A biologist experimenting with DNA modification of bacteria has found a way to make bacteria colonies sensitive to the surrounding population density. By changing the DNA, he is able to "program" the bacteria to respond in varying density areas.

In any given culture dish square, let K be the sum of that square's density and the densities of the four squares immediately to the left, right, above, and below that square. (Squares outside the dish are considered to have density 0.) Then, by the next day, that culture dish square's density will change by D[K].

The culture dish is a square divided into 400 smaller squares, or 20x20. Population in each small square is measured on a four-point scale (from 0 to 3). DNA information is represented as an array, D, indexed from 0 to 15, of integer values and is interpreted as follows:

- A DNA program causing all the bacterias to die off (e.g., [-3, -3, ..., -3]).
- Programs resulting in immediate population explosions (e.g., [3, 3, 3, ..., 3]).
- Programs causing all the bacterias to die off (e.g., [0, 0, ..., 0]).

The biologist is interested in how some of the less obvious DNA programs cause cultures to grow.

Write a program to simulate the culture growth, reading in the number of days to be simulated, the DNA rules, and the initial population densities of the dish.
No other characters may appear in the output.

<table>
<thead>
<tr>
<th>#</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>2</td>
</tr>
<tr>
<td>i</td>
<td>1</td>
</tr>
<tr>
<td>.</td>
<td>0</td>
</tr>
</tbody>
</table>

Density Character

Each character will represent the population density at a single dish square, as follows:

- The culture dish, and will consist of 20 characters. Plus the usual end-of-line termination.
- Each character represents a row of squares in the culture dish at the end of the simulation. Each row represents a row of squares in the culture dish. Each character represents the population densities of the cells in the squares in that row.

**Output Format:**

- The program will produce exactly 20 lines of output, describing the population densities of the cells in the squares in the culture dish.

```
0
1
2
3
```

**Input Format:**

```plaintext
Problem D: A New Growth Industry
```

Sponsored by IBM

2001 ACTM-AMAT Regional Programming Contest

1/10/2001