--- Day 9: Stream Processing ---

A large stream blocks your path. According to the locals, it's not safe to cross the stream at the moment because it's full of garbage. You look down at the stream; rather than water, you discover that it's a stream of characters.

You sit for a while and record part of the stream (your puzzle input). The characters represent groups - sequences that begin with `{` and end with `}`. Within a group, there are zero or more other things, separated by commas: either another group or garbage. Since groups can contain other groups, a `}` only closes the most-recently-opened unclosed group - that is, they are nestable. Your puzzle input represents a single, large group which itself contains many smaller ones.

Sometimes, instead of a group, you will find garbage. Garbage begins with `<` and ends with `>`. Between those angle brackets, almost any character can appear, including `{` and `}`. Within garbage, `<` has no special meaning.

In a futile attempt to clean up the garbage, some program has canceled some of the characters within it using `!`: inside garbage, any character that comes after `!` should be ignored, including `<`, `>`, and even another `!`.

You don't see any characters that deviate from these rules. Outside garbage, you only find well-formed groups, and garbage always terminates according to the rules above.

Here are some self-contained pieces of garbage:

- `<>`, empty garbage.
- `<random characters>`, garbage containing random characters.
- `<<<<>`, because the extra `<` are ignored.
- `<{!>}>`, because the first `>` is canceled.
- `<!!>`, because the second `!` is canceled, allowing the `>` to terminate the garbage.
- `<!!!>>`, because the second `!` and the first `>` are canceled.
- `<{o"i!a,<{i<a>`, which ends at the first `>`.

Here are some examples of whole streams and the number of groups they contain:

- `{}`, `1` group.
- `{{{}}}`, `3` groups.
- `{{},{}}`, also `3` groups.
- `{{{},{},{{}}}}`, `6` groups.
- `{<{},{},{{}}>}`, `1` group (which itself contains garbage).
- `{<a>,<a>,<a>,<a>}`, `1` group.
- `{{<a>},{<a>},{<a>},{<a>}}`, `5` groups.
- `{{<!>},{<!>},{<!>},{<a>}}`, `2` groups (since all but the last `>` are canceled).

Your goal is to find the total score for all groups in your input. Each group is assigned a score which is one more than the score of the group that immediately contains it. (The outermost group gets a score of `1`.)

- `{}`, score of `1`.
- `{{{}}}`, score of `1 + 2 + 3 = 6`.
- `{{},{}}`, score of `1 + 2 + 2 = 5`.
- `{{{},{},{{}}}}`, score of `1 + 2 + 3 + 3 + 3 + 4 = 16`.
- `{<a>,<a>,<a>,<a>}`, score of `1`.
- `{{<ab>},{<ab>},{<ab>},{<ab>}}`, score of `1 + 2 + 2 + 2 + 2 = 9`.
- `{{<!!>},{<!!>},{<!!>},{<!!>}}`, score of `1 + 2 + 2 + 2 + 2 = 9`.

- `{{<a!>},{<a!>},{<a!>},{<ab>}}`, score of `1 + 2 = 3`.

What is the total score for all groups in your input?

Your puzzle answer was `8337`.

--- Part Two ---

Now, you're ready to remove the garbage.

To prove you've removed it, you need to count all of the characters within the garbage. The leading and trailing `<` and `>` don't count, nor do any canceled characters or the `!` doing the canceling.

- `<>`, `0` characters.
- `<random characters>`, `17` characters.
- `<<<<>`, `3` characters.
- `<{!>}>`, `2` characters.
- `<!!>`, `0` characters.
- `<!!!>>`, `0` characters.
- `<{o"i!a,<{i<a>`, `10` characters.

How many non-canceled characters are within the garbage in your puzzle input?

Your puzzle answer was `4330`.

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.