CELLULAR LIFE

Description. The grid below represents the bacteria population of ten adjacent cells. For example, the population of the first cell is 1 bacterium, and the population of the last cell is 9 bacteria. The conditions of each cell are such that the maximum population of any given cell is 9.

1	1	5	7	1	4	0	6	7	9

A cell's "neighbors" consist of the immediately adjacent cells, where the cells on the end have only one neighbor. For example, the neighbors of cell 5 are the cells 4 and 6. The neighbor of cell 1 is just cell 2. Every minute, the bacteria population in each of these cells may change, depending on the current populations of the neighboring cells. The rules for the population changes are:

- If the sum of the populations of a cell's neighbors is less than 3 or greater than 7, then that cell's population will decrease by one, or remain at 0. In the example above, cell 3's neighbors have a total population of 8, so after one minute, cell 3's population will decrease from 5 to 4. Similarly, cell 7's neighbors have a total population of 10, so after one minute, cell 7's population will still be 0.
- If the sum of the populations of a cell's neighbors is 4, 5, 6, or 7, then that cell's population will increase by one, up to a maximum of 9. In the example above, cell 4's neighbors have a total population of 6, so after one minute, cell 4's population will increase from 7 to 8. Similarly, cell 10's neighbors have a total population of 7, so it's population will remain at 9.
- If the sum of the populations of a cell's neighbors is 3, then that cell's population will remain unchanged.

Based on these rules, and using the example above as the starting population, the population after one minute would be:

0	2	4	8	0	3	0	7	6	9

If we watch these populations for another minute, we would observe the following:

0	3	3	9	0	2	0	8	5	9

Input Format: Each line of input will consist of 11 numbers, the first representing the number of minutes for the experiment and the remaining 10 numbers indicating the starting populations of the cells. The number of minutes will not exceed 1000. The total number of experiments in the input will not exceed 500.

Output Format: For each output, show the population of the ten cells after specified minutes, using the format shown below.

Sample input data (cells.txt)

```
1 1 1 5 7 1 4 0 6 7 9
2 1 1 5 7 1 4 0 6 7 9
39 1 1 5 7 1 4 0 6 7 9
40 0 6 0 6 6 0 6 0 6 9
```

Sample Output:

```
#1: 0 2 4 8 0 3 0 7 6 9
#2: 0 3 3 9 0 2 0 8 5 9
#3: 7 5 2 4 4 4 3 2 2 1
#4: 3 3 0 8 8 1 0 0 3 3
```

Data Set 1 - Input

39 1 1 5 7 1 4 0 6 7 9
40 1 1 5 7 1 4 0 6 7 9
1 1 1 5 7 1 4 0 6 7 9
2 0 6 0 6 6 0 6 0 6 9

Data Set 1 – Output (25 marks each)
#1: 7 5 2 4 4 4 3 2 2 1
#2: 8 4 1 5 3 5 4 3 2 0
#3: 0 2 4 8 0 3 0 7 6 9
#4: 2 4 0 8 8 0 4 0 4 9

Data Set 2 - Input

100 1 1 7 5 1 4 0 6 7 9
200 1 1 5 7 1 4 0 6 7 9
300 1 1 5 7 4 1 0 6 7 9
400 0 6 0 6 6 0 6 0 6 9

Data Set 2 – Output (25 marks each)

#1: 0 3 6 5 0 7 7 0 8 8
#2: 6 5 4 0 1 8 8 0 8 8
#3: 2 6 3 8 0 8 8 0 8 8
#4: 3 3 0 8 8 1 0 0 3 3