

## HIRING

You have to hire workers for a construction project. There are  $N$  candidates applying for the job, numbered from 1 to  $N$  inclusive. Each candidate  $k$  requires that if he is hired, he must be paid at least  $S_k$  dollars. Also, each candidate  $k$  has a qualification level  $Q_k$ . The regulations of the construction industry require that you pay your workers in proportion to their qualification level, relative to each other. For example, if you hire two workers  $A$  and  $B$ , and  $Q_A = 3 * Q_B$ , then you have to pay worker  $A$  exactly three times as much as you pay worker  $B$ . You are allowed to pay your workers non-integer amounts of money. This even includes quantities that cannot be written with a finite number of digits in decimal form, such as a third or a sixth of a dollar.

You have  $W$  dollars at hand and you want to hire as many workers as possible. You decide whom to hire and how much to pay them, but you have to meet the minimum salary requirements of those you choose to hire, and you have to obey the industry regulations. You also have to fit within your budget of  $W$  dollars.

The nature of your project is such that the qualification level is completely irrelevant, so you are only interested in maximizing the number of workers without regard to their qualification level. However, if there is more than one way to achieve this, then you want to select the one where the total amount of money you have to pay your workers is as small as possible. In case there is more than one way to achieve this, then you are indifferent among these ways and you would be satisfied with any one of them.

### TASK

Write a program that, given the different salary requirements and qualification levels of the candidates, as well as the amount of money you have, determines which candidates you should hire. You must hire as many of them as possible and you must do so with as little money as possible, while complying with the industry regulations specified above.

### CONSTRAINTS

$1 \leq N \leq 500,000$	The number of candidates
$1 \leq S_k \leq 20,000$	The minimum salary requirement of candidate $k$
$1 \leq Q_k \leq 20,000$	The qualification level of candidate $k$
$1 \leq W \leq 10,000,000,000$	The amount of money available to you

### IMPORTANT NOTE

The maximum value of  $W$  does not fit in 32 bits. You have to use a 64-bit data type, such as `long long` in C/C++ or `int64` in Pascal, in order to store the value of  $W$  in a single variable. Please see the technical info sheet for details.

### INPUT

Your program must read from standard input the following data:

- The first line contains the integers  $N$  and  $W$ , separated by a space.
- The next  $N$  lines describe the candidates, one candidate per line. The  $k^{\text{th}}$  of these lines describes candidate number  $k$  and it contains the integers  $S_k$  and  $Q_k$ , separated by a space.

## OUTPUT

Your program must write to standard output the following data:

- The first line must contain a single integer  $H$ , the number of workers that you hire.
- The next  $H$  lines must list the identifying numbers of the candidates you choose to hire (each of them a different number between 1 and  $N$ ), one per line, in any order.

## GRADING

For any given test case, you will receive full points if your choice of candidates enables you to achieve all of your goals, while satisfying all constraints. If you produce an output file with a correct first line (i.e., a correct value of  $H$ ), but which does not meet the above description, you will receive 50% of the points for that test case. The latter will be the case even if the output file is not properly formatted, as long as the first line is correct.

For a number of tests, worth a total of 50 points,  $N$  will not exceed 5,000.

## EXAMPLES

Sample Input	Sample Output
4 100	2
5 1000	2
10 100	3
8 10	
20 1	

The only combination for which you can afford to hire two workers and still meet all the constraints is if you select workers 2 and 3. You can pay them 80 and 8 dollars respectively and thus fit in your budget of 100.

Sample Input	Sample Output
3 4	3
1 2	1
1 3	2
1 3	3

Here you can afford to hire all three workers. You pay 1 dollar to worker 1 and 1.50 dollars each to workers 2 and 3, and you manage to hire everyone with the 4 dollars that you have.

Sample Input	Sample Output
3 40	2
10 1	2
10 2	3
10 3	

Here you cannot afford to hire all three workers, as it would cost you 60 dollars, but you can afford to hire any two of them. You choose to hire workers 2 and 3 because they would cost you the smallest sum of money, compared to the other two-worker combinations. You can pay 10 dollars to worker 2 and 15 dollars to worker 3 for a total of 25 dollars. If you were to hire workers 1 and 2 you would have to pay them at least 10 and 20 dollars respectively. If you were to hire 1 and 3, then you would have to pay them at least 10 and 30 dollars respectively.