

# 贪心入门

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## 人员

方俊喆、刘祺、夏硕承、牛同泽、柳力玮、高健桓、秦显森、赵熙羽、牟茗、徐浩然、齐振玮、强笑萌、夏志赫、武敬哲 到课，辛帅辰 线上，韩承睿 录课

## 作业检查

上周作业链接：<https://www.luogu.com.cn/contest/203581>

赵熙羽、柳力玮、高健桓 尝试做了第 3 题，其他同学未尝试做

## 作业

<https://www.luogu.com.cn/contest/205677>

## 课堂表现

大部分同学们上课听讲做题态度都很认真，希望同学们继续保持。

## 课堂内容

### T504033 代价 (cost)

```
// 暴力做法
int minn = inf;
for (int i = min; i <= max; i++) { // 10^9
    // 把所有数变成 i 的代价 cost
    int cost = 0;
    for (int j = 1; j <= n; j++) { // N
        if (a[j] < i) {
            // 增加 i-a[j]
            cost += (i-a[j]) * A;
        } else {
            // 减少 a[j]-i
            cost += (a[j]-i) * B;
        }
    }
    minn = min(minn, cost);
}
cout << minn << endl;
```

```
// 符合时间复杂度做法
sort(a+1, a+n+1);
for (int i = 1; i <= n; i++) {
    // 所有数都变成 a[i]
```

```

int x = a[i];
// a[1] ~ a[i-1] 全部都要加:

    x-a[1], x-a[2], ..., x-a[i-1]

    -> x*(i-1) - (a[1]+a[2]+...+a[i-1])

// a[i+1] ~ a[n] 全部都要减:

    ...
}

```

```

#include <bits/stdc++.h>

using namespace std;

typedef long long LL;
const int maxn = 1e5 + 5;
const LL inf = 0x3f3f3f3f3f3f3f3f;
LL w[maxn], p[maxn];

LL get_sum(int l, int r) { return (l<=r ? p[r]-p[l-1] : 0); }

LL calc(int n, int pos, int a, int b) {
    int lnum = pos-1, rnum = n-pos;
    LL lvalue = get_sum(1, pos-1), rvalue = get_sum(pos+1, n);
    LL target_lvalue = (LL)lnum * w[pos], target_rvalue = (LL)rnum * w[pos];
    return (target_lvalue-lvalue)*a + (rvalue-target_rvalue)*b;
}

int main()
{
    int n, a, b; cin >> n >> a >> b;
    for (int i = 1; i <= n; ++i) cin >> w[i];
    sort(w+1, w+n+1);
    for (int i = 1; i <= n; ++i) p[i] = p[i-1] + w[i];

    LL res = inf;
    for (int i = 1; i <= n; ++i) {
        res = min(res, calc(n, i, a, b));
    }
    cout << res << endl;
    return 0;
}

```

## P2240 【深基12.例1】部分背包问题

按照金币的单位价值从大到小排序，从前往后顺着选即可

```

#include <bits/stdc++.h>

using namespace std;

const int maxn = 100 + 5;
struct node {
    int m, v;
    double d_v;
} a[maxn];
bool cmp(node p, node q) {
    return p.d_v > q.d_v;
}

int main()
{
    int n, T; cin >> n >> T;
    for (int i = 1; i <= n; i++) {
        cin >> a[i].m >> a[i].v;
        a[i].d_v = 1.0 * a[i].v / a[i].m;
    }

    sort(a+1, a+n+1, cmp);
    double res = 0;
    for (int i = 1; i <= n; i++) {
        if (a[i].m <= T) {
            res += a[i].v;
            T -= a[i].m;
        } else {
            res += T * a[i].d_v;
            break;
        }
    }

    printf("%.2lf\n", res);
    return 0;
}

```

## P1223 排队接水

按照每个人排队时间从小到大排序，从前往后加上每个人接水时间即可

```

#include <bits/stdc++.h>

using namespace std;

typedef long long LL;
const int maxn = 1000 + 5;
struct node {
    int v, id;
    bool operator < (const node& p) const { return v < p.v; }
}

```

```
} w[maxn];

int main()
{
    int n; cin >> n;
    for (int i = 1; i <= n; ++i) {
        int v; cin >> v; w[i] = {v, i};
    }
    sort(w+1, w+n+1);

    LL res = 0, sum = 0;
    for (int i = 1; i <= n; ++i) {
        cout << w[i].id << " ";
        res += sum; sum += w[i].v;
    }
    cout << endl;
    printf("%.2f\n", 1.0*res/n);
    return 0;
}
```

### P1190 [NOIP2010 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;
}
```