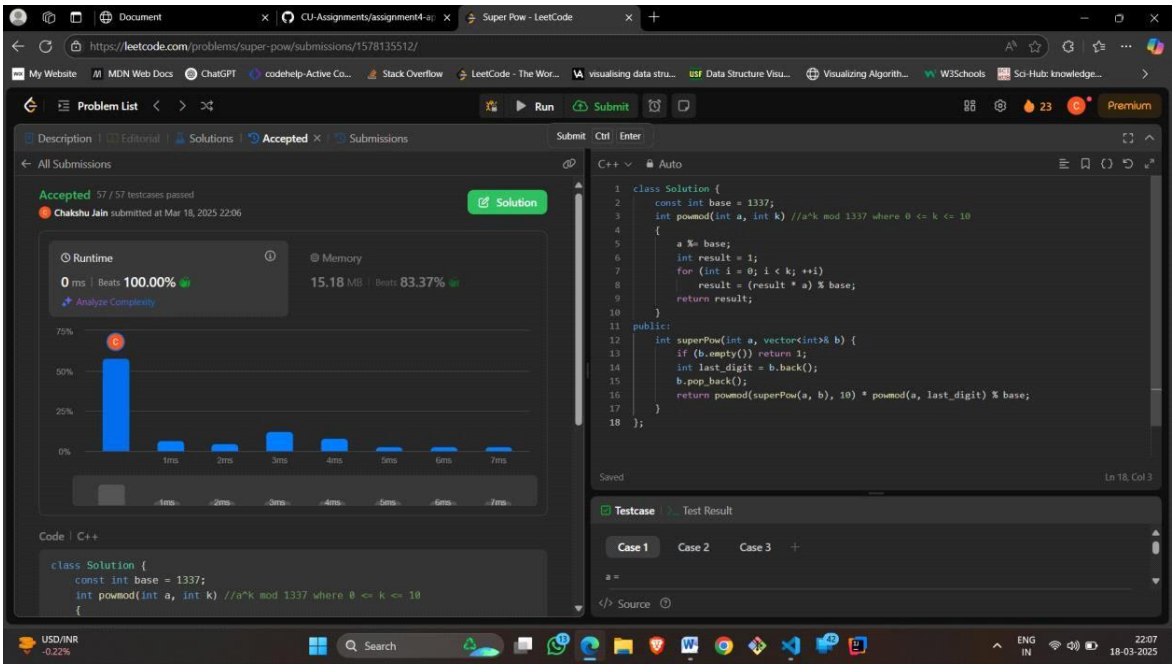
}

};



6. super pow:

```
class Solution {
const int base = 1337;
int powmod(int a, int k) //a^k mod 1337 where 0 <= k <= 10
{
a %= base; int result = 1;
for (int i = 0; i < k; ++i)
result = (result * a) % base; return result;
}
public:
int superPow(int a, vector<int>& b) { if (b.empty()) return 1;
int last_digit = b.back(); b.pop_back();
return powmod(superPow(a, b), 10) * powmod(a, last_digit) % base;

}
};
```



7. beautiful array :

```
class Solution { public:

int partition(vector<int> &v, int start, int end, int mask)

{

int j = start;

for(int i = start; i <= end; i++)

{

if((v[i] & mask) != 0)

{

swap(v[i], v[j]); j++;

}

}

return j;


}
```

void sort(vector<int> & v, int start, int end, int mask)

{

if(start >= end) return;

int mid = partition(v, start, end, mask); sort(v, start, mid - 1, mask << 1); sort(v, mid, end, mask << 1);

}

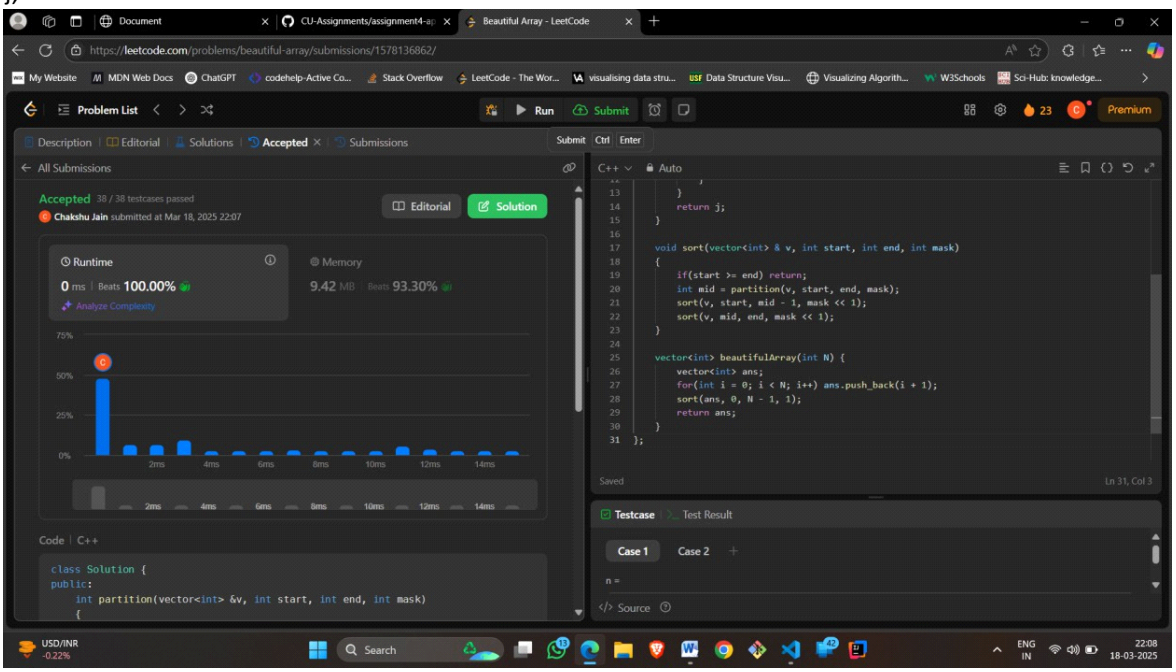
vector<int> beautifulArray(int N) { vector<int> ans;

for(int i = 0; i < N; i++) ans.push_back(i + 1); sort(ans, 0, N - 1, 1);

return ans;

}

};



8. the skyline problem:

class Solution { public:

vector<vector<int>> getSkyline(vector<vector<int>>& buildings) { vector<vector<int>> ans;

multiset<int> pq{0};

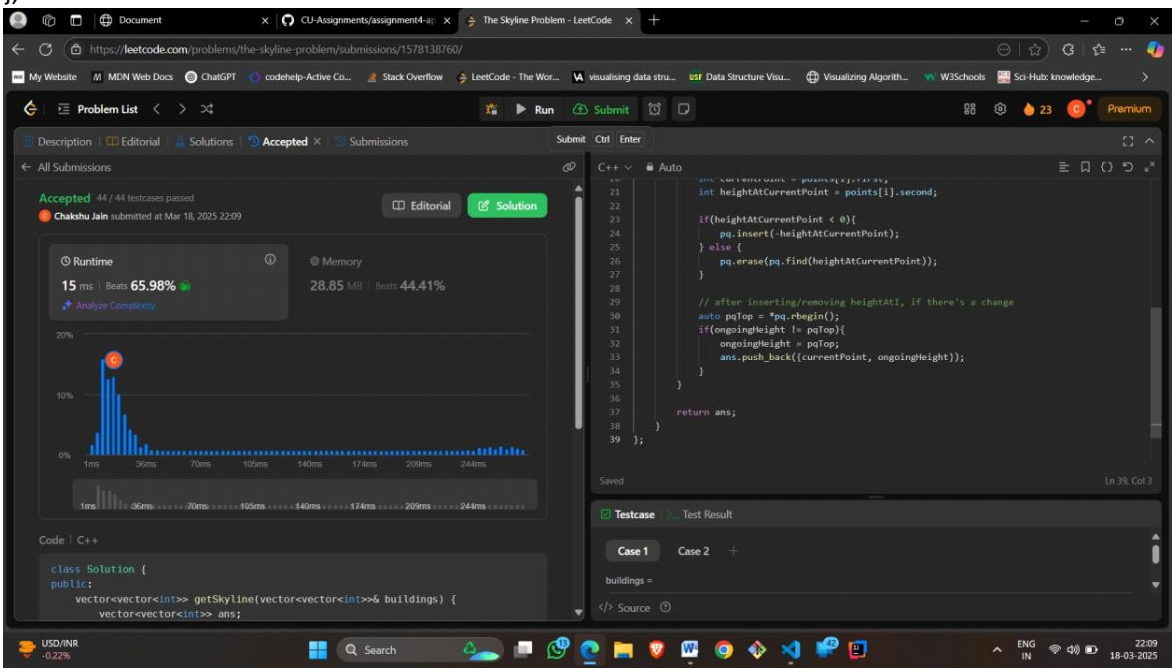
```
vector<pair<int, int>> points;

for(auto b: buildings){ points.push_back({b[0], -b[2]});
points.push_back({b[1], b[2]});
}

sort(points.begin(), points.end());

int ongoingHeight = 0;

// points.first = x coordinate, points.second = height for(int i = 0; i < points.size(); i++){
int currentPoint = points[i].first;
int heightAtCurrentPoint = points[i].second;

if(heightAtCurrentPoint < 0){ pq.insert(-heightAtCurrentPoint);
} else {
pq.erase(pq.find(heightAtCurrentPoint));

}

// after inserting/removing heightAtI, if there's a change auto pqTop = *pq.rbegin();
if(ongoingHeight != pqTop){ ongoingHeight = pqTop;
ans.push_back({currentPoint, ongoingHeight});
}
```

}

return ans;

}

};



9. Reverse pairs :

class Solution

{

int get_pairs(vector<int>& vct , long long int x)

{

//sort(vct.begin() , vct.end()); int size = vct.size();

int low = 0;

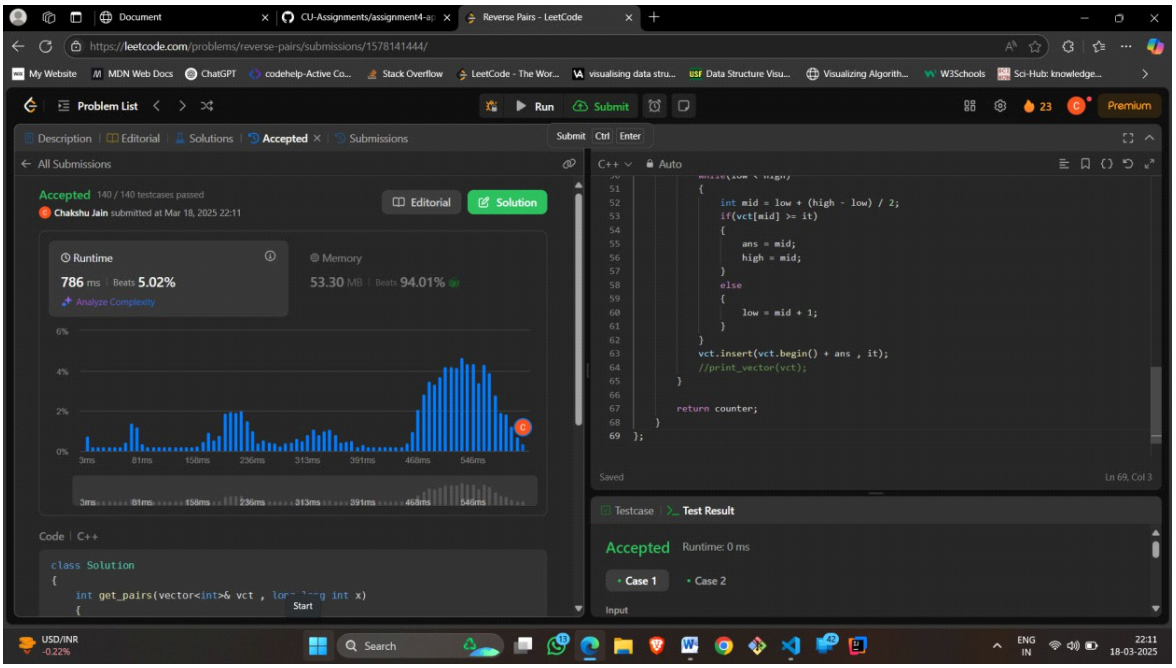
int high = size - 1; int ans = -1; while(low <= high)

{

int mid = high - (high - low) / 2; int ele = vct[mid];

```
if(ele > x)
{
ans = mid; high = mid - 1;
}
else
{
low = mid  + 1;
}
}
if(ans == -1) return 0; return vct.size() - ans;
}

// void print_vector(vector<int>& nums)
// {
//         cout<<endl;

//         for(auto it : nums)
//         {
//         cout<<" "<<it;
//         }
//         cout<<endl;
// }

public:
int reversePairs(vector<int>& nums)
{
```

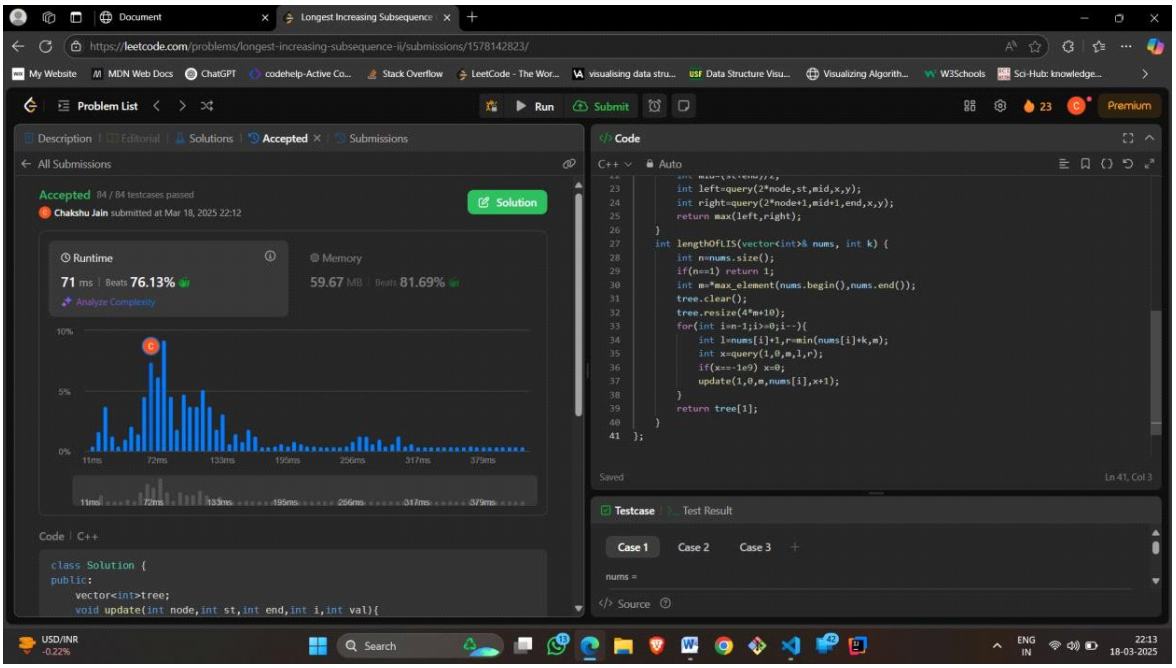
```
vector<int> vct; int counter = 0; for(auto it : nums)

{

long long int x = 1LL * 2 * it; counter += get_pairs(vct , x); int low = 0;

int high = vct.size(); int ans = vct.size(); while(low < high)

{

int mid = low + (high - low) / 2; if(vct[mid] >= it)

{

ans = mid; high = mid;

}

else

{

low = mid + 1;

}

}

vct.insert(vct.begin() + ans , it);

//print_vector(vct);

}


return counter;

}

};
```



10. longest increasing substring :

```
class Solution {

public:

vector<int>tree;


void update(int node,int st,int end,int i,int val){ if(st==end){

tree[node]=max(tree[node],val); return;

}

int mid=(st+end)/2; if(i<=mid){

update(node*2,st,mid,i,val);

}else{

update(node*2+1,mid+1,end,i,val);

}

tree[node]=max(tree[node*2],tree[node*2+1]);

}
```

```
int query(int node,int st,int end,int x,int y){ if(x>end || y<st) return -1e9;
if(st>=x && end<=y){ return tree[node];
}
int mid=(st+end)/2;
int left=query(2*node,st,mid,x,y);
int right=query(2*node+1,mid+1,end,x,y); return max(left,right);
}
int lengthOfLIS(vector<int>& nums, int k) { int n=nums.size();
if(n==1) return 1;
int m=*max_element(nums.begin(),nums.end());

tree.clear(); tree.resize(4*m+10); for(int i=n-1;i>=0;i--){
int l=nums[i]+1,r=min(nums[i]+k,m); int x=query(1,0,m,l,r);
if(x==-1e9) x=0; update(1,0,m,nums[i],x+1);
}
return tree[1];
}
};
```


Document
Longest Increasing Subsequence
https://leetcode.com/problems/longest-increasing-subsequence-ii/submissions/1578142823/
Problem List
Run
Submit
Premium
Description
Editorial
Solutions
Accepted
Submissions
All Submissions
Accepted 84 / 84 testcases passed
Chakshu Jain submitted at Mar 18, 2025 22:12
Solution
Runtime
71 ms | Beats 76.13%
Analyze Complexity
Memory
59.67 MB | Beats 81.69%
Code | C++
class Solution {
public:
vector<int>tree;
void update(int node,int st,int end,int i,int val){
int left=query(2*node,st,mid,x,y);
int right=query(2*node+1,mid+1,end,x,y);
return max(left,right);
}
int lengthOfLIS(vector<int>& nums, int k) {
int n=nums.size();
if(n==1) return 1;
int m=*max_element(nums.begin(),nums.end());
tree.clear();
tree.resize(4*m+10);
for(int i=n-1;i>=0;i--){
int l=nums[i]+1,r=min(nums[i]+k,m);
int x=query(1,0,m,l,r);
if(x==-1e9) x=0;
update(1,0,m,nums[i],x+1);
}
return tree[1];
}
};
Saved
Ln 41, Col 3
Testcase
Test Result
Case 1
Case 2
Case 3
nums =
Source
USD/INR
-0.22%
Search
ENG
IN
22:13
18-03-2025