Syntax I Problem 3

A. Write out the current Phrase Structure Rules we are assuming for English (as of last class).

\[
\begin{align*}
S & \rightarrow NP \ VP \\
N & \rightarrow NN \\
NP & \rightarrow \{(D) (AP)^* N\} \\
& \quad \{ \text{pn} \} \\
PP & \rightarrow P \ NP \\
VP & \rightarrow V (NP)(AP)(PP) \\
AP & \rightarrow (Deg) A
\end{align*}
\]

B. For each of the following sentences, draw the tree(s) assigned to it by this grammar. If there are any problems, discuss them. If the grammar does not generate the sentence (and it is grammatical), revise the grammar so that the sentence is generated. Then draw its tree.

Assume here and from now on that the Lexicon contains all the English words you know; you may have to say something about particular lexical entries, where a Subcategorization Restriction needs to be recognized. Also assume the grammar contains the Determiner Rule and the Pronoun Case Rule, if you have heard of those things. Otherwise you may have more to worry about.

(1) I stabbed a man with a pitchfork.

This sentence is ambiguous so it could have different meanings based on how the complements are interpreted. For example, in this tree the noun phrase and the prepositional phrase is grouped with the verb to create a verb phrase, making the meaning of the sentence “I stabbed a man who possesses a pitchfork.”

```
   S
   |
   NP
   |
   \pn
   |   V
   |   |
   |   NP
   |   |
   |   \pp
   |   |
   |   I stabbed
   |   D
   |   N
   |   p
   |   NP
   |   a
   |   man with
   |   D
   |   N
   |   a
   |   pitchfork
```

For the second meaning, the grammar does not generate this meaning even though it is grammatical, so the phrase structure rule will have to be changed to

\[
NP \rightarrow \{(D) (AP)^* N (PP)^*\} \\
\{ \text{pn} \}
\]

in order for the grammar to generate this sentence.
When grouped this way, the sentence now means “By using a pitchfork, I stabbed a man.”

(2) A man with a pitchfork stabbed me.

(3) The flower in the pot on the windowsill turned brown in the sunlight.
   For this sentence, the verb ‘to turn’ can have multiple meanings so I think we need to create a subcategorization restriction for the word ‘turn’ used in this context. I would subcategorize this as
\[
\text{turn}_1,V[\_ (NP) AP (PP)]_{VP}.
\]
(4) Those children make me crazy with their chatter. I think that a subcategorization restriction should be recognized for the verb ‘make’ because there are multiple meanings for that word. The subcategorization I will use is $\text{make}\{\_\_\_\_\text{NP} \text{AP} (\text{PP})\}_\text{VP}$ for this sentence.

(5) The monkey saw the cover of the book in the cage. This sentence contains ambiguity in its meaning because of the prepositional phrases, so two syntax trees can be created based on this single sentence.

The meaning of this sentence would be that the monkey saw the book cover that was in the cage since all complements in “the cover of the book in the cage” are under one noun phrase based on the phrase structure rule $\text{NP} \rightarrow \{(\text{D} \text{ (AP)}^* \text{N} \text{ (PP)}^*)\}$

However, the grammar also allows a second meaning to be generated:
D. Now consider these:

(8) I shot the duck in the water.
(9) I put the duck in the water.

Can you explain (does our grammar explain) why (8) is ambiguous while (9) is not?

No, our grammar doesn’t explain why (8) is ambiguous while (9) is not. I think we would have to subcategorize the verb ‘to put’ in order to explain this discrepancy. The subcategorization would be put$_{vp}$[ NP (AP) PP]$_{vp}$ because ‘put’ needs to have both a noun phrase and a preposition phrase in order to be grammatical. This now explains why (9) is not ambiguous, because it is impossible to group “the duck in the water” together using the phrase structure rule NP $\rightarrow$ {D (AP)* N (PP)*} since it would remove the pronoun phrase necessary to form a verb phrase for the verb ‘put.’