



Prim's (MST) : Special Subtree

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Problem

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Given a graph which consists of several edges connecting the N nodes in it. It is required to find a subgraph of the given graph with the following properties:

- The subgraph contains all the nodes present in the original graph.
- The subgraph is of minimum overall weight (sum of all edges) among all such subgraphs.
- It is also required that there is **exactly one, exclusive** path between any two nodes of the subgraph.

One specific node S is fixed as the starting point of finding the subgraph. Find the total weight of such a subgraph (sum of all edges in the subgraph)

Input Format

First line has two integers N , denoting the number of nodes in the graph and M , denoting the number of edges in the graph.

The next M lines each consist of three space separated integers $x y r$, where x and y denote the two nodes between which the **undirected** edge exists, r denotes the length of edge between the corresponding nodes.

The last line has an integer S , denoting the starting node.

Constraints

$$2 \leq N \leq 3000$$

$$1 \leq M \leq (N * (N - 1)) / 2$$

$$1 \leq x, y, S \leq N$$

$$0 \leq r \leq 10^5$$

If there are edges between the same pair of nodes with different weights, they are to be considered as is, like multiple edges.

Output Format

Print a single integer denoting the total weight of tree so obtained (sum of weight of edges).

Sample Input 0

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

Sample Output 0

```
15
```

Explanation 0

The graph given in the test case is shown as :

Graph

- The nodes A,B,C,D and E denote the obvious 1,2,3,4 and 5 node numbers.
- The starting node is A or 1 (in the given test case)

Applying the Prim's algorithm, edge choices available at first are :

A->B (**WT. 3**) and A->C (**WT. 4**) , out of which A->B is chosen (smaller weight of edge).

Now the available choices are :

A->C (**WT. 4**) , B->C (**WT. 5**) , B->E (**WT. 2**) and B->D (**WT. 6**) , out of which B->E is chosen by the algorithm.

Following the same method of the algorithm, the next chosen edges , sequentially are :

A->C and B->D.

Hence the overall sequence of edges picked up by prims are:

A->B : B->E : A->C : B->D

and Total weight of the hence formed MST is : **15**

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Max Score:60



Difficulty: Medium

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Java 7  

```
1 import java.io.*;
2 import java.util.*;
3 import java.text.*;
4 import java.math.*;
5 import java.util.regex.*;
6
7 public class Solution {
8
9     public static void main(String[] args) {
10         /* Enter your code here. Read input from STDIN. Print output to STDOUT. Your class should be named Solution. */
11     }
12 }
```

Line: 1 Col: 1

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