Lab 10A: Cookie Optimization at SUSTech

Background

In 2025, the student-run "Xiaobaicai Store" at SUSTech launched a new series of cookies. To enjoy his favorite "Yilin Cookies" every day, student **smy** must please the merciless store manager **Xiaobai**. The store offers three types of cookies:

- **Yilin Cookies**: limited in stock
- **Regular Cookies**: unlimited in stock
- **Exclusive Cookies**: only one per subtype

Each cookie type has several subtypes. There are **m** subtypes in total. The *i-th* subtype has a price of $\mathbf{c_i}$. However, Xiaobai insists that smy **must spend exactly n yuan** to check out.

Each subtype cookie has a specific **value** $\mathbf{v_i}$ (per cookie). Since smy is required to spend all **n yuan**, he hopes to maximize the **total value** of cookies he can purchase.

Problem Description

Given **n**, **m**, and for each cookie subtype: category, quantity, price, and value — calculate the **maximum total value** smy can obtain.

Input Format

- Line 1: Two integers **n** and **m** — total money to spend and number of cookie subtypes.
- The next **m** lines describe each subtype:
  - $op_i = 0$: Regular Cookie — followed by two integers $\mathbf{c_i}$, $\mathbf{v_i}$
  - $op_i = 1$: Exclusive Cookie — followed by two integers $\mathbf{c_i}$, $\mathbf{v_i}$
  - $op_i = 2$: Yilin Cookie — followed by three integers $\mathbf{x_i}$, $\mathbf{c_i}$, $\mathbf{v_i}$, where $\mathbf{x_i}$ is the stock of that subtype

Output Format

Output a single integer: the **maximum total value** smy can get.

Samples

Sample Input 1

```
5 2
0 2 3
1 3 4
```

Sample Output 1

```
7
```

Explanation

Spend 2 yuan on the regular cookie (value 3), and 3 yuan on the exclusive cookie (value 4), totaling 7 in value.

Sample Input 2

```
6 3
0 3 3
1 1 12
2 1 4 100
```

Sample Output 2

```
6
```

Explanation

Xiaobai insists that smy **must spend exactly n yuan** to check out. So, smy spend 6 yuan on the regular cookie (cost `3*2`), totaling 6 in value(value `3*2`). If he buys a Yilin cookie (cost 4) or an Exclusive cookie (cost 1), he won't be able to spend all his remaining money exactly.

Sample Input 3

```
6 3
0 4 3
1 1 12
2 1 4 100
```

Sample Output 3

```
0
```

Explanation

There is no purchasing plan for smy that can both spend all the money exactly and meet the cookie purchase restrictions; in this case, output 0.

Constraints

- For 40% of test cases: $0 < n \leq 100, 0 < m \leq 100$
- For 100% of test cases: $0 < n \leq 2000, 0 < m \leq 2000$, $c_i \leq 20$, $v_i \leq 10^5$, $x_i \leq 200$