G - Patisserie ABC 3

Editorial (/contests/abc400/tasks/abc400_g/editorial)

Time Limit: 3 sec / Memory Limit: 1024 MiB

Score : 625 points

Problem Statement

Takahashi, a patissier working at the ABC pastry shop, decided to sell assorted cakes to commemorate AtCoder Beginner Contest 400.

The shop sells N kinds of cakes: cake 1, cake 2, . . ., cake N.
Each cake has three non-negative integer values: beauty, tastiness, and popularity.
Specifically, cake i has beauty X_i, tastiness Y_i, and popularity Z_i.

He considers pairing up these cakes into K pairs without overlaps.
Formally, he will choose $2K$ **distinct** integers $a_1, b_1, a_2, b_2, \ldots, a_K, b_K$ between 1 and N (inclusive), and pair cake a_i with cake b_i.
The price of a pair formed by cakes a_i and b_i is $\max(X_{a_i} + X_{b_i},\ Y_{a_i} + Y_{b_i},\ Z_{a_i} + Z_{b_i})$.
Here, $\max(P, Q, R)$ denotes the greatest value among P, Q, R.

Find the maximum possible total price of the K pairs.

You are given T test cases; solve each of them.

Constraints

- $1 \leq T \leq 1000$
- $2 \leq N \leq 10^5$
- The sum of N over all test cases in each input file is at most 10^5.

- $1 \leq K \leq \lfloor \frac{N}{2} \rfloor$ (For a real number x, $\lfloor x \rfloor$ denotes the greatest integer not exceeding x.)
- $0 \leq X_i, Y_i, Z_i \leq 10^9$
- All input values are integers.

Input

The input is given from Standard Input in the following format:

$$
\begin{aligned}
&T \\
&\mathrm{case}_1 \\
&\mathrm{case}_2 \\
&\vdots \\
&\mathrm{case}_T
\end{aligned}
$$

case_i represents the i-th test case. Each test case is given in the following format:

$$
\begin{aligned}
&N \quad K \\
&X_1 \quad Y_1 \quad Z_1 \\
&X_2 \quad Y_2 \quad Z_2 \\
&\vdots \\
&X_N \quad Y_N \quad Z_N
\end{aligned}
$$

Output

Print T lines. The i-th line $(1 \leq i \leq T)$ should contain the answer to the i-th test case.

Sample Input 1 Copy

```
1
3 1
6 3 8
3 5 0
2 7 3
```

Sample Output 1 Copy

```
12
```

We form one pair out of three cakes.

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If we pair cake 1 with cake 2, the price is $\max(6+3,\ 3+5,\ 8+0) = 9$.
If we pair cake 1 with cake 3, the price is $\max(6+2,\ 3+7,\ 8+3) = 11$.
If we pair cake 2 with cake 3, the price is $\max(3+2,\ 5+7,\ 0+3) = 12$.

Hence, pairing cake 2 with cake 3 gives the highest price, which is 12.

Sample Input 2 Copy

Copy

```
2
5 2
1 2 3
1 2 3
1 2 3
1 2 3
100 100 200
6 2
21 74 25
44 71 80
46 28 96
1 74 24
81 83 16
55 31 1
```

Sample Output 2 Copy

Copy

```
209
333
```

Note that each cake can appear in at most one pair.
Also note that there can be different cakes with identical values of beauty, tastiness, and popularity.

For the first test case, pairing cake 1 with cake 2 gives a price of 6, pairing cake 3 with cake 5 gives a price of 203, and choosing these two pairs yields a total price of 209, which is the maximum.

For the second test case, pairing cake 2 with cake 3 gives a price of 176, pairing cake 4 with cake 5 gives a price of 157, and choosing these two pairs yields a total price of 333, which is the maximum.

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