4830 Bandwidth allocation

Your company has recently installed a new submarine cable to carry international IP traffic. Bandwidth on this cable is sold under a new model, whereby clients pay a dynamic per-megabit rate. The instantaneous bandwidth price is determined through a bidding system; each client maintains an autonomous software agent to bid on their behalf. The net effect of this is that you must write gateway software to determine the optimal composition of *each and every frame* of data transmitted over the cable, such that the value (price) of each frame is maximised.

IP traffic is unpredictable, and each type of packet that you receive from your clients may be of a different size. Let S_i denote the size of packet type i in bits, and P_i the corresponding price (in microcents) that a client is willing to pay for transmitting packets of that type. Your software must then choose the configuration of packets that will maximise the value of the next frame that you will transmit. Owing to the large input buffers on your gateway you effectively have an unlimited number of each type of packet available. In other words, if you want to, you may fill the entire frame using only packets of a certain type.

Your software must compute the maximum value of a frame, given a list containing the size and price of the different types of input packet.

Input

Your input will consist of an arbitrary number of records adhering to the following format:

C	N
s_0	P_0
s_1	P_1
$\ldots$	$\ldots$
S_{n-1}	P_{n-1}

where C denotes the total capacity of the output frame (in bits), and N denotes the number of packet types. The next N lines of each record contain the sizes (S_i , in bits) and the prices (P_i , in microcents) of each packet type.

The end of input is indicated by a line containing only the value '`-1`' (equivalent to $C = -1$).

The value of C is in the range $1 \ldots 10^7$, while N is in the range $1 \ldots 2000$. Both parameter sequences S_i and P_i are in the range $1 \ldots 10^6$.

Output

For each input record, print out the line

S_{opt} P_{opt}

where S_{opt} denotes the size of the optimal frame (with $S_{opt} \leq C$), and P_{opt} denotes the total cost of the optimal frame.

Sample Input

```
1500 5
1200 40
100 20
200 20
100 10
```

```
400 100
2905 7
120 300
245 580
130 301
260 601
310 605
194 322
190 310
-1
```

Sample Output

```
1500 360
2900 7202
```