1. Consider the following three conditions on coreference.

   a. Anaphors: an anaphor must refer to a c-commanding NP within the smallest TP that contains the anaphor.
   b. Pronouns: a pronoun cannot refer to a c-commanding NP within the smallest TP that contains the pronoun.
   c. Names (and other NPs): if a pronoun c-commands a name, the pronoun cannot refer to that name.

   a. Draw trees for the following examples. One tree can actually suffice for all five examples but for clarity you can draw individual trees. There are three NPs in this tree: (i) the NP corresponding to John, call this NP\(_1\), (ii) the NP corresponding to John’s mother, call this NP\(_2\), and (iii) the NP corresponding to the object, call this NP\(_3\). (12 pts.)

   (2) a. *John’s mother adores himself.
   b. John’s mother adores herself.
   c. John’s brother adores himself.
   d. John’s mother adores her.
   e. John’s mother adores him.

   (use the rules developed in class. Assume possessive NP’s are introduce by the following rule: NP \(\rightarrow\) (NP|D) (AP+) N. For now, we ignore the ‘s.)

   b. Using your tree(s) for (2), fill out the following table. If NP\(_i\) c-commands NP\(_j\), write yes in the box for (row i, column j), otherwise write no. (18 pts.)

   Table 1: c-command relations in the tree for (2)

<table>
<thead>
<tr>
<th></th>
<th>NP(_1)</th>
<th>NP(_2)</th>
<th>NP(_3)</th>
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<tbody>
<tr>
<td>NP(_1)</td>
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<td></td>
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<tr>
<td>NP(_2)</td>
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<tr>
<td>NP(_3)</td>
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</tbody>
</table>

   c. Using your tree(s) for (2) and the rules of coreference, answer the following questions. (12 pts.)

   (3) a. Why is (2a) ungrammatical?
   b. Why is (2b) grammatical?
   c. Why can’t himself refer to John in (2c)?
   d. Why can’t her refer to John’s mother in (2d)?
   e. Why can him refer to John in (2e)?

   d. We repeat the exercise but with a different structure. Draw trees for the following examples. One tree can actually suffice for all the examples but for clarity you can draw separate trees. There are three NPs in this tree: (i) the NP corresponding to the subject of thinks, call this NP\(_1\), (ii) the NP corresponding to the subject of adores, call this NP\(_2\), and (iii) the NP corresponding to the object of adores, call this NP\(_3\). (10 pts.)
(4)  a. *John thinks that Mary adores himself.
    b. Mary thinks that John adores himself.
    c. *Himself thinks that John adores Mary.
    d. Mary thinks that John adores him.
    e. John thinks that Mary adores him.
    f. He thinks that John adores Mary.
(use the rules developed in class.)

e. Using your tree(s) for (4), fill out the following table. If NP
   c-commands NP_j, write yes in the box for (row i, column j), otherwise write no. (18 pts.)

Table 2: c-command relations in the tree for (4)

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<tr>
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<th>NP_1</th>
<th>NP_2</th>
<th>NP_3</th>
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<td>NP_1</td>
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<td>NP_2</td>
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<td>NP_3</td>
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</table>

f. Using your tree(s) for (4) and the rules of coreference, answer the following questions. (12 pts.)

(5)  a. Why is (4a) ungrammatical?
    b. Why is (4b) grammatical?
    c. Why is (4c) ungrammatical?
    d. Why can’t him refer to John in (4d)?
    e. Why can him refer to John in (4e)?
    f. Why can’t him refer to John in (4f)?

g. We repeat the exercise one final time with another structure. Draw trees for the following examples. One
tree can actually suffice for all the examples but for clarity you can draw separate trees. There are three NPs in
this tree: (i) the NP corresponding to the subject of adore, call this NP_1, (ii) the NP corresponding to the object of
adores, call this NP_2, and (iii) the NP corresponding to the object of annoys, call this NP_3. (10 pts.)

    b. That Mary adores him annoys John.
    c. That Mary adores her annoys John.
    d. That Mary adores John annoys her.
    e. *That Mary adores John annoys herself.
    g. That Mary adores John annoys him.
( use the rules developed in class, recall that CPs can be subjects.)
h. Using your tree(s) for (6), fill out the following table. If NP_i c-commands NP_j, write yes in the box for (row i, column j), otherwise write no. (18 pts.)

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<thead>
<tr>
<th></th>
<th>NP_1</th>
<th>NP_2</th>
<th>NP_3</th>
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<tbody>
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<td>NP_1</td>
<td></td>
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<tr>
<td>NP_2</td>
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<td>NP_3</td>
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</table>

i. Using your tree(s) for (6) and the rules of coreference, answer the following questions. (12 pts.)

(7) a. Why is (6a) ungrammatical?
    b. Why is (6b) grammatical?
    c. Why can’t her refer to Mary in (6c) but can in (6d)?
    d. Why is (6e) ungrammatical?
    e. Why is (6f) ungrammatical?
    f. Why is (6g) grammatical?

2. Challenge Problem Set 3 on Irish on Pages 133-134 of your textbook. (5+5+5+5+5+15 pts.)

3. The following sentences are structurally ambiguous.

(8) a. The astronomer saw the student with a telescope.
   b. John and Mary’s friend might come for dinner.

   a. Using the phrase structure rules developed in class (keep in mind: NP → NP and NP; NP → NP N (for possessives, ignoring the ’s)), draw trees for the two readings of these sentences. Indicate which tree goes with which reading. (20 pts.)

   b. Keeping the structure the same, it is possible to change the words in (8) to bring out one reading or the other. Try to change as few words as possible.

   (9) (5 pts. each, 20 pts. total)
      a. Give a modification that favors the low attachment in (8a). Explain why your modifications favors the low attachment.
      b. Give a modification that favors the high attachment in (8a). Explain why your modifications favors the high attachment.
      c. Give a modification that favors the low attachment in (8b). Explain why your modifications favors the low attachment.
      d. Give a modification that favors the high attachment in (8b). Explain why your modifications favors the high attachment.

   c. Explain why the structural ambiguity disappears in the following closely related sentences.

   (10) (5 pts. each, 10 pts. total)
      a. The astronomer with a telescope saw the student.
      b. Mary’s friend and John might come for dinner.