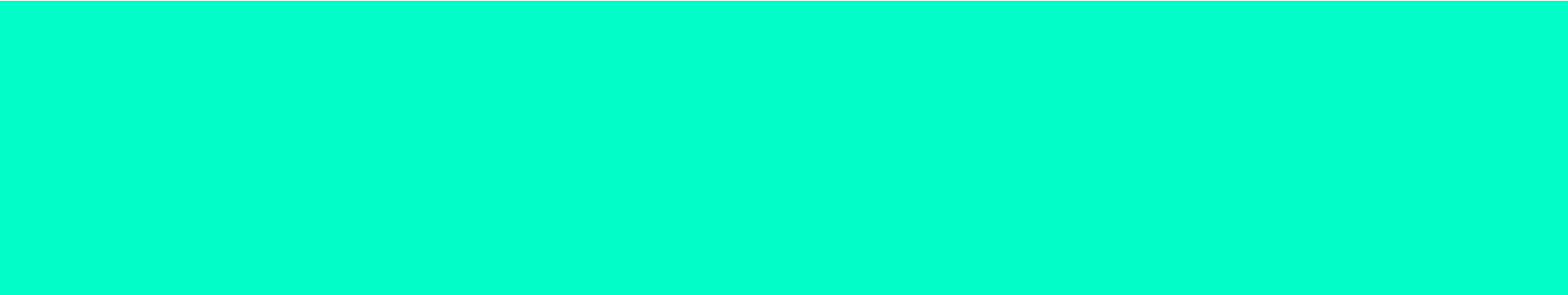


AMBIGUITY AND TREE DIAGRAMS



AMBIGUITY



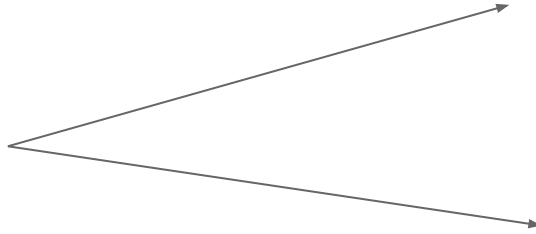
WHAT IS AMBIGUITY?

Ambiguity is a property of strings of symbols, such as a word or a sentence.

A string in language L is **ambiguous** if and only if it has more than one meaning within L .

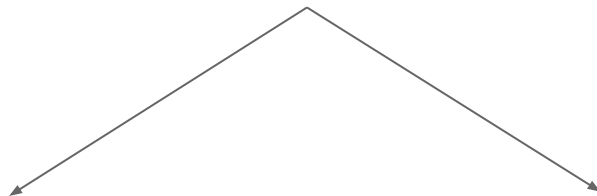
EXAMPLES OF AMBIGUITY

‘bank’



EXAMPLES OF AMBIGUITY (2)

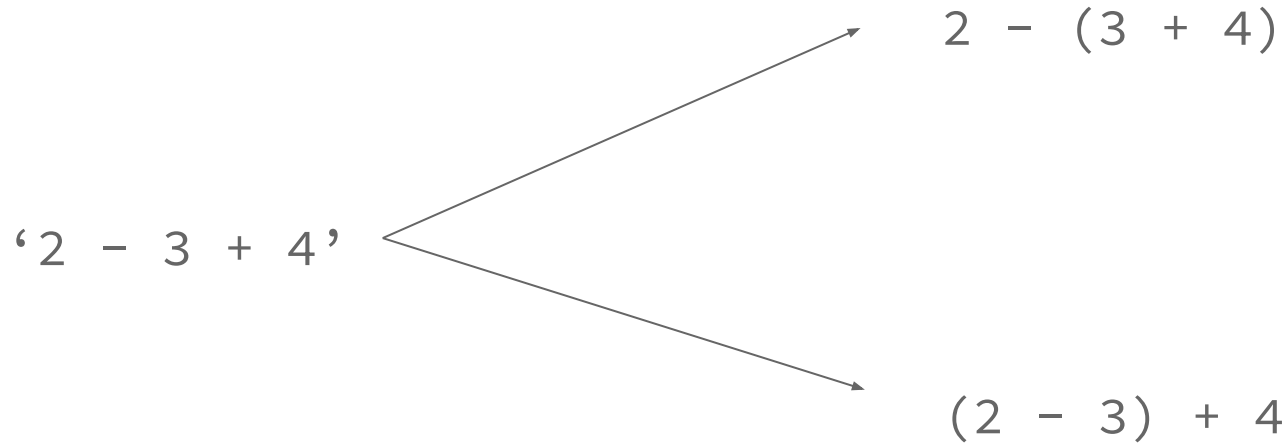
‘Alexis said on Tuesday an exam will be held.’



Alexis said that: an exam will be held on Tuesday.

On Tuesday, Alexis said that: an exam will be held.

EXAMPLES OF AMBIGUITY (3)



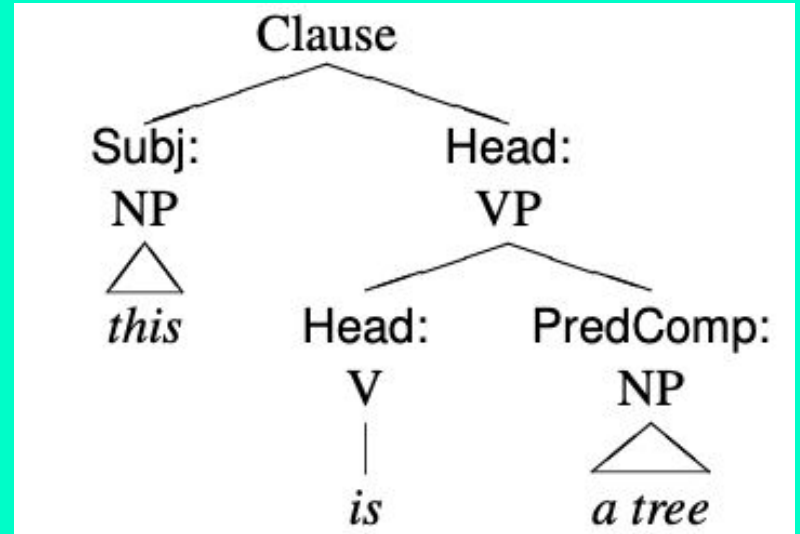
RESOLVING ARITHMETIC AMBIGUITY

In order to resolve ambiguity in written arithmetic language, we can use brackets or we can create a rule that resolves ambiguity caused by different orderings of operations (PEMDAS).

RESOLVING AMBIGUITY IN NATURAL LANGUAGES

In order to resolve ambiguity in natural languages such as English, linguists use **tree diagrams** or **tree structures**.

TREE DIAGRAMS

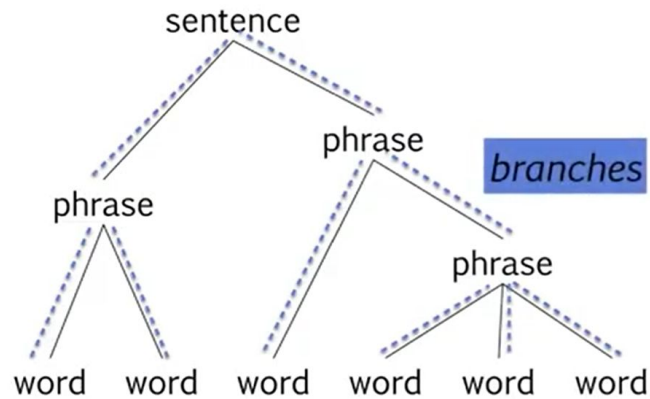


WHAT ARE TREE DIAGRAMS?

Tree diagrams are graphical illustrations of the way sentences are composed from smaller linguistic units.

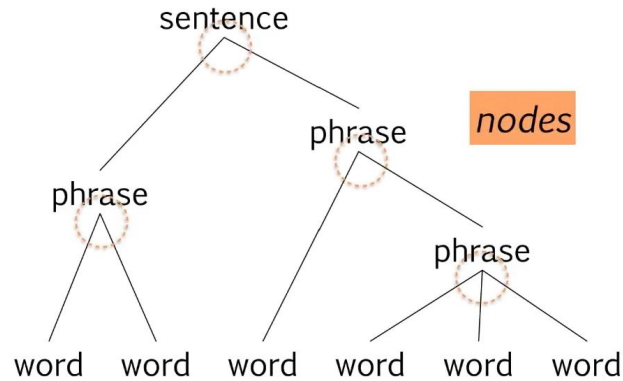
With tree diagrams, we can represent different compositional structures from the same parts, allowing us to disambiguate the two meanings of 'Alexis said on Tuesday there will be an exam'.

TERMINOLOGY FOR TREE DIAGRAMS



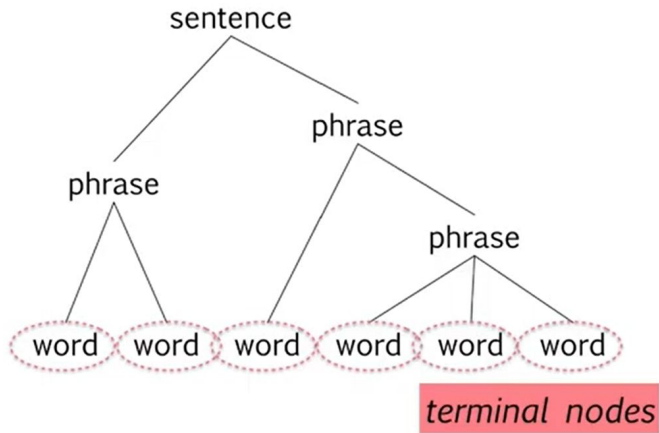
Branches indicate which constituents together form a phrase

TERMINOLOGY FOR TREE DIAGRAMS (2)



Nodes are linguistic units like words, phrases, and sentences.

TERMINOLOGY FOR TREE DIAGRAMS (3)



Terminal Nodes are nodes with no constituents

COMPOSITIONAL RULES FOR TREE DIAGRAMS IN ENGLISH

Permissible Noun Phrases (NP)

1. NP \rightarrow Det N
2. NP \rightarrow NP PP
3. NP \rightarrow N
4. NP \rightarrow Adj N

Permissible Prepositional Phrases (PP)

5. PP \rightarrow P NP

Permissible Sentences (S)

6. S \rightarrow NP VP

Permissible Verb Phrases (VP)

7. VP \rightarrow V NP
8. VP \rightarrow VP PP
9. VP \rightarrow V
10. VP \rightarrow V CP
11. VP \rightarrow Aux VP

Permissible Complementizer Phrases (CP)

12. CP \rightarrow C S

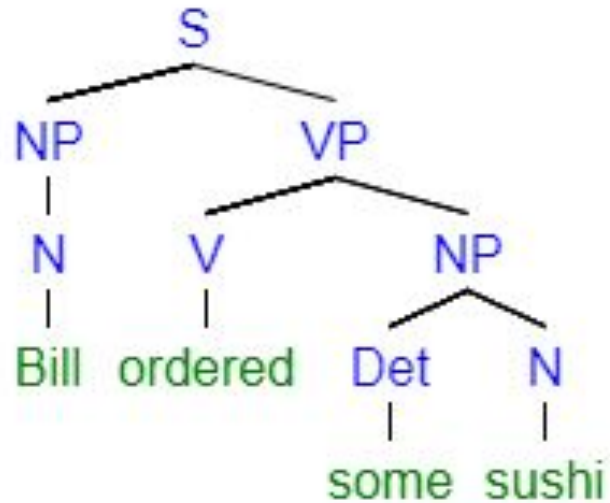
'Det' = Determiner 'N' = Noun 'Adj' = Adjective
'P' = Preposition 'V' = Verb 'Aux' = Auxiliary
'C' = Complementizer

TREE DIAGRAM EXAMPLES

Sentence: Bill ordered some sushi.

Rules:

1. NP \rightarrow Det N
3. NP \rightarrow N
6. S \rightarrow NP VP
7. VP \rightarrow V NP

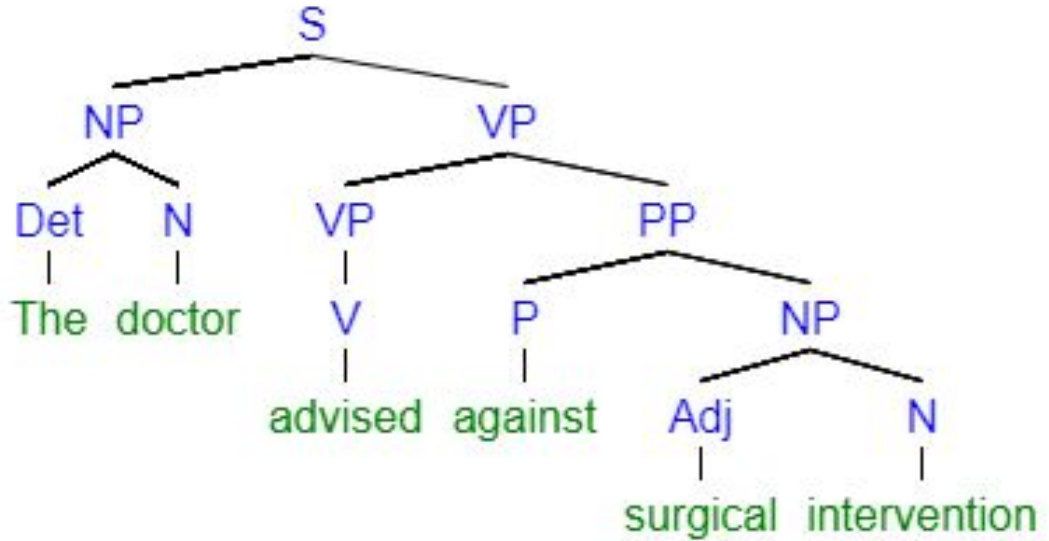


TREE DIAGRAM EXAMPLES (2)

Sentence: The doctor advised against surgical intervention.

Rules:

1. NP \rightarrow Det N
4. NP \rightarrow Adj N
5. PP \rightarrow P NP
6. S \rightarrow NP VP
8. VP \rightarrow VP PP
9. VP \rightarrow V

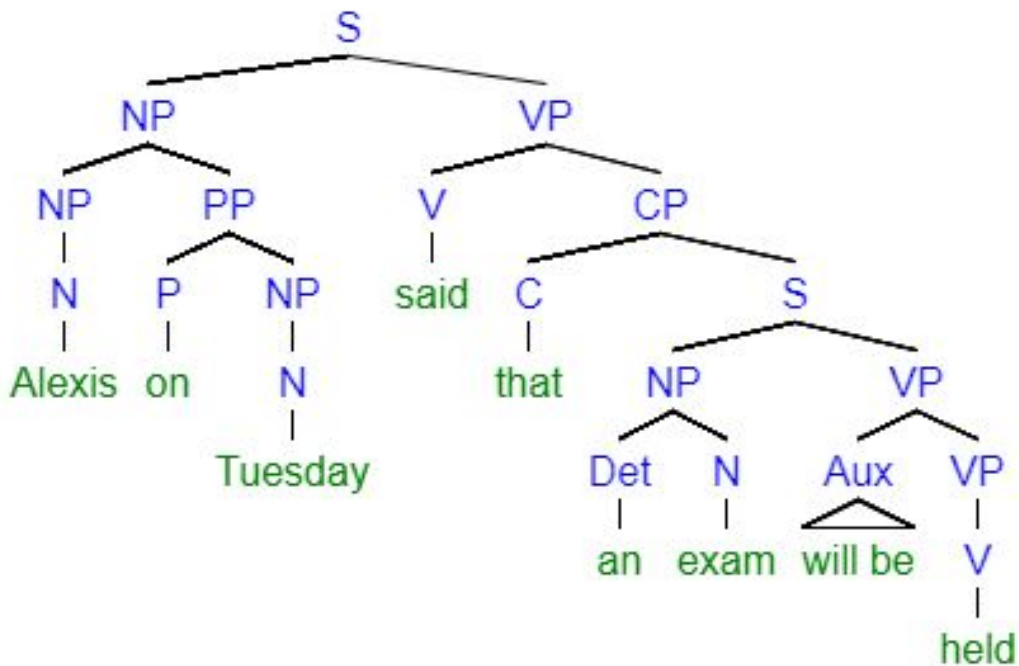


DISAMBIGUATING WITH TREE DIAGRAMS

Sentence: Alexis said on Tuesday an exam will be held.

Rules:

1. NP → Det N
2. NP → NP PP
3. NP → N
4. PP → P NP
5. PP → P NP
6. S → NP VP
7. VP → VP PP
8. VP → V
9. VP → V CP
10. VP → Aux VP
11. CP → C S
12. CP → C S

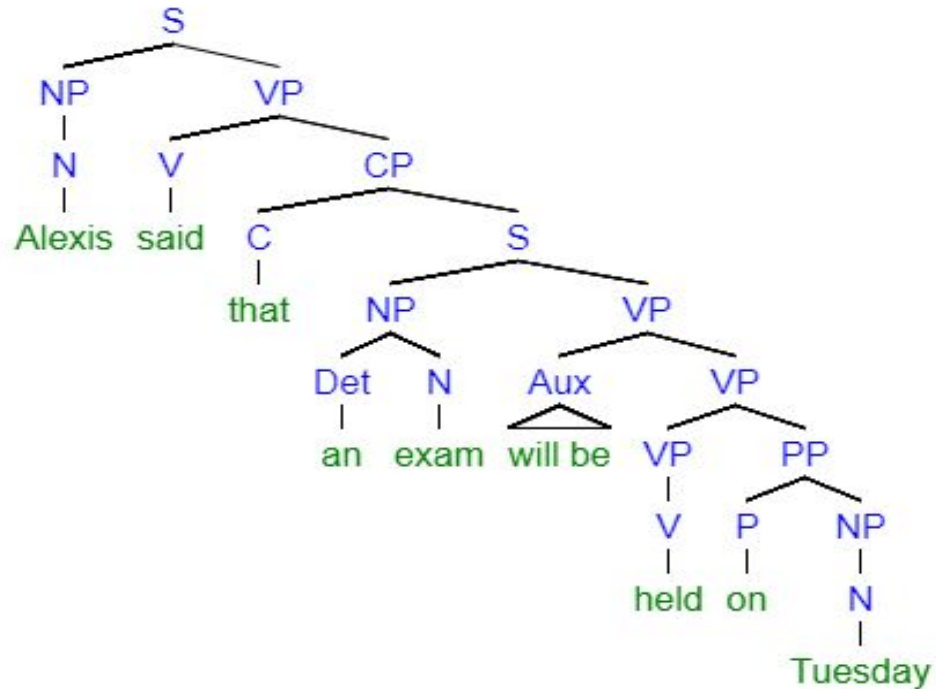


DISAMBIGUATING WITH TREE DIAGRAMS (2)

Sentence: Alexis said on Tuesday an exam will be held.

Rules:

1. NP \rightarrow Det N
3. NP \rightarrow N
5. PP \rightarrow P NP
6. S \rightarrow NP VP
8. VP \rightarrow VP PP
9. VP \rightarrow V
10. VP \rightarrow V CP
11. VP \rightarrow Aux VP
12. CP \rightarrow C S





DISAMBIGUATING WITH
TREE DIAGRAMS DOES
NOT WORK WHEN THE
AMBIGUITY IS DUE TO
HOMOPHONY



TREE DIAGRAMS EXERCISE 1

Draw tree diagrams for the following sentences, and list the rules you used in the diagram:

1. All dogs are mammals.
2. Phillip kicked the bucket.

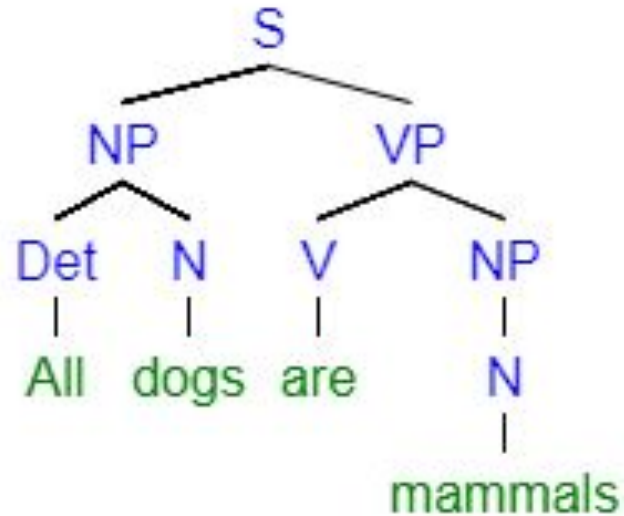
TREE DIAGRAMS EXERCISE 1 ANSWERS (1)

Draw tree diagrams for the following sentences, and list the rules you used in the diagram:

1. All dogs are mammals.

Rules

1. NP \rightarrow Det N
3. NP \rightarrow N
6. S \rightarrow VP NP
7. VP \rightarrow V NP



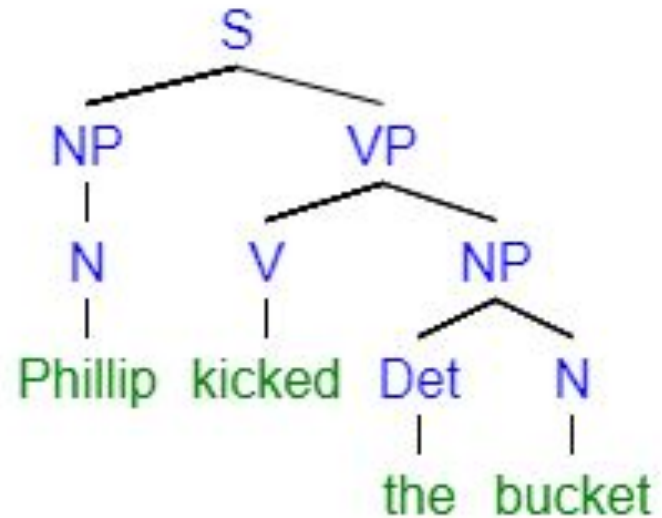
TREE DIAGRAMS EXERCISE 1 ANSWERS (2)

Draw tree diagrams for the following sentences, and list the rules you used in the diagram:

2. Phillip kicked the bucket.

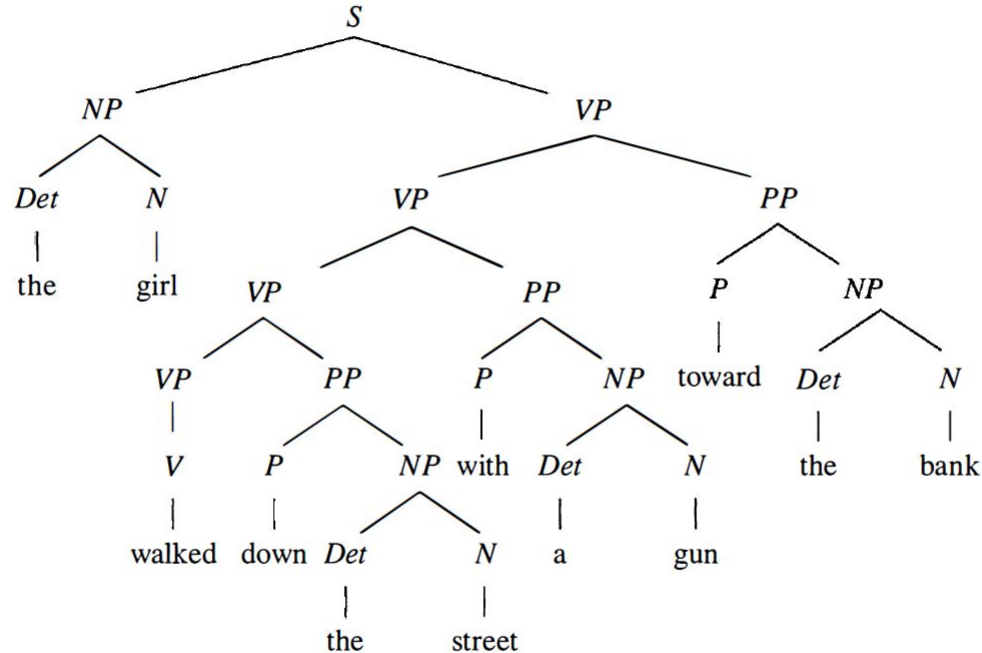
Rules

1. NP \rightarrow Det N
3. NP \rightarrow N
6. S \rightarrow NP VP
7. VP \rightarrow V NP



TREE DIAGRAMS EXERCISE 2

3. List the rules used in the following tree diagram:

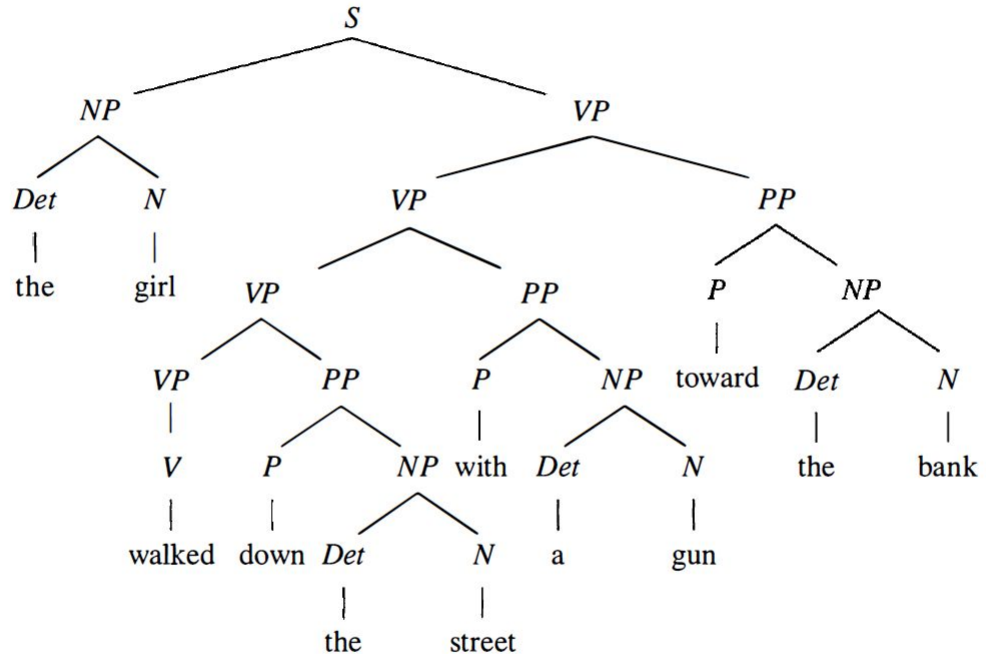


TREE DIAGRAMS EXERCISE 2 ANSWERS

3. List the rules used in the following tree diagram:

Rules

1. NP \rightarrow Det N
5. PP \rightarrow P NP
6. S \rightarrow NP VP
8. VP \rightarrow VP PP
9. VP \rightarrow V



TREE DIAGRAMS EXERCISE 3

4. Write a sentence using all of the following rules, and then draw a tree diagram for it:

4. NP \rightarrow Adj N

6. S \rightarrow NP VP

9. VP \rightarrow V

11. VP \rightarrow Aux VP

TREE DIAGRAMS EXERCISE 3 ANSWERS (EXAMPLE)

4. Write a sentence using all of the following rules, and then draw a tree diagram for it:

- 4. NP \rightarrow Adj N
- 6. S \rightarrow NP VP
- 9. VP \rightarrow V
- 11. VP \rightarrow Aux VP

