Problem G
Power Network

Input File: G.IN
Program Source File: G.C or G.CPP or G.JAVA or G.PAS

A power network consists of nodes (power stations, consumers and dispatchers) connected by power transport lines. A node `u` may be supplied with an amount $s(u) \geq 0$ of power, may produce an amount $0 \leq p(u) \leq p_{max}(u)$ of power, may consume an amount $0 \leq c(u) \leq \min(s(u), c_{max}(u))$ of power, and may deliver an amount $d(u)=s(u)+p(u)-c(u)$ of power. The following restrictions apply: $c(u)=0$ for any power station, $p(u)=0$ for any consumer, and $p(u)=c(u)=0$ for any dispatcher. There is at most one power transport line (u,v) from a node `u` to a node `v` in the net; it transports an amount $0 \leq l(u,v) \leq l_{max}(u,v)$ of power delivered by `u` to `v`. Let $Con=\sum_u c(u)$ be the power consumed in the net. The problem is to compute the maximum value of `Con`.

u	type	s(u)	p(u)	c(u)	d(u)
0	power station	0	4	0	4
1		2	2	0	4
3	consumer	4	0	2	2
4		5	0	1	4
5		3	0	3	0
2	dispatcher	6	0	0	6
6		0	0	0	0

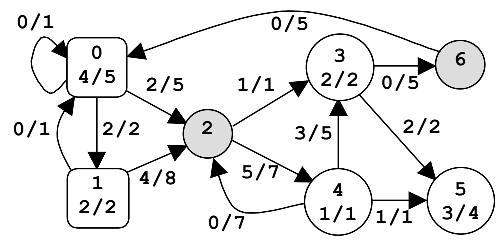

Figure 1. A power network

An example is in figure 1. The label `x/y` of power station `u` shows that $p(u)=x$ and $p_{max}(u)=y$. The label `x/y` of consumer `u` shows that $c(u)=x$ and $c_{max}(u)=y$. The label `x/y` of power transport line (u,v) shows that $l(u,v)=x$ and $l_{max}(u,v)=y$. The power consumed is $Con=6$. Notice that there are other possible states of the network but the value of `Con` cannot exceed `6`.

There are several data sets in the input text file. Each data set encodes a power network. It starts with four integers: $0 \leq n \leq 100$ (nodes), $0 \leq n_p \leq n$ (power stations), $0 \leq n_c \leq n$ (consumers), and $0 \leq m \leq n^2$ (power transport lines). Follow `m` data triplets `(u,v)z`, where `u` and `v` are node identifiers (starting from `0`) and $0 \leq z \leq 1000$ is the value of $l_{max}(u,v)$. Follow n_p doublets `(u)z`, where `u` is the identifier of a power station and $0 \leq z \leq 10000$ is the value of $p_{max}(u)$. The data set ends with n_c doublets `(u)z`, where `u` is the identifier of a consumer and $0 \leq z \leq 10000$ is the value of $c_{max}(u)$. All input numbers are integers. Except the `(u,v)z` triplets and the `(u)z` doublets, which do not contain white spaces, white spaces can occur freely in input. Input data terminate with an end of file and are correct.

Table 1. Input and output samples

Input	Output
`2 1 1 2 (0,1)20 (1,0)10 (0)15 (1)20`	`15`

`7 2 3 13 (0,0)1 (0,1)2 (0,2)5 (1,0)1 (1,2)8 (2,3)1 (2,4)7`
`(3,5)2 (3,6)5 (4,2)7 (4,3)5 (4,5)1 (6,0)5`
`(0)5 (1)2 (3)2 (4)1 (5)4`
	`6`

For each data set from the input, the program prints on the standard output the maximum amount of power that can be consumed in the corresponding network. Each result has an integral value and is printed from the beginning of a separate line.

The input in table 1 contains two data sets. The first data set encodes a network with `2` nodes, power station `0` with $p_{max}(0)=15$ and consumer `1` with $c_{max}(1)=20$, and `2` power transport lines with $l_{max}(0,1)=20$ and $l_{max}(1,0)=10$. The maximum value of `Con` is `15`. The second data set encodes the network from figure 1.