60/69 +3 = 63/69 = 91% [redacted]

10/30/17

9AM DIS ___

Midterm exam

Ethan Poole
LING 120C: Semantics I

Note: You may use the textbook (Heim & Kratzer 1998) and your class notes on this midterm exam.

1

4 points −2

Please complete the following:

2/4

(a) The ~~in~~ ex tension of a sentence is the thing the expression refers to at a given world & time [truth value] ~~CEO of USA~~

(b) The ~~ex~~ in tension of a sentence is the general concept behind the expression that defines what the expression's extension is at a given world & time [truth condition] ~~Donald Trump (currently)~~

2

5 points

Please briefly describe how our semantic system based on **truth values** is able to derive **truth conditions**.

−2

To know the meaning of a sentence is to know its truth conditions. And, as sentences are composed of discrete parts — each of which denote truth values, the conditions of the sentence as a whole depends on the functional application of the individual truth values saturating one another in the sentence. to compose its meaning.

assume [[S]] = T and work backwards

3 *10 points*

Please answer the following comprehension questions about functions.

(a) What is the domain and the range of the following function? What is $f(\text{LA})$?

$f = \{\langle \text{NYC, de Blasio}\rangle, \langle \text{LA, Garcetti}\rangle, \langle \text{Chicago, Emanuel}\rangle\}$

Domain { NYC, LA, Chicago }

Range { de Blasio, Garcetti, Emanuel }

f(LA) = Garcetti

(b) Please define the following function using λ-notation:

$g = \{\langle 1, 1\rangle, \langle 2, 4\rangle, \langle 3, 9\rangle, \langle 4, 16\rangle, \langle 5, 25\rangle\}$

I = Integers

$[\lambda x : x \in N . x^2]$

1-5

(c) Please use λ-conversion to calculate the value of the following expression (show each step):

$[\lambda x : x \in \mathbf{N} . [\lambda z : z \in \mathbf{N} . x + z]](4)(5)$

(remember that **N** is the set of natural numbers)

$= [\lambda z : z \in N . 4 + z](5)$

$= 4 + 5 = 9$

(d) What is the semantic type of the following function?

$\lambda x : x \in D_e . \lambda y : y \in D_e . \lambda z : z \in D_e . z$ introduces x to y

$\langle e, \langle e, \langle e, t\rangle\rangle\rangle$

(c) Please define the following function using λ-notation:

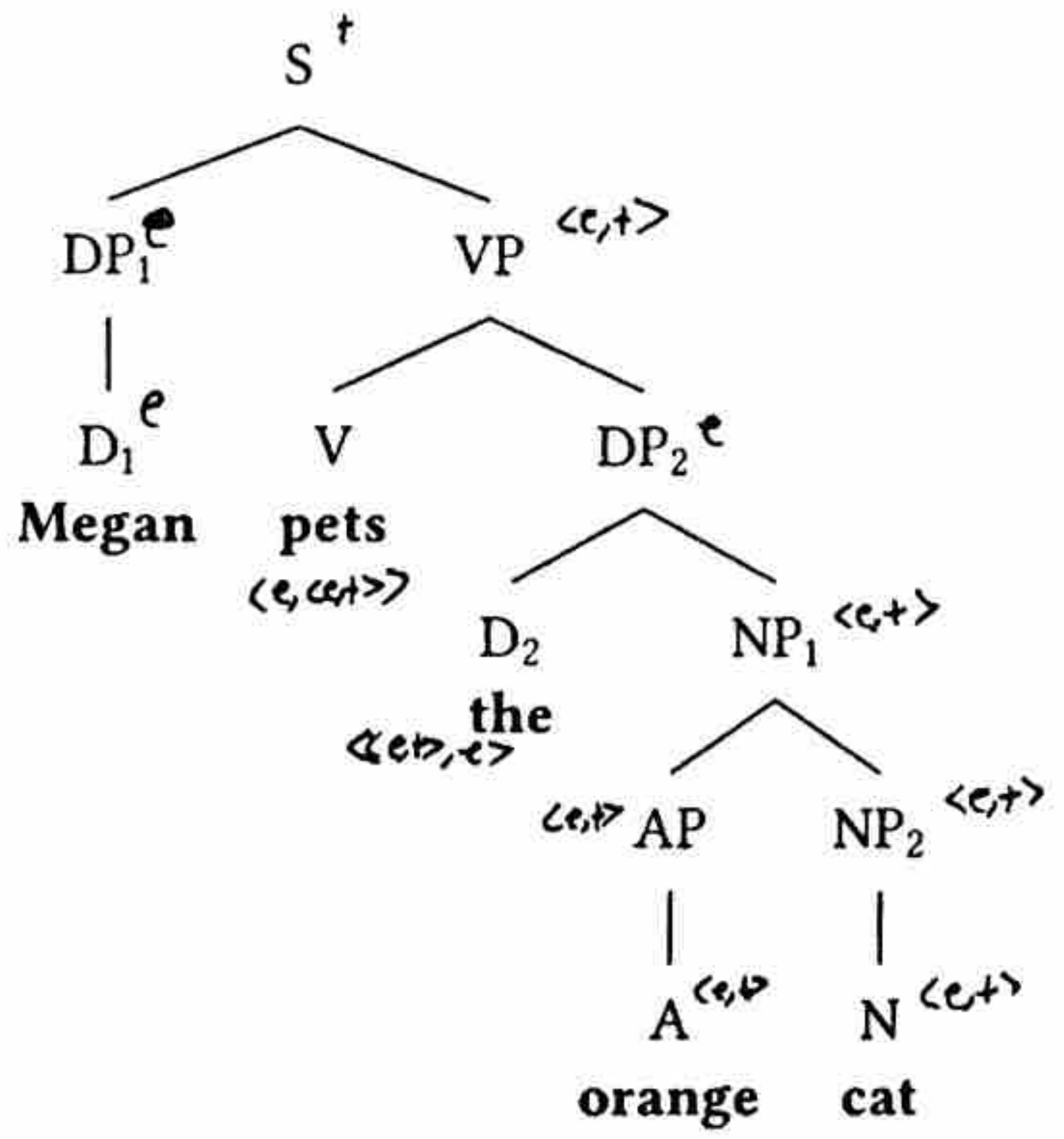
$g : D_e \to D_{\langle e,t \rangle}$
for every $x \in D_e$, $g(x) = i_x : D_e \to D_t$
for every $y \in D_e$,
$i_x(y) = T$ iff y hits x

$[\lambda x_e . [\lambda y_e . y \text{ hits } x]]$

4 | 30 points

On the next sheet, please use our semantic-composition rules (listed on the last page) to compute the truth conditions of the following sentence:

-1



Be sure to show each step of the derivation and to indicate the semantic-composition rule or other deduction (e.g. λ-conversion or a subproof) used at each step.

SUBPROOF 1

$[\![DP_1]\!]$ = NN

$[\![D_1]\!]$ = TN

★ Megan

SUBPROOF 2

$[\![AP]\!]$ = NN

$[\![A]\!]$ = TN

★ $[\lambda x_e .$ x is orange$]$

SUBPROOF 3

$[\![NP_2]\!]$ = NN

$[\![N_2]\!]$ = TN

★ $[\lambda x_e .$ x is a cat$]$

SUBPROOF 4

$[\![NP_1]\!]$ = PM

$[\lambda x_e . [\![AP]\!](x) = T$ and $[\![NP_2]\!](x) = T]$

= by λ conv

$[\lambda x_e . [\lambda x_e .$ x is orange$](x) = T$ and $[\lambda x_e .$ x is a cat$](x) = T]$

= by λ conv

★ $[\lambda x_e .$ x is orange and x is a cat$]$

SUBPROOF 5

$[\![D_2]\!]$ = TN

★ $[\lambda f_{\langle e,t\rangle} : \exists! x[f(x)=T] . \iota y[f(y)=T]]$

SUBPROOF 6

$[\![DP_2]\!]$ = FA

$[\![D_2]\!]([\![NP_1]\!])$ = 5, 4

$[\lambda f_{\langle e,t\rangle} : \exists! x[f(x)=T] . \iota y[f(y)=T]](\lambda x_e .$ x is orange & x is a cat$)$ = λ conven

$\iota y[[\lambda x_e .$ x is orange & x is a cat$](y) = T]$, where $\exists! x[f(x)=T]$ = λ conv
x is orange and x is a cat -1

★ $\iota y[$ y is orange & y is a cat$]$, where $\exists! y\,(f(y)=T]$

SUBPROOF 7

$[\![V]\!]$ = TN

= $[\lambda x_e . (\lambda y_e .$ y pets x$)]$

SUBPROOF 8

$[\![VP]\!]$ = FA

$[\![V]\!]([\![DP_2]\!])$ = 7, 6

$(\lambda x_e . [\lambda y_e .$ y pets x$)]\,(\iota z\,[$z is orange & z is a cat$]$, where $\exists! z[$z is orange & z is cat$])$

★ $[\lambda y_e .$ y pets $[\iota z[$z is orange & z is a cat$]$, where $\exists! z\,[$z is orange & z is cat$]]]$

$[\![S]\!]$ = T iff by FA

$[\![VP]\!]([\![DP_1]\!])$ = T iff by 1, 8

$[\lambda y_e .$ y pets $[\iota z[$z is orange & z is cat$]$, where $\exists! z\,[$z is orange & z is cat$]]]\,($Megan$)$ = T iff by λ-conv

★ Megan pets $\iota z[$z is orange & z is cat$]$, where $\exists! z\,[$z is orange & z is cat$]$

★ QED □

because I'm fancy

5 *20 points*

The English cleft construction is exemplified by sentences like those below:

(1) a. It is Lisa who Jane loves.

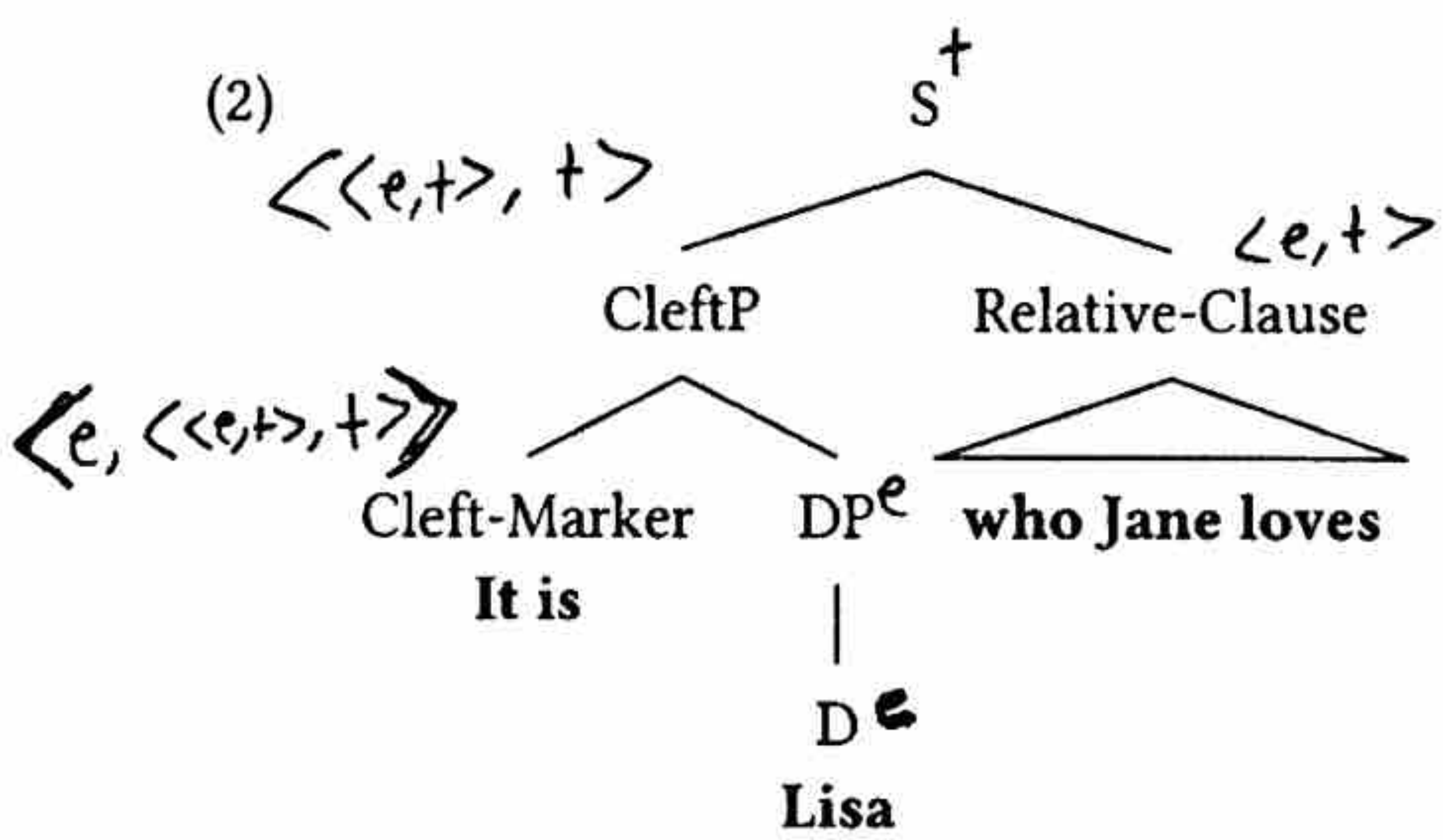
b. It is Lisa who loves Jane.

c. It is Ellen who Jane loves.

d. It is Ellen who loves Jane.

We will assume that this construction has the following, oversimplified syntax:

(2)



In this exercise, you will be working out a compositional semantics for the English cleft construction. To begin with, let us assume the lexical entries below:

(3) a. $[\![$**Lisa**$]\!]$ = Lisa   e

b. $[\![$**Ellen**$]\!]$ = Ellen   e

c. $[\![$**who Jane loves**$]\!] = \lambda x_e$. Jane loves x <e, t>

d. $[\![$**who loves Jane**$]\!] = \lambda x_e$. x loves Jane   <e, t>

Question 1: [5 points]

Assuming the syntax in (2) and the lexical entries in (3), what could the semantic type of the Cleft-Marker **it is** be? [*Note:* There are two possibilities.]

$\langle e, \langle\langle e,t\rangle, t\rangle\rangle$

Linguists have long observed that the English cleft carries a particular *presupposition.* As indicated below, a cleft of the form **It is DP Relative-Clause** presupposes that there is exactly one thing that the relative clause is true of. For example:

PRESUPPOSITIONS

(4) a. **It is Lisa who Jane loves** presupposes there is exactly one *x* such that Jane loves *x*. $\exists! x$ [Jane loves x]

b. **It is Ellen who loves Jane** presupposes there is exactly one *x* such that *x* loves Jane. $\exists! x$ [x loves Jane]

Question 2: [5 points]

Use a diagnostic to show that the presuppositions in (4) are indeed correct.

one way to prove a presupposition's correctness is to check if presupposition failure (aka undefined extension) persists despite negating the original sentence (thus neither T nor F)

under the presuppositions, [[It is DP Rel-Clause]] can only take as argument 1 entity x that unique in this world.

Thus, one example of an input that would give an undefined extension is cats.

It is cats Jane loves

presupposes: there is exactly one x (DP) such that Jane loves x (Rel Clause)

It is not the case that it is cats Jane loves.

presupposes: there is exactly one x such that Jane loves x.

Indeed, ambiguity of what "cat" referred to persists in keeping the truth value of the sentence as a whole unclear even after negation

It's not the case that it's Lisa who Jane loves

[[It's Lisa who Jane loves]] = T iff Jane loves Lisa + presupposed

Jane loves x

Linguists have also long observed that, aside from its presupposition, the English cleft construction does not seem to differ much in meaning from the 'non-clefted' counterpart. That is, the following truth-conditional statements seem accurate:

TRUTH CONDITIONS

(5) a. clefted **It is Lisa who Jane loves** is T iff Lisa is the unique *y* such that Jane loves *y*.

b. non-clefted **It is Ellen who loves Jane** is T iff Ellen is the unique *y* such that *y* loves Jane.

$\langle e, \langle\langle e,t\rangle, t\rangle\rangle$

(−8) −4

Question 3: [10 points]

Provide a lexical entry for the Cleft-Marker **it is** that predicts the truth-conditional statements in (5) and the presuppositions in (4). (You only need to give the lexical entry. You do *not* have to provide a truth-conditional derivation.)

~~$\lambda f_{\langle e,t\rangle} : \exists! x [f(x)=T] . \iota$~~

~~$\lambda x_e : \exists! x [\lambda f_{\langle e,t\rangle} . f(x) = T] . \lambda g_{\langle\langle e,t\rangle,t\rangle} . g(f)$~~

presupp here w/ λf, otherwise f doesn't get bound by the λ, which the correct meaning requires

$[\lambda x_e$: there is exactly one x such that $[\lambda f_{\langle e,t\rangle} . f(x) = T] [\lambda g_{\langle e,t\rangle} . g(x)]]$

not type $\langle e, \langle\langle e,t\rangle, t\rangle\rangle$

$\lambda x_e \, \lambda f_{\langle e,t\rangle} : \exists! y [f(y)=T] \, . \, f(x) = T$

$\langle\langle e,t\rangle, e\rangle$

$[\![\text{the}]\!] = \lambda f_{\langle e,t\rangle} : \exists! x [f(x)=T] \, . \, \iota y [f(y)=T]$

Big Hint: Consider the way that our lexical entry for **the** captures the presupposition with which it is associated.

Bigger Hint: Your answer should analyze CleftP (i.e. **It is Lisa**) as being of semantic type $\langle\langle e,t\rangle, t\rangle$.

"It is Lisa who Jane loves" = T iff Jane loves Lisa

$[\![\text{it is}]\!]([\![\text{DP}]\!])([\![\text{who Jane loves}]\!])$ = DP is the unique x such that Jane loves x

(6) **Semantic-composition rules**

a. **Nonbranching Nodes (NN)**
If α is a nonbranching node, and β is its daughter node, then $[\![\alpha]\!] = [\![\beta]\!]$.

b. **Functional Application (FA)**
If α is a branching node, $\{\beta, \gamma\}$ is the set of α's daughters, and $[\![\beta]\!]$ is a function whose domain contains $[\![\gamma]\!]$, then $[\![\alpha]\!] = [\![\beta]\!]([\![\gamma]\!])$.

c. **Terminal Nodes (TN)**
If α is a terminal node, $[\![\alpha]\!]$ is specified in the lexicon.

d. **Predicate Modification (PM)**
If α is a branching node, $\{\beta, \gamma\}$ is the set of α's daughters, and $[\![\beta]\!]$ and $[\![\gamma]\!]$ are both in $D_{\langle e,t\rangle}$, then $[\![\alpha]\!] = \lambda x \in D_e \, . \, [\![\beta]\!](x) = T$ and $[\![\gamma]\!](x) = T$.