《数据结构与算法》第十一周作业反馈

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A 堆的建立

建堆模板题。

```
#include <bits/stdc++.h>
#define int long long
using namespace std;
const int N = 2e6 + 101;
int a[N], b[N], n, r;
void big(int u) {
    int t = u;
    if (u * 2 <= r && a[u] < a[u * 2]) t = 2 * u;
    if (u * 2 + 1 <= r && a[t] < a[2 * u + 1]) {
        t = 2 * u + 1;
    }
    if (u != t) {
        swap(a[u], a[t]); big(t);
    }
}
void small(int u) {
    int t = u;
    if (u * 2 <= r && b[u] > b[2 * u]) t = 2 * u;
    if (u * 2 + 1 <= r && b[t] > b[2 * u + 1]) {
        t = 2 * u + 1;
    }
    if (u != t) {
        swap(b[u], b[t]);
        small(t);
```

```
    }
}
signed main() {
    ios::sync_with_stdio(false);
    cin.tie(nullptr);
    cin >> n;
    r = n;
    for (int i = 1; i <= n; ++i) {
        cin >> a[i];
        b[i] = a[i];
    }
    for (int i = n / 2; i >= 1; --i) {
        big(i);
    }
    for (int i = 1; i < n; ++i) {
        cout << a[i] << " ";
    } cout << a[n] << '\n';
    for (int i = n / 2; i >= 1; --i) {
        small(i);
    }
    for (int i = 1; i < n; ++i) {
        cout << b[i] << " ";
    } cout << b[n];
    return 0;
}
```

B 是不是堆

初始时可以假设这个堆既是最大堆又是最小堆，然后对每个结点遍历，做排除法即可。

```
#include<bits/stdc++.h>
using namespace std;
#define int long long
const int N=2e6+101;
int n,a[N];
```

```
void pst(int x){
    if (x*2<=n) pst(x*2);
    if (x*2+1<=n) pst(x*2+1);
    cout<<a[x];
    if (x!=1) cout<<" ";
}
void solve(){
    bool mx=1,mi=1;
    for (int i=1;i<=n;i++) cin>>a[i];
    for (int i=1;i<=n;i++){
        if (i*2<=n){
            if (a[i]<a[i*2]) mx=0;
            if (a[i]>a[i*2]) mi=0;
        }
        if (i*2+1<=n){
            if (a[i]<a[i*2+1]) mx=0;
            if (a[i]>a[i*2+1]) mi=0;
        }
    }
    if (!mx&&!mi) cout<<"Not Heap"<<endl;
    else if (mx) cout<<"Max Heap"<<endl;
    else cout<<"Min Heap"<<endl;
    pst(1);
    cout<<endl;
}

signed main(){
    int T=1; cin>>T;
    cin>>n;
    while (T--) solve();
}
```