4136 Army engineer

Like it or not, you are an engineer. In the army, of all places. At least they have managed to find you a problem worthy of your skills: design an optimal road network with minimum risk.

Having recently invaded a new region, your forces have established a number of small bases all over the countryside. Since good logistics (i.e., moving people around in a hurry so that they can sit and wait at a different location) is an important ingredient of any army, you have been tasked with building an optimal road network to connect all these bases. In your army the optimality of a road network is not measured by its total length, but by the effort it takes to secure the network every day. Securing the network comprises two activities: sweeping the dirt road segments for landmines, and checking bridges for explosives.

To make things simpler, you have mapped these two activities to the same scale. The cost of sweeping a dirt road is relative to its length, while the cost of checking a bridge for explosives receives a fixed cost of 4 units.

You have at your disposal a list of all the bases you have to connect, as well as a list of the potential connections that can be made between these bases. From this list of potential connections, you have to choose the connections that will minimise the total cost of securing the network.

A number of your bases have been established on river banks. These bases were all established in pairs, with one on each side of the river. As part of your task of building the optimal road network, you have to choose where you wish to build bridges between these suitable river bank bases. You can choose to build bridges at any (or all) of these locations, but there are some constraints:

1. Each bridge you build will cost you 4 maintenance units to check it for explosives.
2. Your resulting network must be connected, i.e., every base must be reachable from every other base.
3. Every road segment that is directly connected to a bridge has to be swept more thoroughly, and therefore costs double the usual number of units to sweep.

Figure 1 illustrates the various types of road segment. The segment connecting base 'a' to base 'b' is a bridge (we chose to build one here), with a maintenance cost of 4 units. The solid lines emanating from these two bases represent road segments that are considered to be directly connected to the bridge, and hence their maintenance cost must be doubled if the bridge is actually built. If we choose to not build a bridge between 'a' and 'b', then the normal maintenance costs would apply to these segments.

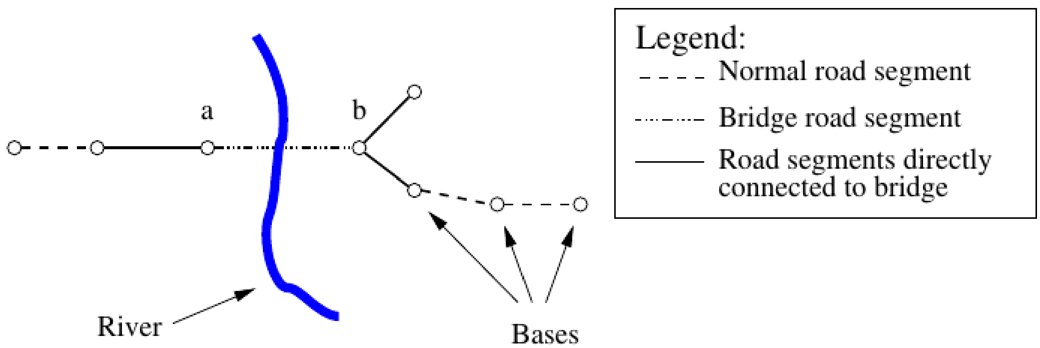

Figure 1: Bases, rivers, and directly connected road segments

Input

Your input will consist of an arbitrary number of records, with each record representing a complete problem.

The format of each record is:

number_of_bases
$start\_base_1$ end_base_1 $cost_1$
...
$start\_base_k$ end_base_k $cost_k$
-1

The *start_base* and *end_base* fields denote the starting and ending base numbers of a given potential connection. Bases are numbered from 1 through to *number_of_bases* inclusive.

The *cost* field denotes the cost of securing this connection, should you choose to make it part of your road network. All costs are integer values. A cost of '-1' indicates that this connection is a potential site for a bridge. If you choose to build a bridge here, the cost of this connection will be 4 units, and the costs of all segments directly connected to the bridge must be doubled.

A *start_base* value of '-1' indicates the end of a given record.

Please note that *more records may follow*.

Output

Your output will be a single integer value for each input record, denoting the total cost of the optimal network that connects every base to every other base.

Sample Input

```
8
1 2 1
1 4 3
2 3 2
3 5 -1
4 6 -1
5 8 2
6 7 2
7 8 1
-1
```

Sample Output

```
19
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