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 $(= 8 + 7 + 1)$.

$$\begin{array}{rrrr} -2 & 5 & 3 & 2 \\ 9 & -6 & 5 & 1 \\ 3 & 2 & 7 & 3 \\ -1 & 8 & -4 & 8 \end{array}$$

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

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

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

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: $a_0, a_1, \ldots, a_{l-1}$.
- 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: $b_0, b_1, \ldots, b_{m-1}$.
- 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 ith 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:

$$\begin{array}{rrrrrrrr}
-39 & -33 & -33 & -134 & 135 & 36 & -134 & 135 \\
0 & -39 & -33 & 135 & -72 & 0 & 0 & -134 \\
135 & 135 & -134 & 36 & 0 & -39 & -33 & 36 \\
-39 & 0 & 0 & -134 & 135 & 3 & -35 & 3 \\
99 & -72 & 0 & 135 & 60 & 0 & -33 & -167 \\
135 & 135 & -35 & 3 & -33 & -72 & 0 & 3 \\
-39 & 99 & 0 & -35 & 3 & 3 & -35 & 135 \\
-33 & -39 & 99 & 36 & -72 & 0 & 99 & -167
\end{array}$$

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

$$
\begin{array}{rrrrrrrr}
\mathbf{-39} & \mathbf{-33} & \mathbf{-33} & \mathbf{-134} & \mathbf{135} & 36 & -134 & 135 \\
\mathbf{0} & \mathbf{-39} & \mathbf{-33} & \mathbf{135} & \mathbf{-72} & 0 & 0 & -134 \\
\underline{\mathbf{135}} & \underline{\mathbf{135}} & \mathbf{-134} & \mathbf{36} & \mathbf{0} & -39 & -33 & 36 \\
\mathbf{-39} & \mathbf{0} & \mathbf{0} & \mathbf{-134} & \mathbf{135} & 3 & -35 & 3 \\
\mathbf{99} & \mathbf{-72} & \mathbf{0} & \mathbf{135} & \mathbf{60} & 0 & -33 & -167 \\
135 & 135 & -35 & 3 & -33 & -72 & 0 & 3 \\
-39 & 99 & 0 & -35 & 3 & 3 & -35 & 135 \\
-33 & -39 & 99 & 36 & -72 & 0 & 99 & -167
\end{array}
$$

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

$$
\begin{array}{rrrrrrrr}
\mathbf{-39} & \mathbf{-33} & \mathbf{-33} & \mathbf{-134} & \mathbf{135} & \mathbf{36} & -134 & 135 \\
\mathbf{0} & \mathbf{-39} & \mathbf{-33} & \mathbf{135} & \mathbf{-72} & \mathbf{0} & 0 & -134 \\
\underline{\mathbf{135}} & \mathbf{135} & \mathbf{-134} & \mathbf{36} & \mathbf{0} & \mathbf{-39} & -33 & 36 \\
\underline{\mathbf{-39}} & \mathbf{0} & \mathbf{0} & \mathbf{-134} & \mathbf{135} & \mathbf{3} & -35 & 3 \\
\underline{\mathbf{99}} & \mathbf{-72} & \mathbf{0} & \mathbf{135} & \mathbf{60} & \mathbf{0} & -33 & -167 \\
\underline{\mathbf{135}} & \mathbf{135} & \mathbf{-35} & \mathbf{3} & \mathbf{-33} & \mathbf{-72} & 0 & 3 \\
-39 & 99 & 0 & -35 & 3 & 3 & -35 & 135 \\
-33 & -39 & 99 & 36 & -72 & 0 & 99 & -167
\end{array}
$$