Get my Entourage to the premier on time

Purpose:Graphs, Dijkstras algorithm

Due: March 19^{th}

Description

There are many competing technologies for navigation by car these days. (Google maps, Yahoo maps, Garman, Tom - Tom to name a few) Each of these technologies suffers from the fact that they do not update quickly to changing local conditions. M and M thinks if you measure local travel conditions and write you own program, you can do better than the commercial technologies. M' and M has asked you to come up with your own program to compute the shortest way to get from the starting intersection S to intersection T so that his enrourage can make it to their movie premier on time.

Input

The first line of the input will contain a positive integer N representing the number of test cases. Each test case with start with a line containing 4 integers $n > 2, m > 0, S < n$, and $T < n$, where $S \neq T$. The integer n represents the number of intersections, to consider. The number m represents the number streets. The number S represents the starting intersection while T represents the ending or terminating intersection. The next m lines of the test case represent a single street. Each street line contain 3 integers a, b and t indicating that it requires t minutes to travel from a to b.

Output

For each output output 1 line containing the time required (in minutes) , followed by the shortest path that achieves that time or the word unreachable. If two paths have the same shortest path time and the same number of intersections, print the one that occurs naturally from Dijktra's algorithm.

Sample Input

```
3
2 1 0 1
0 1 100
3 3 2 0
1 0 100
2 0 200
```

```
2 1 50
2 0 0 1
```

Corresponding Sample Output

```
100 0 1
150 2 1 0
unreachable
```

How the program will be graded

Memo

What	**pts**	**March** 19^{th}
Name	1	
Justify your choice of data structure	6	
Clear box test plan at least 4 tests	10	

Source Code Document

What	**pts**	**March** 19^{th}
Name	1	
Description	2	
Style	10	
pre/post conditions	10	
Number of test cases passed by the autograder	60	