--- Day 6: Lanternfish ---

The sea floor is getting steeper. Maybe the sleigh keys got carried this way?

A massive school of glowing lanternfish swims past. They must spawn quickly to reach such large numbers - maybe **exponentially** quickly? You should model their growth rate to be sure.

Although you know nothing about this specific species of lanternfish, you make some guesses about their attributes. Surely, each lanternfish creates a new lanternfish once every **7** days.

However, this process isn't necessarily synchronized between every lanternfish - one lanternfish might have 2 days left until it creates another lanternfish, while another might have 4. So, you can model each fish as a single number that represents **the number of days until it creates a new lanternfish**.

Furthermore, you reason, a **new** lanternfish would surely need slightly longer before it's capable of producing more lanternfish: two more days for its first cycle.

So, suppose you have a lanternfish with an internal timer value of `3`:

- After one day, its internal timer would become `2`.
- After another day, its internal timer would become `1`.
- After another day, its internal timer would become `0`.
- After another day, its internal timer would reset to `6`, and it would create a **new** lanternfish with an internal timer of `8`.
- After another day, the first lanternfish would have an internal timer of `5`, and the second lanternfish would have an internal timer of `7`.

A lanternfish that creates a new fish resets its timer to `6`, **not `7`** (because `0` is included as a valid timer value). The new lanternfish starts with an internal timer of `8` and does not start counting down until the next day.

Realizing what you're trying to do, the submarine automatically produces a list of the ages of several hundred nearby lanternfish (your puzzle input). For example, suppose you were given the following list:

```
3,4,3,1,2
```

This list means that the first fish has an internal timer of `3`, the second fish has an internal timer of `4`, and so on until the fifth fish, which has an internal timer of `2`. Simulating these fish over several days would proceed as follows:

```
Initial state: 3,4,3,1,2
After  1 day:  2,3,2,0,1
After  2 days: 1,2,1,6,0,8
After  3 days: 0,1,0,5,6,7,8
After  4 days: 6,0,6,4,5,6,7,8,8
After  5 days: 5,6,5,3,4,5,6,7,7,8
After  6 days: 4,5,4,2,3,4,5,6,6,7
After  7 days: 3,4,3,1,2,3,4,5,5,6
After  8 days: 2,3,2,0,1,2,3,4,4,5
After  9 days: 1,2,1,6,0,1,2,3,3,4,8
After 10 days: 0,1,0,5,6,0,1,2,2,3,7,8
After 11 days: 6,0,6,4,5,6,0,1,1,2,6,7,8,8,8
After 12 days: 5,6,5,3,4,5,6,0,0,1,5,6,7,7,7,8,8
After 13 days: 4,5,4,2,3,4,5,6,6,0,4,5,6,6,6,7,7,8,8
After 14 days: 3,4,3,1,2,3,4,5,5,6,3,4,5,5,5,6,6,7,7,8
After 15 days: 2,3,2,0,1,2,3,4,4,5,2,3,4,4,4,5,5,6,6,7
After 16 days: 1,2,1,6,0,1,2,3,3,4,1,2,3,3,3,4,4,5,5,6,8
After 17 days: 0,1,0,5,6,0,1,2,2,3,0,1,2,2,2,3,3,4,4,5,7,8
After 18 days: 6,0,6,4,5,6,0,1,1,2,6,0,1,1,1,2,2,3,3,4,6,7,8,8,8,8
```

Each day, a `0` becomes a `6` and adds a new `8` to the end of the list, while each other number decreases by 1 if it was present at the start of the day.

In this example, after 18 days, there are a total of `26` fish. After 80 days, there would be a total of `5934`.

Find a way to simulate lanternfish. **How many lanternfish would there be after 80 days?**

Your puzzle answer was `355386`.

--- Part Two ---

Suppose the lanternfish live forever and have unlimited food and space. Would they take over the entire ocean?

After 256 days in the example above, there would be a total of `26984457539` lanternfish!

How many lanternfish would there be after 256 days?

Your puzzle answer was `1613415325809`.

Both parts of this puzzle are complete! They provide two gold stars: **

At this point, you should return to your Advent calendar and try another puzzle.

If you still want to see it, you can get your puzzle input.

You can also [Share] this puzzle.