

The Coin Game (250 points)

Introduction

You and a friend are **playing a game**. Being a computer scientist, and hating to lose, you write a program that will **determine ahead of time whether you will win or not**.

If you will not win, you will be a sore loser and refuse to play. If you will win, you will graciously agree to play and beat your friend.

This is likely the last game you will be playing with your friend, but in the mean time, the game rules are as follows:

- There are two players: **A** and **B**.
- There are **N** coins initially.
- Players **take turns picking up coins** from the pile. The **number of coins** that any player can pick in one turn can be one of the numbers in a specific **set $S = \{S[1], S[2], \dots, S[I], \dots, S[K]\}$** .
- In order for a player to select $S[I]$ coins, **atleast** that many coins must be remaining.
- Player A starts the game.
- The **winner** is the player who is able to **pick up exactly all the remaining coins**.

Write a program that given N and S will **determine player A's strategy** that will allow him to always win, regardless of what the other player does.

If there is a strategy that will guarantee A's victory, print the **minumum number** of coins A must select.

Input Specifications

Your program will take from **STDIN**

- A number **$N \leq 100$** representing the number of coins
- A number **$K \leq 5$** representing the size of set S
- This will be followed by **K lines** where line I contains the value **$S[I]$ ($1 \leq I \leq K$)**.

Output Specifications

Based on the input,

- If A has a **winning strategy**, print out the **minimum** number A can choose with their first turn and still be assured victory.
- If **no guaranteed** winning strategy is available for A, print out **-1**

Sample Input/Output

Input

```
1
1
1
```

Output

1

Explanation

Player A wins by going first and taking the only coin.

Input

2

1

1

Output

-1

Explanation

Player A can only take 1 coin and player B will then take the second coin. It is not possible for player A to win.

Input

10

3

1

3

4

Output

1

Explanation

A picks 1 (leaving 9 coins)

If *B picks 1* (leaving 8 coins)

- Then A picks 1 (leaving 7 coins)
- If B picks 1 (leaving 6 coins) - **CASE A**
 - Then A picks 4 (leaving 2 coins)
 - B has to pick 1 coin, leaving 1 - **A wins**
- If B picks 3 (leaving 4 coins) - **CASE B**
 - Then A picks all 4 coins - **A wins**
- If B picks 4 (leaving 3 coins)
 - Then A picks all 3 - **A wins**

If *B picks 3* (leaving 6 coins)

- This reduces to **CASE A** and **A wins**

If *B picks 4* (leaving 5 coins)

- Then A picks 3 (leaving 2 coins)
- Then B must pick 1, leaving 1 - **A wins**