Prim's (MST) : Special Subtree

Given a graph which consists of several edges connecting its nodes, 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 using Prim's Algorithm.
Find the total weight or the sum of all edges in the subgraph.

For example, consider a graph with 3 nodes. Edges are $1 \leftrightarrow 2$ weight 2, $2 \leftrightarrow 3$ weight 3 and $1 \leftrightarrow 3$ weight 3. Starting from 1, we select the lowest weight path, i.e. $1 \leftrightarrow 2$. From 2, there is only one path $2 \leftrightarrow 3$. We have all nodes connected at a cost of $2 + 3 = 5$.

Input Format

The first line has two space-separated integers n and m, the number of nodes and edges in the graph.

Each of the next m lines contains three space-separated integers x, y and r, the end nodes of $edges[i], and the edge's weight. The last line has an integer$ start$, denoting the starting node.

Constraints

$2 \leq n \leq 3000$
$1 \leq m \leq (n * (n-1))/2$
$1 \leq x, y, start \leq n$
$0 <= r <= 10^5$
There may be multiple edges between two nodes.

Output Format

Print a single integer denoting the total weight of the subgraph.

Sample Input 0

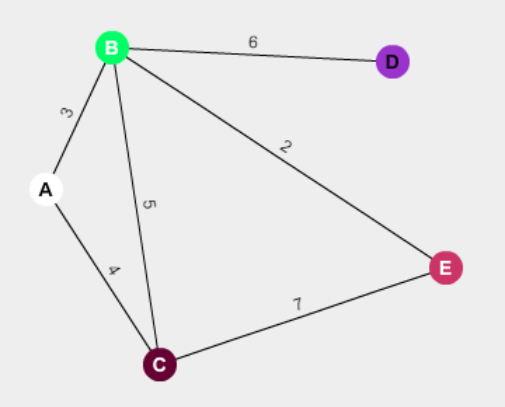
```
5 6
1 2 3
1 3 4
4 2 6
5 2 2
2 3 5
3 5 7
1
```

Sample Output 0

```
15
```

Explanation 0

The graph given in the test case is shown as :



- 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 the total weight of the MST (minimum spanning tree) is : **3+2+4+7=15**