Islamic University of Technology
Department of Computer Science and Engineering

Lab 7

CSE 4404: Algorithms Lab
Summer 2023-24

Task A. Coin Change

Time Limit: 1 second | *Memory Limit: 512 MB*

You are given an integer array coins representing coins of different denominations and an integer amount representing a total amount of money.

Return the fewest number of coins that you need to make up that amount. If that amount of money cannot be made up by any combination of the coins, return -1.

You may assume that you have an infinite number of each kind of coin.

Input Format

Each input contains 3 lines. The first line contains a number C, ($0 \leq C \leq 10^4$), indicating the change amount. Next line contains an integer n, ($1 \leq n \leq 12$), indicating the number of coins. The last line contains n integers ($x_1 \dots x_n$), ($1 \leq x_i \leq 2^{31} - 1$), indicating the values of each coins.

Output Format

A single integer indicating the result.

Examples

Sample Input	Sample Output
11 3 1 2 5	3
3 1 2	-1
0 1 1	0

Task B. Book Shop

Time Limit: 1 second | Memory Limit: 512 MB

You are in a book shop which sells n different books. You know the price and number of pages of each book.

You have decided that the total price of your purchases will be at most x. What is the maximum number of pages you can buy? You can buy each book at most once.

Input Format

- The first input line contains two integers n and x: the number of books and the maximum total price. $1 \leq n \leq 1000$
- The next line contains n integers $h_1, h_2, \ldots, h_n$: the price of each book. $1 \leq x \leq 10^5$
- The last line contains n integers $s_1, s_2, \ldots, s_n$: the number of pages of each book. $1 \leq h_i, s_i \leq 1000$

Output Format

Print one integer: the maximum number of pages.

Examples

Sample Input	Sample Output
4 10 4 8 5 3 5 12 8 1	13

Original Problem Links

Problem	**Links**
Coin Change	https://leetcode.com/problems/coin-change/description/
Book Shop	https://cses.fi/problemset/task/1158

Marks Distribution

Task	**Marks**
Task A	50%
Task B	50%