Unit 3

The Problems of Finite-State Automata for Syntax

For Tuesday, do 3.1, 3.2, and 3.4. The rest is optional.

Exercise 3.1. Give a finite-state automaton that correctly handles Principle A for sentences of the form below:

(1) a. Mary likes herself.
b. John likes himself.
c. * The old woman likes himself.
d. * The old, ugly fisherman likes herself.

(2) a. John introduced himself/*herself to himself/*herself.
b. John introduced himself/*herself to him/her.
c. John introduced him/her to himself/*herself.

(3) a. Mary thinks that Bill/Sue thinks that John likes himself/*herself.
b. Mary seems to Bill to appear to John to like herself/*himself. ⊙

Exercise 3.2. How does your automaton need to be modified to also handle this sentence:

(4) The man that Mary says that she seems to like himself/*herself. ⊙

Exercise 3.3. Bavarian German has inflected complementizers. This means that certain complementizers (sometimes optionally) agree in number and person with the subject of their clause.

(5) a. I sags da wann-st (du) dran bist.
I tell.it you.SG when(-2.SG) (you) next are
b. I sags da wann(-st) du dran bist.
I tell.it you.SG when(-2.SG) (you) next are
c. I sags euch wann-ts (es) dran seids.
I tell.it you.PL when(-2.PL) (you) next are
d. I sags euch wann(*-ts) ihr dran seids.
I tell.it you.PL when(-2.PL) you next are
'I'll tell you when you're next.'

Other inflected complementizers include *wenn* 'if' and for some speakers *dass* 'that'. No other person-number combinations show inflection, only second person singular and plural does. For second person plural, the subject must be *es*, not the semantically equivalent *ihr*.

Interesting things happen with coordinated subjects:

(6) a. ...wenn(-st)/(*-ts) [du und die Maria] woll-ts/-en.
...if-2.SG/*-2.PL [you.SG and the Mary] want-2.PL/-3.PL
'...if you and Mary want to.'

b. ...wenn(*-st)/(*-ts) [die Maria und du] woll-ts/-en.
...if-2.SG/*-2.PL [the Mary and you.SG] want-2.PL/-3.PL

(7) a. ...wenn-ts [es und die Maria] woll-ts/-en.
...if-2.PL [you.PL and the Mary] want-2.PL/-3.PL
'...if you and Mary want to.'

b. ...wenn(*-ts) [die Maria und es] woll-ts/-en.
...if-2.SG/*-2.PL [the Mary and you.PL] want-2.PL/*-3.PL

(8) a. ...wenn(*-ts) [ihr und die Maria] woll-ts/*-en.
...if-2.PL [you.PL and the Mary] want-2.PL/*-3.PL
'...if you and Mary want to.'

b. ...wenn(*-ts) [die Maria und ihr] woll-ts/*-en.
...if-2.SG/*-2.PL [the Mary and you.PL] want-2.PL/*-3.PL

Agreement can also operate across intervening adverbs and dative arguments:

(9) Wenn-st gestern dem Hans (du) derart deppert kumm-st,
If-2.SG yesterday the.DAT Hans (you.SG) this stupid come-2.SG,
brauch-st (du) di net wundern dass er di heut verarscht.
need-2.SG (you.SG) SE not wonder that he you today mocks
'If you acted like an idiot towards Hans yesterday, you shouldn't be surprised that he's mocking you today.'

Provide two finite-state automata, one for subject-verb agreement, and one for complementizer-subject agreement. Together, they should correctly account for the contrasts noted above. Then construct an automaton that enforces both agreement patterns. Are the regularities of the original two automata easy to discern in this automaton? ⊙

Exercise 3.4. Icelandic allows long-distance agreement between subjects and the finite verb.

(10) Það voru konugi gefnar ambátt-ir í vettur.
there were king.DAT given slaves.NOM in winter
'Slaves were given to the king in the winter.

Surprisingly, long-distance agreement is optional in bi-clausal constructions.

(11) a. Einhverjum stúdent finnst tölvurnar ljótar.
Some.DAT student.DAT finds.SG computers.DEF.NOM ugly.NOM

b. Einhverjum stúdent finnast tölvurnar ljótar.
Some.DAT student.DAT finds.PL computers.DEF.NOM ugly.NOM
'Some student finds the computers ugly.'

And to complicate matters even further, a linearly intervening dative argument blocks long-distance agreement.

(12) a. Það virðist einhverjum manni hestarnir vera seinir.
There seems.SG some.DAT man.DAT horses.DEF.NOM be slow.NOM

b. * Það virðast einhverjum manni hestarnir vera seinir.
There seems.PL some.DAT man.DAT horses.DEF.NOM be slow.NOM
'The horses seem slow to some man.'

Construct a finite-state automaton that captures the contrast above. To simplify things, you may assume that every string contains exactly one finite verb and that nominative and dative arguments can be unambiguously identified based on their case suffix. ⊙

Exercise 3.5. At an abstract level, inflected complementizers in Bavarian German and Icelandic long-distance agreement seem very similar in that they both can operate locally or at a distance, and are sometimes optional. Only the latter seems to be subject to a robust intervention effect, however. Are these similarities and discrepancies readily apparent from the automata you drew in the previous exercises? ⊙