YOUR NAME: REGISTRATION #

# (O) CCG (1/2) [5 points]

One way for computers to understand language is by forming a structure that represents the relationships between words using a technique called Combinatorial Categorial Grammar (CCG). Computer scientists and linguists can use CCG to parse sentences (that is, try to figure out their structure) and then extract meaning from the structure.

As the name suggests, Combinatorial Categorial Grammar parses sentences by combining categories. Each word in a sentence is assigned a particular category; note that / and \ are two different symbols:

| | |
|---|---|
| I | NP |
| books | NP |
| sleep | S \ NP |
| enjoy | (S \ NP) / NP |

These categories are then combined in systematic ways. We will not explain how, but we will give you two successful parses…

| I | sleep |
|---|---|
| *NP* | *S \ NP* |
| *S* ◀ | |

| I | enjoy | books |
|---|---|---|
| *NP* | *(S \ NP) / NP* | *NP* |
| | *S \ NP* ▶ | |
| *S* ◀ | | |

...and four unsuccessful parses…

| enjoy | books |
|---|---|
| *(S \ NP) / NP* | *NP* |
| *S \ NP* ▶ | |

| I | sleep | books |
|---|---|---|
| *NP* | *S \ NP* | *NP* |
| *S* ◀ | | |

| I | enjoy |
|---|---|
| *NP* | *(S \ NP) / NP* |

| Books | I | sleep |
|---|---|---|
| *NP* | *NP* | *S \ NP* |
| | *S* ◀ | |

If a parse is successful, the sentence is declared "grammatical"; if not, the sentence is declared "ungrammatical".

YOUR NAME: REGISTRATION #

# (O) CCG (2/2)

O1. Using the above examples as evidence, figure out how CCG parses sentences, and describe it briefly here:

O2. In the sentence “I enjoy long books”, list all of the categories that, if assigned to “long”, make the sentence have a successful parse.

O3. Not every grammatical sentence of English will be declared “grammatical” by the process above. Using only the words “I”, “books”, “sleep”, and “enjoy”, form a grammatically correct English sentence that will fail to parse given the categories above. You don’t have to use all four of the words.