[**https://www.youtube.com/watch?v=axQAxv2Gqoc&list=PLoa\_roVVsxA1CJu4DsOljb9d7FJkMCynM&index=14**](https://www.youtube.com/watch?v=axQAxv2Gqoc&list=PLoa_roVVsxA1CJu4DsOljb9d7FJkMCynM&index=14)

**[L1]Class - 14 ( Practice problem of priority queue, My Template, Future practice strategy )[Bangla]**

Class Video link : [https://youtu.be/axQAxv2Gqoc](https://l.facebook.com/l.php?u=https%3A%2F%2Fyoutu.be%2FaxQAxv2Gqoc%3Ffbclid%3DIwAR3_AVk3GIc7_ThVoeZVeIHHlPuFIrb_HTpaFD_WHsJbrQy4rKmhmr9BfFw&h=AT2PDWoiafyVdaA4uzNnT1Jpj77nwSWhWaorjNALND5_M299zHKMT4Q7_k2hgMzcRLgewTI63NZC1TSp3BjqTkMMu0fruK5-NBQkqxJwtSd_uw-Slso1juFJuZ8R&__tn__=-UK-R&c%5B0%5D=AT2Hfg0WsjL5PZOZSMSbwVLM8jibi5sEf8hLOydcfLMpagYEk48soqWyFYopGyHlUGYPf6HYGOUz3NK3x6tzpSw2fFNG2bJUFi30Kzwk-n7QPeRkQa0PHYkrQVpvDxkDA6y1NWGD_r_HFyCqOq85Il2P_QnWxQUb6s5Uzmg8bTCsV-gg9KbIM122fw)

Discussed topics :

1) Practice problem of priority queue, My Template, Future practice strategy

2) Constructing the Array (Codeforces)

Link : [https://codeforces.com/problemset/problem/1353/D](https://l.facebook.com/l.php?u=https%3A%2F%2Fcodeforces.com%2Fproblemset%2Fproblem%2F1353%2FD%3Ffbclid%3DIwAR3_AVk3GIc7_ThVoeZVeIHHlPuFIrb_HTpaFD_WHsJbrQy4rKmhmr9BfFw&h=AT10cJ7hoG8llPRblQer6rzCWn8-pI2mOFv-VSixS-QU9YAYOsGq1y_hKlxFBRlQmhFdwHu7pib2QXdwPerUgVqYMwlK6OBl82oVQFX2igubJStx3TBhczFlG4wJ&__tn__=-UK-R&c%5B0%5D=AT2Hfg0WsjL5PZOZSMSbwVLM8jibi5sEf8hLOydcfLMpagYEk48soqWyFYopGyHlUGYPf6HYGOUz3NK3x6tzpSw2fFNG2bJUFi30Kzwk-n7QPeRkQa0PHYkrQVpvDxkDA6y1NWGD_r_HFyCqOq85Il2P_QnWxQUb6s5Uzmg8bTCsV-gg9KbIM122fw)

My Code : [https://paste.ubuntu.com/p/N3rsVVg8zW/](https://l.facebook.com/l.php?u=https%3A%2F%2Fpaste.ubuntu.com%2Fp%2FN3rsVVg8zW%2F%3Ffbclid%3DIwAR3_AVk3GIc7_ThVoeZVeIHHlPuFIrb_HTpaFD_WHsJbrQy4rKmhmr9BfFw&h=AT1n9nKo58mewfOyM_5-6cSJxGJtmtW0M_uvvd8GPR9NoY2agy1J0AVL2aC_Bf7Uf_sYLfjiAOhYuZ3nLCNK2WfpYsG5YZLs-b-sZAWOSKVlqKKBVGU9A4Fz_J3L&__tn__=-UK-R&c%5B0%5D=AT2Hfg0WsjL5PZOZSMSbwVLM8jibi5sEf8hLOydcfLMpagYEk48soqWyFYopGyHlUGYPf6HYGOUz3NK3x6tzpSw2fFNG2bJUFi30Kzwk-n7QPeRkQa0PHYkrQVpvDxkDA6y1NWGD_r_HFyCqOq85Il2P_QnWxQUb6s5Uzmg8bTCsV-gg9KbIM122fw)

Important Links :

1) Template : [https://pastebin.com/nY7wdbBn](https://pastebin.com/nY7wdbBn?fbclid=IwAR3_AVk3GIc7_ThVoeZVeIHHlPuFIrb_HTpaFD_WHsJbrQy4rKmhmr9BfFw)

2) Atcoder : [https://kenkoooo.com/atcoder/#/table/](https://kenkoooo.com/atcoder/?fbclid=IwAR3_AVk3GIc7_ThVoeZVeIHHlPuFIrb_HTpaFD_WHsJbrQy4rKmhmr9BfFw#/table/)

Class Tasks :

All the problems discussed in class are class tasks.

**problem link=**[**https://codeforces.com/problemset/problem/1353/D**](https://codeforces.com/problemset/problem/1353/D)

**In [ ]:**

***#include<bits/stdc++.h>***

**using namespace std;**

***#define hamid() ios\_base::sync\_with\_stdio(0);cin.tie(0);cout.tie(0);***

***#define endl '\n';***

***#define ll long long***

**const int mx=2e5+123;**

**int a[mx],b[mx],p[mx];**

**int main()**

**{**

**hamid();**

**int t;**

**cin >> t;**

**while ( t-- ) {**

**priority\_queue< pair<int, int> > q;**

**int n;**

**cin >> n;**

**q.push ( { n, -1 } );**

**int cnt = 1;**

**while ( !q.empty() ) {**

**int l = q.top().second \* -1;**

**int len = q.top().first;**

**q.pop();**

**int r = l + len - 1;**

**int mid;**

**if ( len % 2 ) {**

**mid = ( l + r ) / 2;**

**}**

**else {**

**mid = ( l + r - 1 ) / 2;**

**}**

**a[mid] = cnt;**

**cnt++;**

**int l1, r1, l2, r2;**

**l1 = l;**

**r1 = mid-1;**

**l2 = mid+1;**

**r2 = r;**

**if ( l1 <= r1 ) {**

**q.push ( { r1-l1+1, -l1 } );**

**}**

**if ( l2 <= r2 ) {**

**q.push ( { r2-l2+1, -l2 } );**

**}**

**}**

**for ( int i = 1; i <= n; i++ ) cout << a[i] << " ";**

**cout << endl;**

**}**

**return 0;**

**}**

**In [ ]:**

**"C:\Users\Md.Hamid Hosen\CLionProjects\untitled2\cmake-build-debug\untitled2.exe"**

**6**

**1**

**2**

**3**

**4**

**5**

**6**

**1**

**1 2**

**2 1 3**

**3 1 2 4**

**2 4 1 3 5**

**3 4 1 5 2 6**

**Process finished with exit code 0**

**Template**

**In [ ]:**

*/\*In the name of Almighty Allah\*/*#include**<bits/stdc++.h>  
using namespace** std;  
  
**typedef long long** ll;  
**typedef** vector<**int**> vi;  
**typedef** vector<string> vs;  
**typedef** vector<ll> vl;  
**typedef** vector<vi> vvi;  
**typedef** vector<vl> vvl;  
**typedef** pair<**int**,**int**> pii;  
**typedef** pair<**double**, **double**> pdd;  
**typedef** pair<ll, ll> pll;  
**typedef** vector<pii> vii;  
**typedef** vector<pll> vll;  
**typedef** set<**int**> si;  
**typedef double** dl;  
**typedef** string st;  
  
#define **PB** push\_back  
#define **F** first  
#define **S** second  
#define **MP** make\_pair  
#define **endl '\n'**#define **all**(a) (a).begin(),(a).end()  
#define **sz**(x) (**int**)x.size()  
#define **mid**(l,r) ((r+l)/2)  
#define **left**(node) (node\*2)  
#define **right**(node) (node\*2+1)  
#define **mx\_int\_prime** 999999937  
#define **CY** cout<<**"YES"**<<**endl**#define **CN** cout<<**"NO"**<<**endl**#define **r return** 0  
  
**const double** PI = acos(-1);  
**const double** eps = 1e-9;*//10^-9***const int** inf = 2000000000;  
**const** ll infLL = 9000000000000000000;  
#define **MOD** 1000000007  
  
#define **mem**(a,b) memset(a, b, **sizeof**(a) )  
#define **gcd**(a,b) \_\_gcd(a,b)  
#define **sqr**(a) ((a) \* (a))  
#define **sw**(a,b) swap(a,b)  
#define **sor**(a) sort(a.begin(),a.end())  
#define **uni**(s) unique(s.begin(),s.end())-s.begin()  
#define **mxdex**(a) max\_element(v.begin(),v.end())-v.begin()  
#define **mindex**(a) min\_element(v.begin(),v.end())-v.begin()  
#define **mxele**(a) max\_element(v.begin(),v.end())  
#define **minele**(a) min\_element(v.begin(),v.end())  
  
#define **optimize**() ios\_base::sync\_with\_stdio(0);cin.tie(0);cout.tie(0);  
#define **fraction**(a) cout.unsetf(ios::floatfield); cout.precision(a); cout.setf(ios::fixed,ios::floatfield);  
#define **file**() freopen(**"input.txt"**,**"r"**,**stdin**);freopen(**"output.txt"**,**"w"**,**stdout**);  
  
**typedef** vector<**int**>::iterator vit;  
**typedef** set<**int**>::iterator sit;  
  
**int** dx[] = {0, 0, +1, -1};  
**int** dy[] = {+1, -1, 0, 0};  
*//int dx[] = {+1, 0, -1, 0, +1, +1, -1, -1};  
//int dy[] = {0, +1, 0, -1, +1, -1, +1, -1};  
  
//Debugger***template** < **typename F**, **typename S** >  
ostream& **operator** << ( ostream& os, **const** pair< **F**, **S** > & p ) {  
 **return** os << **"("** << p.first << **", "** << p.second << **")"**;  
}  
  
**template** < **typename** T >  
ostream &**operator** << ( ostream & os, **const** vector< T > &v ) {  
 os << **"{"**;  
 **for**(**auto** it = v.begin(); it != v.end(); ++it) {  
 **if**( it != v.begin() ) os << **", "**;  
 os << \*it;  
 }  
 **return** os << **"}"**;  
}  
  
**template** < **typename** T >  
ostream &**operator** << ( ostream & os, **const** set< T > &v ) {  
 os << **"["**;  
 **for**(**auto** it = v.begin(); it != v.end(); ++it) {  
 **if**( it != v.begin() ) os << **", "**;  
 os << \*it;  
 }  
 **return** os << **"]"**;  
}  
  
**template** < **typename** T >  
ostream &**operator** << ( ostream & os, **const** multiset< T > &v ) {  
 os << **"["**;  
 **for**(**auto** it = v.begin(); it != v.end(); ++it) {  
 **if**( it != v.begin() ) os << **", "**;  
 os << \*it;  
 }  
 **return** os << **"]"**;  
}  
  
**template** < **typename** F, **typename** S >  
ostream &**operator** << ( ostream & os, **const** map< F, S > &v ) {  
 os << **"["**;  
 **for**(**auto** it = v.begin(); it != v.end(); ++it) {  
 **if**( it != v.begin() ) os << **", "**;  
 os << it -> first << **" = "** << it -> second ;  
 }  
 **return** os << **"]"**;  
}  
  
#define **dbg**(args...) **do** {cerr << #args << **" : "**; faltu(args); } **while**(0)  
  
**void** faltu () {  
 cerr << **endl**;  
}  
  
**template** <**typename** T>  
**void** faltu( T a[], **int** n ) {  
 **for**(**int** i = 0; i < n; ++i) cerr << a[i] << **' '**;  
 cerr << **endl**;  
}  
  
**template** <**typename** T, **typename** ... hello>  
**void** faltu( T arg, **const** hello &... rest) {  
 cerr << arg << **' '**;  
 faltu(rest...);  
}  
  
**int** main()  
{  
 **optimize**();  
  
  
 **r**;  
}

**In [ ]:**

**//In the name of ALLAH**

***#include<bits/stdc++.h>***

**using namespace std;**

**typedef long long ll;**

**typedef vector<int> vi;**

**typedef vector<ll> vl;**

**typedef vector<vi> vvi;**

**typedef vector<vl> vvl;**

**typedef pair<int,int> pii;**

**typedef pair<double, double> pdd;**

**typedef pair<ll, ll> pll;**

**typedef vector<pii> vii;**

**typedef vector<pll> vll;**

**typedef double dl;**

***#define PB push\_back***

***#define F first***

***#define S second***

***#define MP make\_pair***

***#define endl '\n'***

***#define all(a) (a).begin(),(a).end()***

***#define sz(x) (int)x.size()***

***#define mid(l,r) ((r+l)/2)***

***#define left(node) (node\*2)***

***#define right(node) (node\*2+1)***

***#define mx\_int\_prime 999999937***

**const double PI = acos(-1);**

**const double eps = 1e-9;//10^-9**

**const int inf = 2000000000;**

**const ll infLL = 9000000000000000000;**

***#define MOD 1000000007***

***#define mem(a,b) memset(a, b, sizeof(a) )***

***#define gcd(a,b) \_\_gcd(a,b)***

***#define sqr(a) ((a) \* (a))***

***#define optimize() ios\_base::sync\_with\_stdio(0);cin.tie(0);cout.tie(0);***

***#define fraction(a) cout.unsetf(ios::floatfield); cout.precision(a); cout.setf(ios::fixed,ios::floatfield);***

***#define file() freopen("input.txt","r",stdin);freopen("output.txt","w",stdout);***

**typedef vector<int>::iterator vit;**

**typedef set<int>::iterator sit;**

**int dx[] = {0, 0, +1, -1};**

**int dy[] = {+1, -1, 0, 0};**

**//int dx[] = {+1, 0, -1, 0, +1, +1, -1, -1};**

**//int dy[] = {0, +1, 0, -1, +1, -1, +1, -1};**

**//Debugger**

**template < typename F, typename S >**

**ostream& operator << ( ostream& os, const pair< F, S > & p ) {**

**return os << "(" << p.first << ", " << p.second << ")";**

**}**

**template < typename T >**

**ostream &operator << ( ostream & os, const vector< T > &v ) {**

**os << "{";**

**for(auto it = v.begin(); it != v.end(); ++it) {**

**if( it != v.begin() ) os << ", ";**

**os << \*it;**

**}**

**return os << "}";**

**}**

**template < typename T >**

**ostream &operator << ( ostream & os, const set< T > &v ) {**

**os << "[";**

**for(auto it = v.begin(); it != v.end(); ++it) {**

**if( it != v.begin() ) os << ", ";**

**os << \*it;**

**}**

**return os << "]";**

**}**

**template < typename T >**

**ostream &operator << ( ostream & os, const multiset< T > &v ) {**

**os << "[";**

**for(auto it = v.begin(); it != v.end(); ++it) {**

**if( it != v.begin() ) os << ", ";**

**os << \*it;**

**}**

**return os << "]";**

**}**

**template < typename F, typename S >**

**ostream &operator << ( ostream & os, const map< F, S > &v ) {**

**os << "[";**

**for(auto it = v.begin(); it != v.end(); ++it) {**

**if( it != v.begin() ) os << ", ";**

**os << it -> first << " = " << it -> second ;**

**}**

**return os << "]";**

**}**

***#define dbg(args...) do {cerr << #args << " : "; faltu(args); } while(0)***

**void faltu () {**

**cerr << endl;**

**}**

**template <typename T>**

**void faltu( T a[], int n ) {**

**for(int i = 0; i < n; ++i) cerr << a[i] << ' ';**

**cerr << endl;**

**}**

**template <typename T, typename ... hello>**

**void faltu( T arg, const hello &... rest) {**

**cerr << arg << ' ';**

**faltu(rest...);**

**}**

**int main()**

**{**

**optimize();**

**dl a,b;**

**a=1.234,b=2.234;**

**if(abs(a-b)<eps){**

**cout<<"Equal";**

**}else{**

**cout<<"Not equal.";**

**}**

**cout<<endl<<endl;**

**//*#define mem(a,b) memset(a, b, sizeof(a) )***

**int c[10];**

**mem(c,-1);**

**for(int i=0;i<10;i++){**

**cout<<c[i]<<' ';**

**}**

**cout<<endl<<endl;**

**//*#define fraction() cout.unsetf(ios::floatfield); cout.precision(10); cout.setf(ios::fixed,ios::floatfield);***

**dl d=2.324345436;**

**fraction(4);**

**cout<<d<<endl<<endl;**

**return 0;**

**}**

**In [ ]:**

**"C:\Users\Md.Hamid Hosen\CLionProjects\untitled\cmake-build-debug\untitled.exe"**

**Not equal.**

**-1 -1 -1 -1 -1 -1 -1 -1 -1 -1**

**2.3243**

**Process finished with exit code 0**

**In [ ]:**

**//In the name of ALLAH**

***#include<bits/stdc++.h>***

**using namespace std;**

**typedef long long ll;**

**typedef vector<int> vi;**

**typedef vector<ll> vl;**

**typedef vector<vi> vvi;**

**typedef vector<vl> vvl;**

**typedef pair<int,int> pii;**

**typedef pair<double, double> pdd;**

**typedef pair<ll, ll> pll;**

**typedef vector<pii> vii;**

**typedef vector<pll> vll;**

**typedef set<int> si;**

**typedef double dl;**

***#define PB push\_back***

***#define F first***

***#define S second***

***#define MP make\_pair***

***#define endl '\n'***

***#define all(a) (a).begin(),(a).end()***

***#define sz(x) (int)x.size()***

***#define mid(l,r) ((r+l)/2)***

***#define left(node) (node\*2)***

***#define right(node) (node\*2+1)***

***#define mx\_int\_prime 999999937***

**const double PI = acos(-1);**

**const double eps = 1e-9;//10^-9**

**const int inf = 2000000000;**

**const ll infLL = 9000000000000000000;**

***#define MOD 1000000007***

***#define mem(a,b) memset(a, b, sizeof(a) )***

***#define gcd(a,b) \_\_gcd(a,b)***

***#define sqr(a) ((a) \* (a))***

***#define optimize() ios\_base::sync\_with\_stdio(0);cin.tie(0);cout.tie(0);***

***#define fraction(a) cout.unsetf(ios::floatfield); cout.precision(a); cout.setf(ios::fixed,ios::floatfield);***

***#define file() freopen("input.txt","r",stdin);freopen("output.txt","w",stdout);***

**typedef vector<int>::iterator vit;**

**typedef set<int>::iterator sit;**

**int dx[] = {0, 0, +1, -1};**

**int dy[] = {+1, -1, 0, 0};**

**//int dx[] = {+1, 0, -1, 0, +1, +1, -1, -1};**

**//int dy[] = {0, +1, 0, -1, +1, -1, +1, -1};**

**//Debugger**

**template < typename F, typename S >**

**ostream& operator << ( ostream& os, const pair< F, S > & p ) {**

**return os << "(" << p.first << ", " << p.second << ")";**

**}**

**template < typename T >**

**ostream &operator << ( ostream & os, const vector< T > &v ) {**

**os << "{";**

**for(auto it = v.begin(); it != v.end(); ++it) {**

**if( it != v.begin() ) os << ", ";**

**os << \*it;**

**}**

**return os << "}";**

**}**

**template < typename T >**

**ostream &operator << ( ostream & os, const set< T > &v ) {**

**os << "[";**

**for(auto it = v.begin(); it != v.end(); ++it) {**

**if( it != v.begin() ) os << ", ";**

**os << \*it;**

**}**

**return os << "]";**

**}**

**template < typename T >**

**ostream &operator << ( ostream & os, const multiset< T > &v ) {**

**os << "[";**

**for(auto it = v.begin(); it != v.end(); ++it) {**

**if( it != v.begin() ) os << ", ";**

**os << \*it;**

**}**

**return os << "]";**

**}**

**template < typename F, typename S >**

**ostream &operator << ( ostream & os, const map< F, S > &v ) {**

**os << "[";**

**for(auto it = v.begin(); it != v.end(); ++it) {**

**if( it != v.begin() ) os << ", ";**

**os << it -> first << " = " << it -> second ;**

**}**

**return os << "]";**

**}**

***#define dbg(args...) do {cerr << #args << " : "; faltu(args); } while(0)***

**void faltu () {**

**cerr << endl;**

**}**

**template <typename T>**

**void faltu( T a[], int n ) {**

**for(int i = 0; i < n; ++i) cerr << a[i] << ' ';**

**cerr << endl;**

**}**

**template <typename T, typename ... hello>**

**void faltu( T arg, const hello &... rest) {**

**cerr << arg << ' ';**

**faltu(rest...);**

**}**

**int d[123];**

**int main()**

**{**

**optimize();**

**int a=1,b=3,c=4;**

**vi v={1,2,3};**

**si s={1,2,3,4};**

**pii p={1,2};**

**dbg(a,b,c);**

**dbg(v);**

**dbg(s);**

**dbg(p);**

**vii vo={{1,2},{2,3}};**

**dbg(vo);**

**mem(d,-1);**

**dbg(d,10);**

**return 0;**

**}**

**In [ ]:**

**"C:\Users\Md.Hamid Hosen\CLionProjects\untitled\cmake-build-debug\untitled.exe"**

**a,b,c : 1 3 4**

**v : {1, 2, 3}**

**s : [1, 2, 3, 4]**

**p : (1, 2)**

**vo : {(1, 2), (2, 3)}**

**d,10 : -1 -1 -1 -1 -1 -1 -1 -1 -1 -1**

**Process finished with exit code 0**