

CSCI 301 - Lecture 29: Parsing II

$$S \rightarrow aS \mid bS \mid \epsilon$$

$$\underline{S} \rightarrow \underline{S} \underset{\alpha}{a} \mid S b \mid \epsilon$$

$$\begin{aligned} S &\Rightarrow aS \\ &aaS \\ &aa bS \\ &aa b bS \\ &aa bb \end{aligned}$$

$$\begin{aligned} S &\Rightarrow Sb \\ &Sbb \\ &Sabb \\ &Saabb \\ &aabb \end{aligned}$$

Eliminate Left Recursion

$$S \rightarrow Sa \mid Sb \mid c \mid d$$

$$(c \cup d)(a \cup b)^*$$

$$S \rightarrow cS' \mid dS'$$

$$S' \rightarrow aS' \mid bS' \mid \epsilon$$

Common Prefixes - Left Factoring

$$S \rightarrow \boxed{aCbS} \mid \boxed{aCbS}cS$$

$$\left\{ \begin{array}{l} S \rightarrow aCbSM \\ M \rightarrow cS \mid \epsilon \end{array} \right.$$

$S \rightarrow$ if C or d then S start

\mid if C or d then S start else S start

$$S \rightarrow \boxed{SS}^+ \mid \boxed{SS}^* \mid a$$

$$S \rightarrow SS^+ \mid a$$

$$M \rightarrow + \mid *$$

$$A \Rightarrow B$$

$$B \Rightarrow A^*$$

$$A \Rightarrow^* A^*$$

Reverse Polish Notation (RPN)

$$1 + 2 * (4 - 3) \quad \text{infix}$$

$$(+ 1 (* 2 (- 4 3)))) \quad \text{prefix (Reverse)}$$

$$1 \ 2 \ 4 \ 3 \ - \ * \ + \quad \text{RPN}$$

$$\frac{3}{\quad}$$

$$(8 - 4) * 2$$

$$\underbrace{8 \ 4 \ - \ 2 \ *}$$

$$4 \ 2 \ *$$

$$8$$