--- Day 22: Mode Maze ---

This is it, your final stop: the year -483. It's snowing and dark outside; the only light you can see is coming from a small cottage in the distance. You make your way there and knock on the door.

A portly man with a large, white beard answers the door and invites you inside. For someone living near the North Pole in -483, he must not get many visitors, but he doesn't act surprised to see you. Instead, he offers you some milk and cookies.

After talking for a while, he asks a favor of you. His friend hasn't come back in a few hours, and he's not sure where he is. Scanning the region briefly, you discover one life signal in a cave system nearby; his friend must have taken shelter there. The man asks if you can go there to retrieve his friend.

The cave is divided into square **regions** which are either dominantly **rocky**, **narrow**, or **wet** (called its **type**). Each region occupies exactly one **coordinate** in `X,Y` format where `X` and `Y` are integers and zero or greater. (Adjacent regions can be the same type.)

The scan (your puzzle input) is not very detailed: it only reveals the **depth** of the cave system and the **coordinates of the target**. However, it does not reveal the type of each region. The mouth of the cave is at `0,0`.

The man explains that due to the unusual geology in the area, there is a method to determine any region's type based on its **erosion level**. The erosion level of a region can be determined from its **geologic index**. The geologic index can be determined using the first rule that applies from the list below:

- The region at `0,0` (the mouth of the cave) has a geologic index of `0`.
- The region at the coordinates of the target has a geologic index of `0`.
- If the region's `Y` coordinate is `0`, the geologic index is its `X` coordinate times `16807`.
- If the region's `X` coordinate is `0`, the geologic index is its `Y` coordinate times `48271`.
- Otherwise, the region's geologic index is the result of multiplying the erosion **levels** of the regions at `X-1,Y` and `X,Y-1`.

A region's **erosion level** is its **geologic index** plus the cave system's **depth**, all modulo `20183`. Then:

- If the **erosion level** modulo `3` is `0`, the region's type is **rocky**.
- If the **erosion level** modulo `3` is `1`, the region's type is **wet**.
- If the **erosion level** modulo `3` is `2`, the region's type is **narrow**.

For example, suppose the cave system's depth is `510` and the target's coordinates are `10,10`. Using `%` to represent the modulo operator, the cavern would look as follows:

- At `0,0`, the geologic index is `0`. The erosion level is `(0 + 510) % 20183 = 510`. The type is `510 % 3 = 0`, **rocky**.
- At `1,0`, because the `Y` coordinate is `0`, the geologic index is `1 * 16807 = 16807`. The erosion level is `(16807 + 510) % 20183 = 17317`. The type is `17317 % 3 = 1`, **wet**.
- At `0,1`, because the `X` coordinate is `0`, the geologic index is `1 * 48271 = 48271`. The erosion level is `(48271 + 510) % 20183 = 8415`. The type is `8415 % 3 = 0`, **rocky**.
- At `1,1`, neither coordinate is `0` and it is not the coordinate of the target, so the geologic index is the erosion level of `0,1` (`8415`) times the erosion level of `1,0` (`17317`), `8415 * 17317 = 145722555`. The erosion level is `(145722555 + 510) % 20183 = 1805`. The type is `1805 % 3 = 2`, **narrow**.
- At `10,10`, because they are the target's coordinates, the geologic index is `0`. The erosion level is `(0 + 510) % 20183 = 510`. The type is `510 % 3 = 0`, **rocky**.

Drawing this same cave system with rocky as `.`, wet as `=`, narrow as `|`, the mouth as `M`, the target as `T`, with `0,0` in the top-left corner, `X` increasing to the right, and `Y` increasing downward, the top-left corner of the map looks like this:

Before you go in, you should determine the risk level of the area. For the the rectangle that has a top-left corner of region `0,0` and a bottom-right corner of the region containing the target, add up the risk level of each individual region: `0` for rocky regions, `1` for wet regions, and `2` for narrow regions.

In the cave system above, because the mouth is at `0,0` and the target is at `10,10`, adding up the risk level of all regions with an `X` coordinate from `0` to `10` and a `Y` coordinate from `0` to `10`, this total is `114`.

What is the total risk level for the smallest rectangle that includes `0,0` and the target's coordinates?

To begin, get your puzzle input.

Answer: [Submit]

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