6.034 Recitation 5: Frame System Solutions 10/22/04

LOrtiz (Orig. by KKoile)

Note: Other solutions to problems 1-3 are possible.

1. Create *role frames* for the following sentences. (With these examples, represent a trajectory with a phrase, e.g. "to the theatre", rather than with a trajectory frame.)

   a. John fried some eggs for Mary in a frying pan.
   b. Robbie went to the theatre with Suzie.
   c. The plants were grown with fertilizer by Pat.

a.

Actor	John
Act	fry
Beneficiary	Mary
Object	eggs
Instrument	frying pan

b.

Actor	Robbie
Act	go
Coagent	Suzie
Trajectory	to theatre
Conveyance	foot

c.

Actor	Pat
Act	grow
Object	plants
Instrument	fertilizer

2. Create *trajectory frames* for sentences b and c above. Why is it difficult to use a trajectory frame to represent sentence a? (Use the definition of trajectory frame described in class and in the recitation notes. You might also work out a trajectory frame representation that uses the more structured frame system used in Problem Set 3. It uses the terms Go, Path, etc..)

b.

Agent	Robbie
Object	Robbie's body
Destination	theatre
Result	at theatre

Note: There's no good way to represent Suzie in b. The best representation would be a role frame with a trajectory frame as the value of the trajectory slot. Also, the result frame could be a transition frame. What might it look like?

c.

Agent	Pat
Object	fertilizer
Source	bag
Destination	plants
Result	size increase

Note: The result slot could be a transition frame. What might it look like?

It's difficult to represent sentence a using a trajectory frame because the sentence is describing the roles being played, rather than a trajectory. There's no good way to represent "for Mary" in a trajectory frame.

3. Alyssa P. Hacker was working on the description of a car crashing into a wall using a *transition frame representation*. After some thought, she settled on a description using two variables: car speed, and distance between car and wall. Unfortunately, she had to leave before filling out the frame information. Please finish her work.

After you finish with Alyssa's work, Ben Bitdiddle walks in and notices, "Wait! I can describe a kiss the same way – as lips crashing into another person." Revise Alyssa's original description to differentiate the two (very obviously) different situations and show Ben a counter example to his claim.

Car crashing into wall

Speed	Not Δ	D	Not A
Distance	↓	D	Not A

Car crashing into wall (revised)

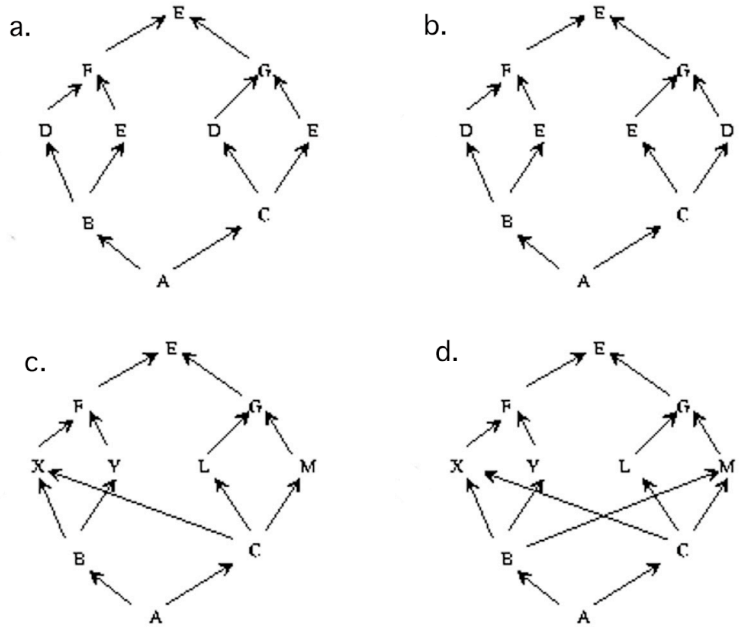
Speed	Not Δ	D	Not A	Not A
Distance	↓	D	Not A	Not A
Integrity	Not Δ	Not Δ	Δ	Not Δ

Kissing

Speed	↓	D	A	↑
Distance	↓	D	A	↑
Integrity	Not Δ	Not Δ	Not Δ	Not Δ

Note: In order to support inference about cause and effect, an effect must be explicitly represented (e.g. integrity), and events must be not occur in the same time slot. If distance to wall disappeared in one time slot, and speed disappeared in the next, for example, a program could infer that the speed disappeared because the car crashed into the wall.

4. Use *topological sorting* to provide a linearization of the inheritance hierarchies shown below. If there is no such linearization, explain why. Use alphabetical order to resolve ambiguities.



a. No solution. E is its own superclass.
b. No solution. E is its own superclass. Also D appears left of E in one set of superclasses, and D appears right of E in another.
c. sub-before-super, and left-before-right constraints:
(A B) (B C) (B X) (X Y) (C X) (X L) (L M) (X F) (Y F) (L G) (M G) (F E) (G E)
Order: **(A B C X L M G Y F E)**
d. sub-before-super and left-before-right constraints:
(A B) (B C) (B X) (X Y) (Y M) (C X) (X L) (L M) (X F) (Y F) (L G) (M G) (F E) (G E)
Order: **(A B C X L Y F M G E)**