知识精炼（一）

主讲人：邓哲也

CF 366C Dima and Salad

有 n 个数对 (a[i], b[i])

现在要求取出若干个数对使得 sum(a[i]) / sum(b[i]) = k

你需要最大化 sum(a[i])

n≤100, k≤10, a[i]≤100

input
3 2 10 8 1 2 7 1
output
18

input
5 3 4 4 4 4 4 2 2 2 2 2
output
-1

CF 366C Dima and Salad

观察 sum(a[i]) / sum(b[i]) = k

也就是 sum(a[i]) = sum(b[i]) * k

sum(a[i]) - sum(b[i]) * k = 0

sum(a[i] - k * b[i]) = 0

也就是体积是V[i] = a[i] - k * b[i]，价值是 a[i] 的背包问题。

CF 366C Dima and Salad

```
int main(){
    scanf(“%d%d”, &n, &k);
    for(int i = 1;i <= n;i ++) scanf(“%d”, &a[i]);
    for(int j = 1;j <= n;j ++) scanf(“%d”, &b[i]);
    memset(f, -1, sizeof(f));
    memset(g, -1, sizeof(g));
    f[0] = g[0] = 0;
    …
```

CF 366C Dima and Salad

```
        ...
        for(int i = 1;i <= n;i ++){
                int c = a[i] - k * b[i];
                if (c >= 0)
                        for(int j = 10000;j >= c;j --)
                                f[j] = max(f[j], f[j - c] +
a[i]):
                else
                        for(int j = 10000;j >= -c;j --)
                                g[j] = max(g[j], f[j + c] +
a[i]);
        }
```

CF 366C Dima and Salad

```
    int ans = 0;
    for(int i = 0;i <= 10000;i ++)
        ans = max(ans, f[i] + g[i]);
    cout << (ans == 0) ? -1 : ans << endl;
    return 0;
}
```

下节课再见