Problem 2: Bills and Coins

The newly established republic of Northopia is in the process of defining its monetary system, and is looking for a logical way of deciding on the number and denomination of the units of its money (that is, its bills and coins). The government's assumption is that the total number of bills and coins that must be exchanged during a cash transaction is a measure of the "goodness" of the number and denomination selection.

Government consultants have already decided that the smallest unit of money will be worth exactly one "Northing," and that all other units of money must be worth an integral number of Northings. They have also agreed that there should be no more than ten different monetary units, each worth no more than 10,000 Northings.

You have been employed to write a program to help in determining the "goodness" of a selection of monetary units. Given a description of a set of proposed units of money available in Northopia, and the total amount of a transaction, your program is to determine the fewest number of bills and coins that can be used in concluding the transaction.

For example, suppose five units of money are proposed, and that they are worth 1, 5, 50, 100, and 500 Northings. A 999 Northing transaction could be completed by paying one 500-Northing unit, four 100-Northing units, one 50-Northing unit, nine 5-Northing units, and four 1-Northing units, and then receiving no units as change, for a total of 19 units of money exchanged in the transaction. The minimum number of units, however, would be obtained by paying with two 500-Northing units and then receiving one 1-Northing unit in change, for a total of 3 units of money involved in the transaction.

Input

The input data will contain multiple test cases. Each test case will begin with an integer N that indicates the proposed number of units of money. This integer is then followed by N integers representing the proposed value of each of those N units of money (in one Northing units), one of which will be 1 Northing, as defined by the consultants. Finally, the amount of a proposed transaction is given as an integer, again in one Northing units. All transaction amounts will be non-negative. The last case will be followed by a single integer zero.

Output

For each input case, display the case number (they are numbered sequentially starting with 1), and the minimum number of units of money required to complete the transaction. Leave one blank line between the output for each test case.

Sample Input	Expected Output
5 1 5 50 100 500 999	Case 1: 3 units required.
10 1 2 4 8 16 32 64 128 256 512 999	Case 2: 5 units required.
0	