

(10 points)

(H) Thorny Stems (1/3)

Wouldn't it be nice if your computer could understand English? In this problem, you will write down a small set of rules encoding one piece of your knowledge about English.

The problem you will approach is called "stemming." You know that "work", "working", "works", and "worked" are all forms of the same verb: "work". Similarly, "guesses" and "guess" are both forms of the same noun: "guess". Below you will find a list of pairs of a word and its stem, both nouns and verbs. Your goal is to write down a list of rules which is as short as possible, but covers all of the example pairs. You must also list exactly **one** exception for every rule which has one.

Example

Rule 1: If a word ends in ss, then replace ss with ss to form the stem.

Rule 2: If a word ends in s, then replace s with _ to form the stem.

Rule 3: Otherwise the word is its own stem.

Let's look at how these rules will apply to a few examples. We always use only the first numbered rule that applies. For the word "work", Rules 1-2 do not apply, so we are left with Rule 3, "work" is its own stem. For the word "works", Rule 1 does not apply, but Rule 2 does, so the stem of "works" is formed by replacing the final "s" with nothing - i.e. deleting it, to form "work". Finally, for the word "grass", Rule 1 does apply, and so we replace "ss" with "ss", i.e. the word is unchanged and then we stop.

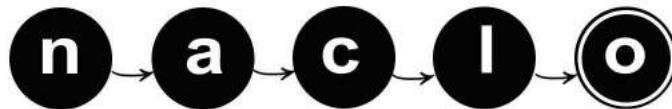
Your goal is to write one list of rules which will apply to both the nouns and the verbs listed on the next page.

Exceptions

The rules you write will not always work. Any word for which your rules give the wrong stem is called an "exception". You will write down exceptions for your rules - an exception is written next to the first rule whose "if" part applies to it. For example, "guess" is not an exception to the rules above, since even though Rule 2 does not handle it, Rule 1 (which comes first) does. However, "cries" is an exception (these rules gives its stem as "crie" instead of "cry"), and it should be written next to Rule 2 as follows:

If a word ends in ss, then replace ss with ss to form the stem. **Exception:** -none-

If a word ends in s, then replace s with _ to form the stem. **Exception:** cries



(H) Thorny Stems (2/3)

Judging

Your score will be determined according to the following criteria:

You should have rules to cover all the words in the list below.

You should use as few rules as you can.

You should list an exception next to as many rules as you can.

Words and stems

NOUNS

| word | stem |
|------------|-----------|
| backs | back |
| books | book |
| chiefs | chief |
| companies | company |
| duties | duty |
| dwarves | dwarf |
| grass | grass |
| moss | moss |
| potatoes | potato |
| presidents | president |
| roses | rose |
| shelves | shelf |
| stores | store |
| stapler | stapler |
| times | time |
| toe | toe |
| tomatoes | tomato |
| wives | wife |

VERBS

| word | stem |
|----------|--------|
| cried | cry |
| cries | cry |
| dished | dish |
| flies | fly |
| married | marry |
| killed | kill |
| listened | listen |
| ordered | order |
| resorts | resort |
| sailing | sail |
| tailing | tail |
| tell | tell |



(H) Thorny Stems (3/3)

H1. Your rules

You do not need to use all the blank rules below. Cross out any rules you do not use.

1. If a word ends in _____, then replace _____ with _____ to form the stem.
Exception:
2. If a word ends in _____, then replace _____ with _____ to form the stem.
Exception:
3. If a word ends in _____, then replace _____ with _____ to form the stem.
Exception:
4. If a word ends in _____, then replace _____ with _____ to form the stem.
Exception:
5. If a word ends in _____, then replace _____ with _____ to form the stem.
Exception:
6. If a word ends in _____, then replace _____ with _____ to form the stem.
Exception:
7. If a word ends in _____, then replace _____ with _____ to form the stem.
Exception:
8. If a word ends in _____, then replace _____ with _____ to form the stem.
Exception:
9. If a word ends in _____, then replace _____ with _____ to form the stem.
Exception:
10. If a word ends in _____, then replace _____ with _____ to form the stem.
Exception:
11. Otherwise the word is its own stem.

H2. Explain your reasoning in the space below.

