

Problem Description:

Two major corporations *RedNova* and *StarTrace* that create and maintain two-way wormholes decided to merge into one company. Creation and maintenance of wormholes requires a lot of energy and therefore is very expensive. This is why each station in a wormhole network of either corporation is connected only via unique path with any other station. RedNova and StarTrace had their own separate wormhole networks. To combine the two networks, they chose four closest stations *A* and *B* from RedNova's network and *C* and *D* from StarTrace's network. The managers must to decide whether to add two new wormholes between *A* (RedNova) and *C* (StarTrace) and between *B* (RedNova) and *D* (StarTrace) and remove one of the existing wormholes (so that there is only one unique path between any two stations in the combined network) or to add only one of these new wormholes. Each wormhole *i* requires maintenance fee w_i per year. Creation of a new wormhole *i* requires onetime cost of c_i . Cost of removal of an existing wormhole is negligible. Help those managers to choose the best strategy based on 10-year planning: choose which one of the above two strategies will minimize the expenses over the first 10 years. The maintenance fee w is correlated to the onetime cost c : the higher c , the greater w .

Input:

Line 1: N , integer, the total number of stations in RedNova's wormhole network

Lines 2... N : the next $(N-1)$ lines have format: $a \ b \ w$, where a and b are integers, IDs of stations between which there is a wormhole in RedNova's network, and w is maintenance fee for this wormhole (integer); IDs values are 0, 1, 2,..., $N-1$.

Line $N+1$: M , integer, the total number of stations in StarTrace's wormhole network

Lines $N+2$... $N+M$: the next $(M-1)$ lines have format: $a \ b \ w$, where a and b are integers, IDs of stations between which there is a wormhole in StarTrace's network and w is maintenance fee for this wormhole (integer); IDs values are 0, 1, 2,..., $N-1$.

Line $N+M+1$: $A \ C \ w_1 \ c_1$, integers, A is ID of a station in RedNova's network, and C is ID of a station in StarTrace's network, w_1 is maintenance fee of the wormhole between A and C , and c_1 is onetime cost to create this wormhole.

Line $N+M+2$: $B \ D \ w_2 \ c_2$, integers, B is ID of a station in RedNova's network, and D is ID of a station in StarTrace's network, w_2 is maintenance fee of the wormhole between B and D , and c_2 is onetime cost to create this wormhole.

Output: One out of the three choices below:

$A \ C \ Sum_1$ If only wormhole between A and C is needed to be added, and Sum_1 is the total expenses for the first 10 years after merging: this includes cost c_1 , and maintenance fees to maintain both old networks and new wormhole between A and C within 10 years.

B D Sum_2 If only wormhole between **B** and **D** is needed to be added, and Sum_2 is the total expenses for the first 10 years after merging: this includes cost c_2 , and maintenance fees to maintain both old networks and new wormhole between **B** and **D** within 10 years.

E F K Sum_3 If both new wormholes between **A** and **C** and between **B** and **D** are needed to be added and one wormhole between **E** and **F** is needed to be removed, where **E** and **F** are IDs of stations of RedNova's network if **K** is 1, or **E** and **F** are IDs of stations of StarTrace if **K** is 2. Moreover, $E < F$.
 Sum_3 is the total expenses for the first 10 years after merging: this includes cost c_1 and c_2 , maintenance of both old networks (except for the removed wormhole between **E** and **F**) and new two wormholes within 10 years.

Format of output: <word><space><word><endl>