Problem H - Having Wet Sushi

Daniel and the rest of the people at ACM practice are tired of pizza, so they decide to get some sushi instead. Unfortunately, sushi places near UBC don't deliver, so Daniel needs to go pick up the sushi.

Its a rainy day and Daniel forgot his umbrella, so he's using a newspaper that is k millimeters thick to cover his head to avoid getting wet. As he travels towards the sushi restaurant, Daniel spots some ideal regions with cover from the rain, but to get between one region of cover to the next, he may have to walk through the rain. Every time Daniel needs to walk in the rain, depending on the path he's taking, his newspaper will deteriorate by some number of millimeters. When the newspaper Daniel is holding completely deteriorates, he wil get wet, something Daniel absolutely refuses to have happen.

Daniel has numbered the n regions that have cover $1, 2, ..., n$. He also has cleverly mapped out m reasonable paths between the the regions and have figured out the time it takes and the amount his newspaper will deteriorate.

Daniel wants to get to the sushi place and back while spending the minimum amount of time in the rain. He doesn't mind spending extra time under cover. Output the minimum amount of time Daniel will need to spend in the rain for him to get to the sushi place and back while not getting wet, or output `-1` if there is no way to avoid getting wet. A valid route to the sushi place and back will have the sum of deterioration values less than k.

Input

The first line contains an integer T denoting the number of test cases.

Each test case begins with a line with three space seperated integers $1 \leq k \leq 400$ denoting the thickness of his newspaper, $2 \leq n \leq 2000$ denoting the number of regions of cover Daniel has identified, and $1 \leq M \leq 10000$ denoting the number of reasonable paths between regions of cover Daniel is willing to take.

On each of the next M lines contains $1 \leq a_i, b_i \leq N$, $1 \leq t_i \leq 10^5$, and $0 \leq h_i \leq 200$. This means that there is a path between the a_ith region of cover to the b_ith region of cover takes t_i minutes and deteriorates his newspaper by h_i. Daniel can travel along such a path in either direction. Note that $a_i \neq b_i$, so the ends of any path are unique, and we can take the path in either direction.

The last line of input contains $1 \leq A, B \leq N$ with $A \neq B$ where A is Daniel's starting location and B is the sushi restaurant.

Output

For each test case, ouput the integer representing the minimal time spent in the rain required to travel from A to B and back to A with less than k millimeters of newspaper deterioriation, or -1 if there is no way to travel from A to B and back to A without getting wet.

Sample Input

```
2
20 4 7
1 2 4 4
1 3 7 2
3 1 8 1
3 2 2 2
4 2 1 6
3 4 1 1
1 4 6 12
1 4
5 3 3
1 2 5 1
3 2 8 2
1 3 1 3
1 3
```

Sample Output

```
12
-1
```