

Project Euler #149: Searching for a maximum-sum subsequence.

This problem is a programming version of [Problem 149](#) from [projecteuler.net](#)

Looking at the table below, it is easy to verify that the maximum possible sum of adjacent numbers in any direction (horizontal, vertical, diagonal or anti-diagonal) is **16** ($= 8 + 7 + 1$).

| | | | |
|----|----|----|---|
| -2 | 5 | 3 | 2 |
| 9 | -6 | 5 | 1 |
| 3 | 2 | 7 | 3 |
| -1 | 8 | -4 | 8 |

Now, let us repeat the search, but on a much larger scale.

First, generate N^2 pseudo-random numbers $s_0, s_1, s_2, \dots, s_{N^2-1}$ using the following generator:

$$\begin{aligned} s_i &= a_{f_i} + b_{g_i} \\ f_i &= (f_{i-1} + f_{i-2} + f_{i-3} + f_{i-4} + f_{i-5}) \bmod l \\ g_i &= (g_{i-1} + g_{i-2} + g_{i-3} + g_{i-4} + g_{i-5}) \bmod m \end{aligned}$$

The terms of s are then arranged in a $N \times N$ table, using the first N numbers to fill the first row (sequentially), the next N numbers to fill the second row, and so on.

For every i from 1 to N , find the greatest sum of (any number of) adjacent entries in any direction (horizontal, vertical, diagonal or anti-diagonal), considering *only* the cells that belong to the first i rows and columns.

Input Format

The input consists of exactly seven lines.

- The 1st line of input contains N , the dimension of the square grid.
- The 2nd line contains a single integer l .
- The 3rd line contains l integers separated by single spaces: a_0, a_1, \dots, a_{l-1} .
- The 4th line contains five integers f_0, f_1, f_2, f_3 and f_4 .
- The 5th line contains a single integer m .
- The 6th line contains m integers separated by single spaces: b_0, b_1, \dots, b_{m-1} .
- The 7th line contains five integers g_0, g_1, g_2, g_3 and g_4 .

Constraints

$$1 \leq l, m \leq 10^4$$

$$|a_i|, |b_i| \leq 10^5$$

$$0 \leq f_i < l$$

$$0 \leq g_i < m$$

In input files #01-#10: $1 \leq N \leq 600$

In input files #11-#20: $1 \leq N \leq 3000$

Output Format

Output N lines. The i th line must contain a single integer, denoting the greatest sum of (any number of) adjacent entries in any direction considering *only* the cells that belong to the first i rows and columns.

Sample Input

```
8
4
81 -89 45 6
3 2 2 1 0
3
-78 -45 54
1 0 0 1 2
```

Sample Output

```
-39
0
270
270
270
330
334
430
```

Explanation

The following is the whole grid:

| | | | | | | | |
|-----|-----|------|------|-----|-----|------|------|
| -39 | -33 | -33 | -134 | 135 | 36 | -134 | 135 |
| 0 | -39 | -33 | 135 | -72 | 0 | 0 | -134 |
| 135 | 135 | -134 | 36 | 0 | -39 | -33 | 36 |
| -39 | 0 | 0 | -134 | 135 | 3 | -35 | 3 |
| 99 | -72 | 0 | 135 | 60 | 0 | -33 | -167 |
| 135 | 135 | -35 | 3 | -33 | -72 | 0 | 3 |
| -39 | 99 | 0 | -35 | 3 | 3 | -35 | 135 |
| -33 | -39 | 99 | 36 | -72 | 0 | 99 | -167 |

As an example, the fifth answer is **270** because the largest sum in the first five rows and columns is **270 = 135 + 135**:

| | | | | | | | |
|------------|------------|------|------|-----|-----|------|------|
| -39 | -33 | -33 | -134 | 135 | 36 | -134 | 135 |
| 0 | -39 | -33 | 135 | -72 | 0 | 0 | -134 |
| <u>135</u> | <u>135</u> | -134 | 36 | 0 | -39 | -33 | 36 |
| -39 | 0 | 0 | -134 | 135 | 3 | -35 | 3 |
| 99 | -72 | 0 | 135 | 60 | 0 | -33 | -167 |
| 135 | 135 | -35 | 3 | -33 | -72 | 0 | 3 |
| -39 | 99 | 0 | -35 | 3 | 3 | -35 | 135 |
| -33 | -39 | 99 | 36 | -72 | 0 | 99 | -167 |

On the other hand, the sixth answer is **330** because the largest sum in the first six rows and columns is **330 = 135 + (-39) + 99 + 135**:

| | | | | | | | |
|-------------------|------------|-------------|-------------|------------|------------|-------------|-------------|
| -39 | -33 | -33 | -134 | 135 | 36 | -134 | 135 |
| 0 | -39 | -33 | 135 | -72 | 0 | 0 | -134 |
| <u>135</u> | 135 | -134 | 36 | 0 | -39 | -33 | 36 |
| <u>-39</u> | 0 | 0 | -134 | 135 | 3 | -35 | 3 |
| <u>99</u> | -72 | 0 | 135 | 60 | 0 | -33 | -167 |
| <u>135</u> | 135 | -35 | 3 | -33 | -72 | 0 | 3 |
| -39 | 99 | 0 | -35 | 3 | 3 | -35 | 135 |
| -33 | -39 | 99 | 36 | -72 | 0 | 99 | -167 |