

You were put in charge of the tax collection bureau of a small country. One of the major sources of income for your country's government is the money received by the state when persons without heirs die. However, you suspect some of the tax officers have been embezzling part of this money. Since embezzlement is a very serious offence, you do not wish to pursue the matter without further proof.

As such, you decide to write a computer program to calculate how much should have been received during the recent past, in order to compare it with what was actually collected.

The inheritance laws work as follows:

- Should the deceased have a living spouse and descendants, half of his fortune goes to the spouse and the other half goes to their descendants.
- Should there be no living spouse, the money is shared among the descendants. Should there be no living descendants, all the money goes to the living spouse. Should there be no living spouse nor descendants (nor descendants' spouses), the money reverts to the state.
- The money is divided among living descendants by assigning each branch with living descendants (or descendants' spouses) an equal share. Should the closest descendant still be alive the money goes to him/her, otherwise it is shared as if he/she had just died.
- The state only considers a marriage official when a children is born. Marriages are monogamous and there are no divorces.
- All divisions are made using integer arithmetic. Remainders are lost.

Consider the following example (input 1): 1 and 2 had three children: 3, 4 and 5. 4 had a child, 7, but the other parent is unknown. 5 married 6 and had a child: 8.

Later, 1 died and all his money was shared among 2 (1/2), 3, 4 and 5 (1/6 each). Then 5 died leaving his money to be equally divided among 6 and 8. Afterwards, 4 passed away, leaving 7 as the sole heir. At the death of 3, the state collects his fortune. Later, 2 dies, leaving her money to 7 (1/2), 6 (1/4) and 8 (1/4). When 6 dies, all the money goes to 8. 7 and 8 have no heirs, at their death, their fortunes will go to the state.

Each person manages to save a certain amount of money each year. When they die, their fortune is comprised of this amount, multiplied by their age, along with the money they have inherited.

Input

The input will contain several test cases, each of them as described below. Consecutive test cases are separated by a single blank line.

Your program will receive $2 + N$ lines. The first line contains a single integer, with a date (a year). The second contains the number of citizens (N) which will follow. Each of the N following lines will contain 5 integers, separated by spaces, describing a citizen, who will be identified by an integer. The first citizen will be number 1, the last number N .

Each citizen line has his birth year, death year, father identifier, mother identifier (1 to N) and annual savings, in this order. Citizens whose parents are unknown will have a zero in the mother or father fields. To prevent ambiguity, there will only be one death per year.

Output

For each test case, the output must follow the description below. The outputs of two consecutive cases will be separated by a blank line.

The output consists of $2 + M$ lines. The first line contains an integer, representing the total amount of money collected by the state from the beginning of time up to the provided date (inclusive). The second line will indicate the number of living citizens after that date (M). Each of the following M lines will show two integers separated by a space: the citizen identifier, the amount of money he possesses (at the date).

The M lines are sorted in ascending order by citizen identifier.

Sample Input

```
2100
8
1900 1950 0 0 1
1910 2000 0 0 2
1940 1992 1 2 10
1940 1990 1 2 2
1944 1981 1 2 1
1946 2020 0 0 0
1962 2030 4 0 5
1980 2040 5 6 5

2040
4
1950 2010 0 0 1000
1970 2040 1 0 500
1990 2030 2 0 1500
2020 2050 3 0 2000
```

Sample Output

```
1524
0

0
1
4 195000
```