# Min Cost Max Flow

## The Problem

Given a network which has a single source vertex with no in edges and a single destination (sink) vertex with no out edges, compute the minimum cost for the maximum flow of the network.

## The Input

The first line contains the number of test cases $T$ ($T$ <= 250).

The first line of each test case contains 4 integers – $N$, $E$, $S$ and $D$. $N$ is the number of vertices in the network, $2 \leq N \leq 1000$. $E$ is the number of directed edges in the network, $1 \leq E \leq 10{,}000$. $S$ is the source vertex of the network, $0 \leq S < N$. $D$ is the sink vertex of the network , $0 \leq D < N$. There is a further constraint that $S \neq D$.

The next $E$ lines contain four integers – $V_i$, $V_j$, *Cap, Cost* – where $V_i$ is the source vertex of the directed edge, $V_j$ is the destination vertex of the directed edge, *Cap* is the capacity of the directed edge and *Cost* is the cost for the edge. $1 \leq Cap \leq 10{,}000$. $1 \leq Cap \leq 1{,}000$.

## The Output

For each test case, output the message "Test x: Minimum Cost = y", where $x$ is the test case number and $y$ is the minimum cost of the maximum flow for the given network. Test case numbers start at 1.

## Sample Input

```
2
4 4 0 3
0 1 10 5
1 3 10 5
0 2 10 2
2 3 10 2
7 8 0 6
0 1 3 10
0 2 1 12
1 3 3 5
2 3 5 1
2 4 4 4
3 6 2 10
4 5 2 6
5 6 3 2
```

## Sample Output

```
Test 1: Minimum Cost = 140
Test 2: Minimum Cost = 74
```