12615 Fantastic Network

An undirected weighted graph $G = (V, E)$ is defined as a **Fantastic** network if it has the following properties:

1. The graph is connected.
2. The **degree** of any node is at most **6**.
3. It may or may not contain **cycles**, but the **length** of any **cycle** (if exists) in this network will be **3**. The nodes which are part of at least one **cycle** are called **fine** nodes.
4. The **degree** of any **fine** node can be at most **3**.

Here, **cycle** is defined as a path $< v_0, v_1, \ldots, v_k >$ in any graph such that the following statements hold:

1. $k \geq 3$. (k is the **length** of the **cycle**)
2. $v_0 = v_k$.
3. For each i $(0 \leq i < K)$ v_i and v_{i+1} are connected by an edge.
4. $v_1, \ldots, v_k$ are distinct.

An **edge dominating set** for an undirected graph $G = (V, E)$ is a subset F of E such that every edge not included in F is adjacent to (i.e. shares a vertex with) some edge in F. The **weight** of an **edge dominating set** is the sum of the weights of all edges in that set. Given a **Fantastic** network with positive edge weights, you need to determine the weight of the **minimum weight edge dominating set**.

Input

First line of the input contains a positive integer T $(T \leq 100)$. The first line of each of the T cases contains two integers N $(2 \leq N \leq 5000)$ and M $(1 \leq M \leq 2 * N)$, representing the number of nodes and edges, respectively, in a Fantastic network. Each of the following M lines contains 3 integers u_i, v_i, w_i, which means there is an edge from u_i to v_i $(1 \leq u_i, v_i \leq n)$ with weight w_i $(1 \leq w_i \leq 10000)$.

Output

For each case, print a line of the form '`Case` x`:` y', where x is the case number and y is the weight of ***minimum weight edge dominating set*** of the given Fantastic network.

Sample Input

```
2
3 2
1 2 1
1 3 2
7 6
1 2 2
1 3 1
```

```
2 4 2
2 5 1
3 6 2
3 7 1
```

Sample Output

```
Case 1: 1
Case 2: 2
```