

## Problem A

### Cash Machine

A Bank plans to install a machine for cash withdrawal. The machine is able to deliver appropriate  $\clubsuit^1$  bills for a requested cash amount. The machine uses exactly  $N$  distinct bill denominations, say  $D_k$ ,  $k=1, N$ , and for each denomination  $D_k$  the machine has a supply of  $n_k$  bills. For example,

$$N=3, n_1=10, D_1=100, n_2=4, D_2=50, n_3=5, D_3=10$$

means the machine has a supply of 10 bills of  $\clubsuit 100$  each, 4 bills of  $\clubsuit 50$  each, and 5 bills of  $\clubsuit 10$  each.

Call **cash** the requested amount of cash the machine should deliver and write a program that computes the maximum amount of cash less than or equal to **cash** that can be effectively delivered according to the available bill supply of the machine. The program input is from a text file. Each data set in the file stands for a particular transaction and has the format:

$$\text{cash } N \ n_1 \ D_1 \ n_2 \ D_2 \ \dots \ n_N \ D_N$$

where  $0 \leq \text{cash} \leq 100000$  is the amount of cash requested,  $0 \leq N \leq 10$  is the number of bill denominations and  $0 \leq n_k \leq 1000$  is the number of available bills for the  $D_k$  denomination,  $1 \leq D_k \leq 1000$ ,  $k=1, N$ . White spaces can occur freely between the numbers in the input. The input data are correct. For each set of data the program prints the result to the standard output on a separate line as shown in the examples below.

Input	Output	Comment
735 3 4 125 6 5 3 350	735	$\clubsuit 735 = 1 \cdot \clubsuit 350 + 3 \cdot \clubsuit 125 + 2 \cdot \clubsuit 5$
633 4 500 30 6 100 1 5 0 1	630	$\clubsuit 630 = 6 \cdot \clubsuit 100 + 1 \cdot \clubsuit 30$ OR
735 0	0	$21 \cdot \clubsuit 30$
0 3 10 100 10 50 10 10	0	No cash delivered
		No cash delivered

The first data set designates a transaction where the amount of cash requested is  $\clubsuit 735$ . The machine contains 3 bill denominations: 4 bills of  $\clubsuit 125$ , 6 bills of  $\clubsuit 5$ , and 3 bills of  $\clubsuit 350$ . The machine can deliver the exact amount of requested cash.

In the second case the bill supply of the machine does not fit the exact amount of cash requested. The maximum cash that can be delivered is  $\clubsuit 630$ . Notice that there can be several possibilities to combine the bills in the machine for matching the delivered cash.

In the third case the machine is empty and no cash is delivered. In the fourth case the amount of cash requested is  $\clubsuit 0$  and, therefore, the machine delivers no cash.

---

<sup>1</sup>  $\clubsuit$  is the symbol of the currency delivered by the machine. For instance,  $\clubsuit$  may stand for dollar, euro, pound etc.