--- 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 `16021`.

--- 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 `7685`.

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.