YOUR NAME: REGISTRATION #

(15 points)

R. One, Two, Tree (1/4)

English has the wonderful feature that it lets you stick two nouns together into a **compound noun**, whose meaning derives in some idiosyncratic way from the meanings of its parts:

- *water fountain*: a fountain that *supplies* water
- *water ballet*: a ballet that *takes place in* water
- *water meter*: a device (called *meter*) that *measures* water
- *water barometer*: a barometer that *uses* water instead of mercury (to measure air pressure)
- *water biscuit*: a biscuit that *is made with* water
- *water glass*: a glass that *is meant to hold* water

Even more fun is that one of the two nouns in the compound noun could itself be a compound noun, as in the case of *ice cream soda*. But what's the recipe for that beverage? It depends. You make [[*ice cream*] *soda*] by dropping *ice cream* into *soda*, but you make [*ice* [*cream soda*]] by dropping *ice* into *cream soda*.

R-1 The paragraph above used [**square brackets**] to distinguish two possible meanings of *ice cream soda*, one of them being the conventional meaning. Add brackets to each compound below to indicate whether the most likely meaning corresponds to [[X Y] Z] or [X [Y Z]].

a. *ice cream soda*

b. *science fiction writer*

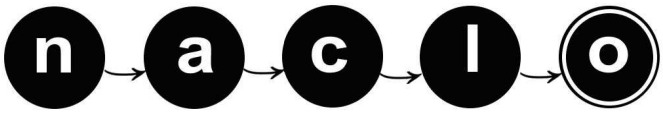
c. *customer service representative*

d. *state chess tournament*

e. *Mars Rover landing*

f. *plastic water cooler*

g. *typeface design report*



YOUR NAME: REGISTRATION #

R. One, Two, Tree (2/4)

R-2 Choose the most likely bracketing for the 4-word compound noun *country song platinum album*.

a. [*country* [*song* [*platinum album*]]]
b. [*country* [[*song platinum*] *album*]]
c. [[*country song*] [*platinum album*]]
d. [[*country* [*song platinum*]] *album*]
e. [[[*country song*] *platinum*] *album*]

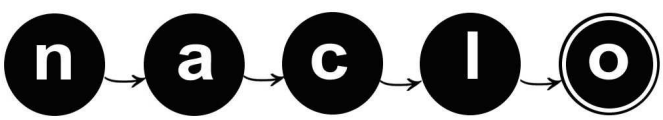
R-3 Give a plausible definition of [[*space mission*] [[*control freak*] *show*]]. (If you must use compound nouns in your definition, define them too.)

R-4 Show the most likely bracketing for the 8-noun sequence below. As in the examples above, your bracketing must have the form [X Y], where each of X and Y is either a single-word noun or a compound noun (which must also be written as a bracketing [X Y] and so on.)

family *board* *game* *togetherness* *effect* *government* *study* *author*

R-5 A computer program knows less about the world than you do, so it may have more trouble interpreting these sequences of nouns. How many bracketings must it choose among? Complete the following table by inserting the correct numbers for *f*(5), *f*(6), and *f*(7).

Number of words (call this *n*)	**Number of bracketings (call this *f*(*n*))**	
1	**1**	(Should be obvious)
2	**1**	(Should be obvious)
3	**2**	(As in R-1)
4	**5**	(As in R-2)
5		(As in R-3)
6		
7		



YOUR NAME: REGISTRATION #

R. One, Two, Tree (3/4)

Hint: A *very* slow way to solve this problem would be to systematically list all the bracketings for each *n*. R-2 shows a systematic list for *n*=4. Could this pattern be extended to *n*=5?

Hint: Suppose you were computing *f*(8) by laboriously listing all the bracketings for R-4. Some of your bracketings (not necessarily the correct one) would combine the noun *family board game* with the noun *togetherness effect government study author*. Of course, these would consider both of the possible bracketings for *family board game*… and how many bracketings for *togetherness effect government study author*?

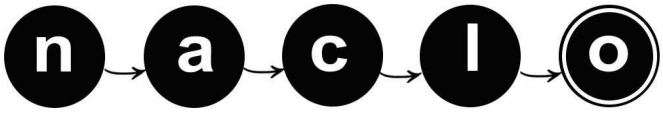
R-6 So far we've been using the rule "noun + noun = noun." English also allows "adjective + noun = noun" where an **adjective** is a word such as *smelly*. Phrases that include adjectives may still have multiple interpretations: [*smelly* [*skin lotion*]] versus [[*smelly skin*] *lotion*].

But a sequence of nouns and adjectives does behave differently from a sequence of nouns. *big fluffy pancake* can only be interpreted as [*big* [*fluffy pancake*]], and *samurai short sword* can only be interpreted as [*samurai* [*short sword*]]. The other interpretations are impossible or at least highly unlikely. For purposes of this problem, we will assume that the other interpretations are impossible, and explain this by saying that certain rules are "missing" from English. What are the "missing" rules?

R-7 For each phrase below, list all possible bracketings. The definition of "bracketing" is the same as in R-4, except that now X is also allowed to be a single-word adjective.

a. *roasted red potato pancake*

b. *crazy monkey cheap cider house*



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R. One, Two, Tree (4/4)

R-8 Recall from R-5 that there are *f(6)* possible bracketings for a sequence *Noun Noun Noun Noun Noun Noun*. How many bracketings are possible for each of the following 6-word sequences? Explain.

a. Adj Adj Adj Adj Adj Adj
b. Adj Adj Adj Adj Adj Noun
c. Adj Adj Adj Adj Noun Noun
d. Adj Adj Adj Noun Noun Noun

Hint: The second hint from R-5 may still be useful in R-8 and/or R-9.

R-9 How many bracketings are possible for each of these sequences? Explain.

a. Noun Adj Noun
b. Adj Noun Adj Noun
c. Noun Adj Noun Adj Noun
d. Adj Noun Adj Noun Adj Noun
e. Noun Adj Noun Adj Noun Adj Noun
f. Adj Noun Adj Noun Adj Noun Adj Noun