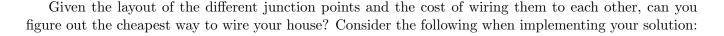
Wiring the house

You have decided to build a new house, but you are hoping to save costs by doing some of the work yourself. Specifically, you think you are able to do the electrical wiring. The wiring works by using different types of junction points and running electrical wires between these junction points. Complicating things slightly, there are several types of junction points:

- Breaker Box: This is a special node in from which the electricity is sourced. There will only be one breaker box.
- Switch: A switch is a special node that cannot affect the current coming in on a path from the breaker box, but can be turned off to not allow current to continue past the switch onward.
- Light: A light is a node that is controlled by a switch.

 Thus, there MUST be exactly one switch between the light and the breaker box. Each light has a specific switch you want to control it with, and thus that particular switch must be the one between the light and breaker box.
- Electrical Outlet: You want your outlets to be active all of the time. Thus, an outlet must have a path directly to the breaker box with NO switches in between.
- Junction Box: A junction box is simply a location that can connect multiply wires together. For example, one wire from the breaker can go into a junction box, and three wires can fan out of the box to distribute electricity to the house.



- Your solution MUST use Prim's algorithm from class. The purpose of this assignment is to practice with this algorithm, though you may need to adjust the strategy very slightly.
- Your wired house must be a spanning tree (there can be no cycles)
- Lights can be wired to one another if they have the same desired switch, as long as the switch is between both of them and the breaker.
- Every type of junction point (breaker, switch, boxes, etc.) must be connected into your wiring.



Input

The input file will begin with one line containing integers J and C, the number of junction points and the number of possible connections respectively. The next J lines will each specify the name of a junction point along with the type (breaker, switch, light, outlet, box). There will only be one breaker box. The next C lines specify the connections by providing the name of two junction points and the cost between them.

Output

Output the cost of the minimum wiring for the house that adheres to all of the constraints

Sample Input

6 8	
b1 breaker	
j1 box	
s1 switch	
o1 outlet	
11 light	C1- O-44
12 light	Sample Output
b1 j1 5	7
b1 o1 1	1
j1 s1 1	
j1 o1 2	
o1 11 1	
11 12 2	
s1 11 6	
s1 12 1	