

# 优先队列

## 人员

王馨琪、温郝冬、柳力玮、田心一、谢梓轩、李知朔、韩昱辰、燕润石、李瑞涵、苑钊、赵牧之 到课, 刘宸熙、栾婷婷、刘子轩 线上

## 上周作业检查

上周作业链接: <https://www.luogu.com.cn/contest/246120>

2025-0511周日15:30

报名

编辑比赛

题目数6

报名人数17

比赛说明

题目列表

排行榜

名次	参赛者	总分	A	B	C	D	E	F
#1	柳力玮	600 (3.05d)	100 (687ms)	100 (34ms)	100 (1.66s)	100 (71ms)	100 (13ms)	100 (3.05d)
#2	赵牧之	600 (5.67d)	100 (2.04h)	100 (3.54h)	100 (3.80h)	100 (77ms)	100 (2.12d)	100 (3.15d)
#3	田心一	594 (20.61d)	100 (691ms)	100 (6.84d)	100 (6.86d)	100 (77ms)	100 (13ms)	94 (6.92d)
#4	初锦阳	540 (1.19d)	100 (687ms)	100 (33ms)	100 (1.68s)	100 (77ms)	100 (14ms)	40 (1.19d)
#5	苑钊	524 (13.36h)	100 (2.87h)	100 (33ms)	100 (3.16h)	100 (79ms)	100 (3.46h)	24 (3.86h)
#6	李知朔	518 (27.72d)	100 (666ms)	100 (6.90d)	100 (6.93d)	100 (79ms)	100 (6.93d)	18 (6.96d)
#7	谢梓轩	506 (27.78d)	100 (679ms)	100 (6.94d)	100 (6.94d)	100 (77ms)	100 (6.94d)	6 (6.95d)
#8	温郝冬	500 (2.16d)	100 (865ms)	100 (2.16d)	100 (1.64s)	100 (79ms)	100 (14ms)	
#9	栾婷婷	500 (13.73d)	100 (688ms)	100 (32ms)	100 (6.86d)	100 (79ms)	100 (6.88d)	
#10	李瑞涵	460 (4.65h)	100 (676ms)	60 (2.33h)	100 (1.66s)	100 (77ms)	100 (2.32h)	
#11	纪博涵	452 (2.04h)	100 (689ms)	100 (32ms)	52 (0ms)	100 (80ms)	100 (2.04h)	
#12	刘宸熙	450 (20.42d)	100 (678ms)	100 (32ms)	50 (6.83d)	100 (6.80d)	100 (6.80d)	
#13	姜皓轩	400 (897ms)	100 (770ms)	100 (34ms)		100 (80ms)	100 (13ms)	
#14	王馨琪	326 (20.58d)	100 (677ms)	100 (6.85d)	14 (6.89d)	100 (81ms)	0 (0ms)	12 (6.84d)
#15	韩昱辰	300 (4.76h)	100 (2.32h)	100 (2.44h)		100 (75ms)		
#16	燕润石	200 (743ms)	100 (668ms)			100 (75ms)	0 (0ms)	
#17	刘子轩	100 (662ms)	100 (662ms)					

## 作业

<https://www.luogu.com.cn/contest/247008> (课上讲了 A ~ E 题, 课后作业是 F 题)

## 课堂表现

同学们上课听讲都很认真, 这节课整体做题表现也很好。

## 课堂内容

### U478303 有多少个可能的密码数量

从 0000 到 9999 循环一遍, 看这些里面有多少合法的即可

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

using namespace std;

vector<int> vec1, vec2;
set<int> st;
bool check(int a, int b, int c, int d) {
    int f[10] = {0};
    f[a]++, f[b]++, f[c]++, f[d]++;
    for (int i : vec1) {
        if (!f[i]) return false;
    }

    if (!st.count(a) || !st.count(b) || !st.count(c) || !st.count(d)) return false;
    return true;
}

int main()
{
    string s; cin >> s;
    for (int i = 0; i <= 9; ++i) {
        if (s[i] == 'o') vec1.push_back(i), st.insert(i);
        else if (s[i] == '?') vec2.push_back(i), st.insert(i);
    }

    int res = 0;
    for (int i = 0; i <= 9999; ++i) {
        int a = i%10, b = (i/10)%10, c = (i/100)%10, d = i/1000;
        if (check(a,b,c,d)) ++res;
    }
    cout << res << endl;
    return 0;
}
```

### P1190 [NOIP 2010 普及组] 接水问题

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

using namespace std;

const int N = 10000 + 5, M = 100 + 5;
int a[N], w[M];
```

```
int main()
{
    int n, m; cin >> n >> m;
    for (int i = 1; i <= n; ++i) cin >> a[i];

    for (int i = 1; i <= m; ++i) w[i] = a[i];
    for (int i = m+1; i <= n; ++i) {
        sort(w+1, w+m+1); w[1] += a[i];
    }

    sort(w+1, w+m+1);
    cout << w[m] << endl;
    return 0;
}
```

```
priority_queue<int> q; // 默认是大根堆
priority_queue<int, vector<int>, greater<int>> q1; // 小根堆
priority_queue<int, vector<int>, less<int>> q2; // 大根堆
```

常用方法:

```
q.push()
q.pop()
q.top()
q.empty()
q.size()
```

### P3378 【模板】堆

```
#include<bits/stdc++.h>
using namespace std;
int w[10010];
int f[10010];
int main(){
    priority_queue<int, vector<int>, greater<int>>q;
    int n;
    cin >> n;
    int op;
    for(int i=1;i<=n;i++){
        cin >> op;
        if(op==1){
            int x;
            cin >> x;
            q.push(x);
        }else if(op==2){
            cout << q.top() << endl;
        }else if(op==3){
            if(q.size()!=0){
                q.pop();
            }
        }
    }
}
```

```

    }
}
return 0;
}

```

## P1090 [NOIP 2004 提高组] 合并果子

每次选两个最小的合并即可

```

#include <bits/stdc++.h>

using namespace std;

int main()
{
    priority_queue<int, vector<int>, greater<int>>>q;
    int n; cin >> n;
    while (n -- ) { int x; cin >> x; q.push(x); }

    int res = 0;
    while (q.size() > 1) {
        int t1 = q.top(); q.pop();
        int t2 = q.top(); q.pop();
        int t = t1 + t2;
        q.push(t); res += t;
    }
    cout << res << endl;
    return 0;
}

```

## U507364 接水问题 2

```

#include <bits/stdc++.h>
#define int long long

using namespace std;

signed main()
{
    int n, m; cin >> n >> m;
    priority_queue<int, vector<int>, greater<int>>> q;
    for (int i = 1; i <= m; ++i) {
        int x; cin >> x; q.push(x);
    }

    for (int i = m+1; i <= n; ++i) {
        int x; cin >> x;
        int t = q.top(); q.pop(); q.push(x+t);
    }
}

```

```
    }

    int t = 0;
    while (!q.empty()) { t = max(t, q.top()); q.pop(); }
    cout << t << endl;
    return 0;
}
```

### P3056 [USACO12NOV] Clumsy Cows S

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

using namespace std;

const int maxn = 1e5 + 5;
char s[maxn];

int main()
{
    cin >> (s+1);
    int n = strlen(s+1), res = 0;
    stack<char> stk;
    for (int i = 1; i <= n; ++i) {
        char x = s[i];
        if (x == '(') stk.push(x);
        else {
            if (!stk.empty()) stk.pop();
            else {
                stk.push('('), ++res;
            }
        }
    }
    res += stk.size()/2;
    cout << res << endl;
    return 0;
}
```