CS4248
AY 2022/23 Semester 1
Tutorial 5

1. Consider the following context-free grammar (CFG):

S → NP VP
NP → PN
VP → V NP
PN → he | him | she | her | we | they | them
V → love | loves | hate | hates

a. Describe the problems with the use of this CFG to model a tiny fragment of English.
b. Give a revised CFG that overcomes the problems.

2. Convert the following grammar into Chomsky Normal Form (CNF):

S → NP
NP → N
NP → NP and N
N → dog
N → (NP)

In this grammar, the set of non-terminal symbols is { S, NP, N }, and the set of terminal symbols is { and, dog, (,) }

List the productions (grammar rules) of the transformed grammar in CNF. Show clearly the steps of your conversion.

3. Consider the following grammar, where NP is the start symbol:

NP → NP PP
NP → flights | Monday | Singapore | Sydney
PP → P NP
P → from | on | to

Consider the noun phrase (NP): “flights on Monday from Singapore to Sydney”. How many different parse trees does this noun phrase have? Draw each of the parse trees.

4. Consider the sentence “Visiting relatives can be annoying.” For each semantic interpretation of this sentence, draw an untyped dependency parse tree, and explain in words the semantic interpretation corresponding to the parse tree.