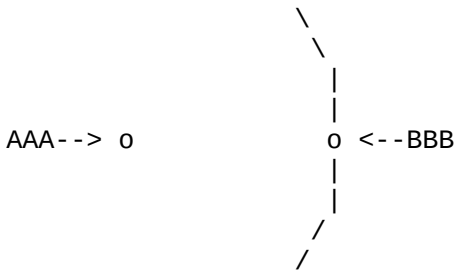
--- Week 11: Universal Orbit Map ---

You've landed at the Universal Orbit Map facility on Mercury. Because navigation in space often involves transferring between orbits, the orbit maps here are useful for finding efficient routes between orbiting bodies. You download a map of the local orbits (“11.txt”).

Except for the universal Center of Mass (`COM`), every object in space is in orbit around exactly one other object. An orbit looks roughly like this:



In this diagram, the object `BBB` is in orbit around `AAA`. The path that `BBB` takes around `AAA` (drawn with lines) is only partly shown. In the map data, this orbital relationship is written `AAA)BBB`, which means "`BBB` is in orbit around `AAA`".

For example, suppose you have the following map (“`11_test.txt`”):

```
COM)BBB
BBB)CCC
CCC)DDD
DDD)EEE
EEE)FFF
BBB)GIG
GIG)HHH
DDD)III
EEE)JJJ
JJJ)KIK
KIK)LLL
```

Visually, the above map of orbits looks like this:

```
        GIG - HHH   JJJ - KIK - LLL
       /           /
COM - BBB - CCC - DDD - EEE - FFF
               \
                III
```

Before you use your map data to plot a course, you need to make sure it wasn't corrupted during the download. The first step of verification is doing a width check. You need to calculate the width from the left of the map (`COM`) to the farthest planet? In the test case it is 7, `COM-BBB-CCC-DDD-JJJ-KIK-LLL`.

What is the width of your map data?

--- Part Two ---

For the second part of the verification of maps, the Universal Orbit Map facility uses *orbit count checksums* - the total number of *direct orbits* (like the one shown above) and *indirect orbits*.

Whenever `AAA` orbits `BBB` and `BBB` orbits `CCC`, then `AAA` *indirectly orbits* `CCC`. This chain can be any number of objects long: if `AAA` orbits `BBB`, `BBB` orbits `CCC`, and `CCC` orbits `DDD`, then `AAA` indirectly orbits `DDD`.

Recall the map from the test case:

```
        GIG - HHH       JJJ - KIK - LLL
       /           /
COM - BBB - CCC - DDD - EEE - FFF
               \
                III
```

In this visual representation, when two objects are connected by a line, the one on the right directly orbits the one on the left.

Here, we can count the total number of orbits as follows:

- `DDD` directly orbits `CCC` and indirectly orbits `BBB` and `COM`, a total of `3` orbits.
- `LLL` directly orbits `KIK` and indirectly orbits `JJJ`, `EEE`, `DDD`, `CCC`, `BBB`, and `COM`, a total of `7` orbits.
- `COM` orbits nothing.

The total number of direct and indirect orbits in this example is `42`.

What is the total number of direct and indirect orbits in your map data?

Scoring will be as follows:

1 point for entering the correct answer for part 1 in the quiz

1 point for entering the correct answer for part 2 in the quiz

6 points for your code printing the test case and the answer for part 1.

4 points for your code printing the test case and the answer for part 2.

8 points for using the BinaryTree from the lab (please paste this at the top of your file and do not submit more than one file).

Adapted from Advent of Code 2019 Day 6.