Chương 8

1) Simplify following formulas using lambda reduction:

a) (lambda x (P x)) A)

b) (lambda x (x A)) (lambda y (Q y)))

c) ((lambda x ((lambda y (P y)) x)) A)

Giải

a) (lambda x (P x)) A) = PA

b) (lambda x (x A)) (lambda y (Q y))) = (lambda y (Q y)) A = QA

c) ((lambda x ((lambda y (P y)) x)) A) = (lambda y (P y)) A = PA

2) Using the interpretation rules defined in this chapter and defining any rules that you need, give a detailed trace of the interpretation of the sentence *The man gave the apple to Bill*. Give the analysis of each constituent and show its SEM feature.

Giải

The: ART SEM THE

man: N SEM MAN1, VAR m1

Theo luật 7

CNP SEM ?semn -> N SEM ?semn,

=> **man: CNP SEM m1**

Theo luật 6

NP VAR ?v SEM <?semart ?v (?semcnp ?v)>) -> (ART SEM ?semart) (CNP SEM ?semcnp),

=> **The man: NP SEM <THE m1 (MAN m1)>, VAR m1**

gave: V SEM <PAST GIVE>, VAR g1

the: ART SEM THE

apple: N SEM APPLE1, VAR a1

Theo luật 7

CNP SEM ?semn -> N SEM ?semn,

=> **apple: CNP SEM a1**

Theo luật 6

NP VAR ?v SEM <?semart ?v (?semcnp ?v)>) -> (ART SEM ?semart) (CNP SEM ?semcnp),

=> **the apple: NP SEM <THE a1 (APPLE a1)>, VAR a1**

Theo luật 3

VP VAR ?v SEM (lambda a3 (?semv ?v a3 ?semnp)) -> (V[_np] SEM ?semv) (NP SEM ?semnp)

=> **gave the apple: VP SEM (lambda x (<PAST GIVE> g1 x <THE a1 (APPLE a1)>)), VAR g1**

to: TO-POSS

Bill: NAME SEM “Bill”, VAR b1

Theo luật 5

NP VAR ?v SEM (NAME ?v ?semname) -> NAME SEM ?semname

=> **Bill: NP SEM (NAME b1 “Bill”), VAR b1**

Theo luật 8

PP PRED+ SEM (lambda x (?semp x ?semnp)) -> (P SEM ?semnp) (NP SEM ?semnp)

=> **to Bill: PP PRED+ SEM (lambda x (<TO-POSS> x <NAME b1 “Bill”>))**

Theo luật 10

VP VAR ?v SEM (lambda ag1 (& (?semvp ag1) (?sempp ?v))) -> (VP SEM ?semvp) (PP PRED+ SEM ?sempp)

=> **gave the apple to Bill: VP SEM (lambda x (& (<PAST GIVE> g1 x <THE a1 (APPLE a1)>) (<TO-POSS> <NAME b1 “Bill”>))), VAR g1**

Theo luật 1

S SEM (?semvp ?semnp) -> (NP SEM ?semnp) (VP SEM ?semvp)

=> **The man gave the apple to Bill:**

S SEM ((<PAST GIVE> g1 <THE m1 (MAN m1)> <THE a1 (APPLE a1)>)

(<TO-POSS> <NAME b1 "Bill">)), VAR g1 VAR m1

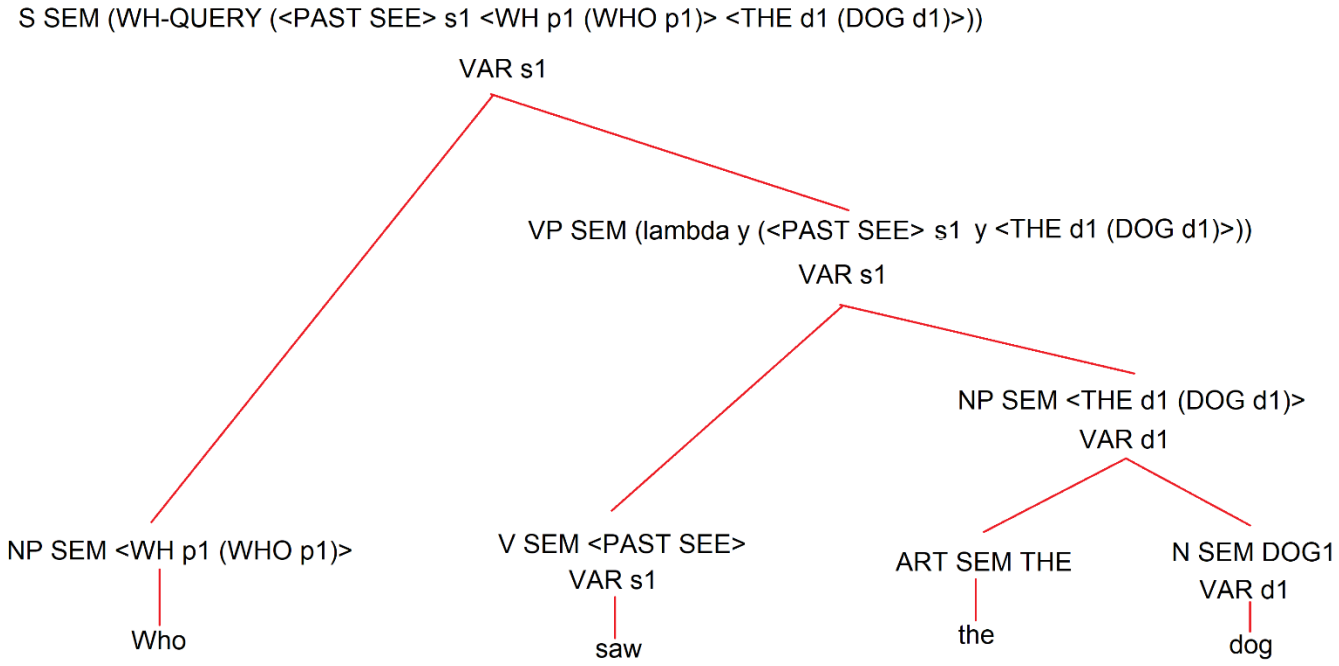
3) Draw the parse trees showing the semantic interpretation for the constituents for following questions. Give the lexical entries showing the SEM feature for each word used that is not defined in this chapter, and define any additional rules needed that are not specified in this chapter.

a) Who saw the dog?

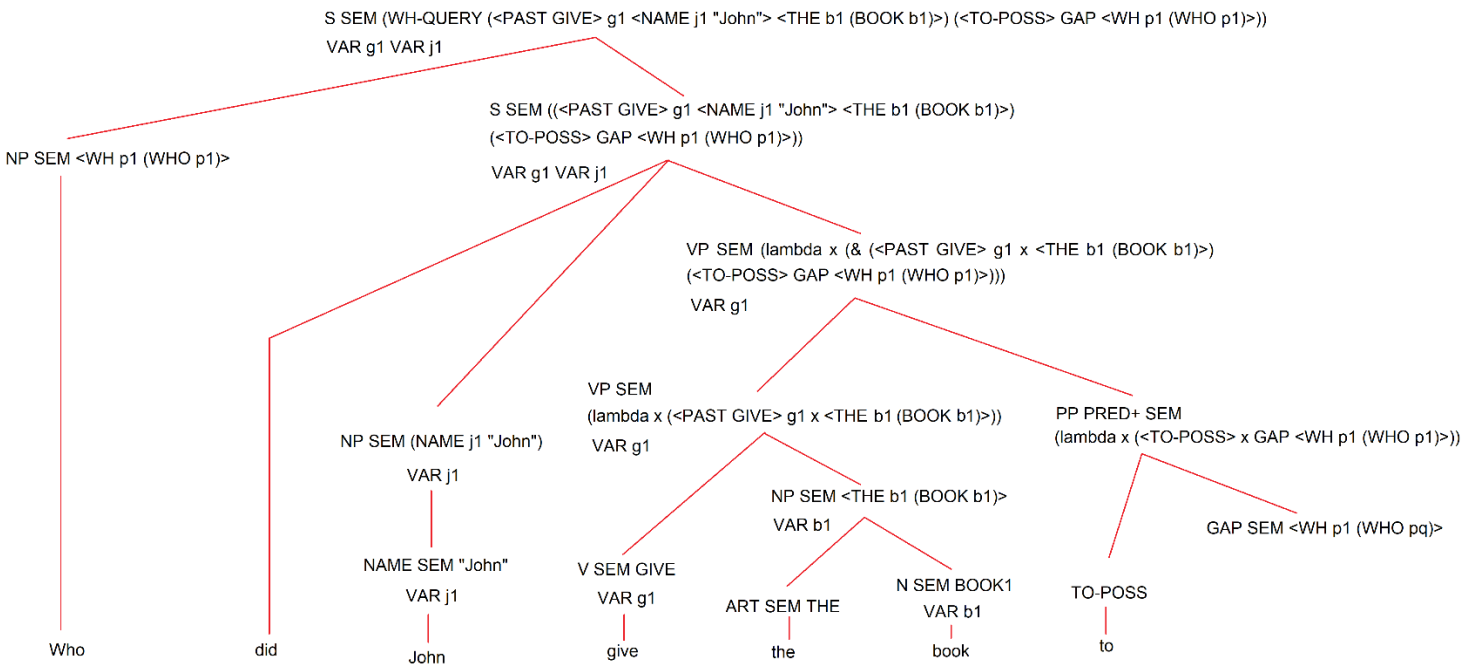
b) Who did John give the book to?

Giải

a)



b)


S SEM (WH-QUERY (<PAST GIVE> g1 <NAME j1 "John"> <THE b1 (BOOK b1)>) (<TO-POSS> GAP <WH p1 (WHO p1)>))
VAR g1 VAR j1
NP SEM <WH p1 (WHO p1)>
S SEM ((<PAST GIVE> g1 <NAME j1 "John"> <THE b1 (BOOK b1)>)
(<TO-POSS> GAP <WH p1 (WHO p1)>))
VAR g1 VAR j1
VP SEM (lambda x (& (<PAST GIVE> g1 x <THE b1 (BOOK b1)>)
(<TO-POSS> GAP <WH p1 (WHO p1)>)))
VAR g1
NP SEM (NAME j1 "John")
VAR j1
VP SEM
(lambda x (<PAST GIVE> g1 x <THE b1 (BOOK b1)>))
VAR g1
PP PRED+ SEM
(lambda x (<TO-POSS> x GAP <WH p1 (WHO p1)>))
NP SEM <THE b1 (BOOK b1)>
VAR b1
GAP SEM <WH p1 (WHO pq)>
NAME SEM "John"
VAR j1
V SEM GIVE
VAR g1
ART SEM THE
N SEM BOOK1
VAR b1
TO-POSS
Who
did
John
give
the
book
to