

# RPS

**Input File:** *rpsin.txt*

**Output File:** *rpsout.txt*

Rock. Paper. Scissors. The rules are simple. The game is contested by two people over  $N$  rounds. During each round, you and your opponent simultaneously throw either Rock, Paper or Scissors. Rock beats Scissors, Scissors beats Paper, and Paper beats Rock. If your throw beats your opponent's, you gain one point. Conversely, if their throw beats yours, you lose one point.

Your opponent is very predictable. You know that they will throw Rock in the first  $R_a$  rounds, throw Paper in the next  $P_a$  rounds, then finally throw Scissors in the last  $S_a$  rounds, where  $R_a + P_a + S_a = N$ .

You will throw Rock in  $R_b$  rounds, Paper in  $P_b$  rounds, and Scissors in  $S_b$  rounds, where  $R_b + P_b + S_b = N$ . However, as you are an experienced player, you may throw these in **any order** you like.

At the beginning of the game, you start with 0 points. What is the maximum number of points you can finish with?

## Input

- The first line of input contains a single integer  $N$ , the number of rounds.
- The second line of input contains three space-separated integers:  $R_a$ ,  $P_a$  and  $S_a$ .
- The third line of input contains three space-separated integers:  $R_b$ ,  $P_b$  and  $S_b$ .

## Output

Your program should output a single integer: the maximum number of points you could score after all  $N$  rounds have been played. Note that this number may be positive, negative, or zero.

### Sample Input 1

```
5
2 2 1
1 3 1
```

### Sample Input 2

```
4
1 2 1
4 0 0
```

### Sample Input 3

```
1
0 0 1
0 0 1
```

### Sample Output 1

```
4
```

### Sample Output 2

```
-1
```

### Sample Output 3

```
0
```

## Explanation

In the first sample input, there are  $N = 5$  rounds, where your opponent will throw Rock twice, then Paper twice, then Scissors once. You must throw Rock once, Paper three times and Scissors once. Here is one way you can order your throws:

Round	Your Throw	Their Throw	Your Result	Points
1	Paper	Rock	Win!	+1
2	Paper	Rock	Win!	+1
3	Scissors	Paper	Win!	+1
4	Paper	Paper	Draw	0
5	Rock	Scissors	Win!	+1

This results in a total of 4 points, which is the maximum possible.

In the second sample input, there are  $N = 4$  rounds, where your opponent will throw Rock once, then Paper twice, then Scissors once. You must throw Rock four times, and cannot throw Paper or Scissors.

There is only one way you can order your throws:

Round	Your Throw	Their Throw	Your Result	Points
1	Rock	Rock	Draw	0
2	Rock	Paper	Lose...	-1
3	Rock	Paper	Lose...	-1
4	Rock	Scissors	Win!	+1

This results in a total of  $-1$  points, which is the maximum possible. Note that the answer can be negative!

In the third sample input, there is  $N = 1$  round. Your opponent will throw Scissors in this one round, and you will also throw Scissors. This results in a draw, so you will score 0 points.

## Subtasks & Constraints

For all test cases:

- $1 \leq N \leq 5000$ .
- $0 \leq R_a, P_a, S_a, R_b, P_b, S_b$ .
- $R_a + P_a + S_a = N$  (that is, your opponent makes exactly  $N$  throws).
- $R_b + P_b + S_b = N$  (that is, you make exactly  $N$  throws).

Furthermore:

- For Subtask 1 (10 marks),  $N = 1$ . Sample Input 3 is an example of a case that could be in this subtask.
- For Subtask 2 (25 marks), you only throw Rock. More formally,  $R_b = N$ ,  $P_b = 0$  and  $S_b = 0$ . Sample Input 2 is an example of a case that could be in this subtask.
- For Subtask 3 (25 marks), your opponent only throws Rock. More formally,  $R_a = N$ ,  $P_a = 0$  and  $S_a = 0$ .
- For Subtask 4 (20 marks), neither you nor your opponent throws Scissors. More formally,  $S_a = 0$  and  $S_b = 0$ .
- For Subtask 5 (20 marks), no further constraints apply.