COM S-342

Recitation 09/04/18 – 09/05/18

Today

- Setup Homework 2
- Ambiguity in Context Free Grammars
- Associativity in Grammar Rules

Setup Project

- Download zip file in the announcement
- Demo

Ambiguity in Context Free Grammars

- A CFG is ambiguous if there exists a string with more than one parse tree
- You can also show ambiguity by using leftmost derivation
- Remove ambiguity:
  - Add delimiters
  - Add operator precedence and associativity

Operator Precedence

S → S @ S | S # S | b

Example:

b @ b # b @ b

Operator Precedence

- If more than one operator is present in the expression, the precedence order decides the order in which the operators should be applied.
- Add non-terminals for each precedence level. Push the higher levels towards the bottom of the parse-tree (stratification of tree)

Operator Precedence

$S \rightarrow S \ @ \ S \mid A$
$A \rightarrow A \ \# \ A \mid b$

Example:

b @ b # b @ b

Associativity in Grammar Rules

$S \rightarrow S + T \mid S - T \mid T$
$T \rightarrow T * T \mid T / T \mid \text{part}$

Example:

$1 - 2 + 3 * 4 \rightarrow 1 - (2 + 3 * 4)$