

1/1/2016

②

L A CFL

R REGULAR

CAN $L \cap R$ BE

(a) REGULAR? $L = \{a^n b^n \mid n \geq 0\}$
 $R = \emptyset \quad L \cap R = \emptyset$

(b) CFL? $L = \{a^n b^n \mid n \geq 0\}$
 $R = a^* b^* \quad L \cap R = L$

(c) CSL? IMPOSSIBLE, BECAUSE CFL
ARE CLOSED UNDER INTERSECTION
WITH REGULAR

L A CSL

R REGULAR

CAN $L \cap R$ BE

(a) REGULAR? $L = a^n b^n c^n \mid n \geq 0$
 $R = \emptyset \quad L \cap R = \emptyset$

(b) CFL? $L = a^n b^n c^n \vee a^n b^n \mid n \geq 0$
 $R = a^* b^* \quad L \cap R = a^n b^n \mid n \geq 0$

(c) CSL? $L = a^n b^n c^n$
 $R = a^* b^* c^* \quad L \cap R = a^n b^n c^n$

11/1/2014

(3)

L A CFL

R REGULAR

CAN $L \cup R$ BE

(a) REGULAR? $L = a^n b^n$
 $R = a^* b^*$ $L \cup R = a^* b^*$

(b) CFL? $L = a^n b^n$
 $R = \emptyset$ $L \cup R = a^n b^n$

(c) CSL? IMPOSSIBLE, BECAUSE
CFLS ARE CLOSED UNDER $\cup$

L A CSL

R REGULAR

CAN $L \cup R$ BE

(a) REGULAR? $L = a^n b^n c^n$
 $R = a^* b^* c^*$ $L \cup R = a^* b^* c^*$

(b) CFL? $L = a^n b^n c^n \cup d^n e^n$
 $R = a^* b^* c^*$ $L \cup R = a^* b^* c^* \cup d^n e^n$

(c) CSL? $L = a^n b^n c^n$
 $R = \emptyset$ $L \cup R = a^n b^n c^n$

11/1/2016

AMBIGUITY

④

CAN SHOW BY 2 DISTINCT PARSE TREES,
2 DISTINCT LM GENERATIONS, OR
2 DISTINCT RM GENERATIONS

EXAMPLES OF CLOSURES

PROPER SUBSTRING (NOT ALL, NOT NOTHING)

$$PS = L(f(L) \cap \frac{g(\Sigma^+) \Sigma^+ g(\Sigma^*) v}{g(\Sigma^*) \Sigma^+ g(\Sigma^+)})$$

Top Down


$$S \rightarrow aST \mid b \quad \{a^n b^{n+1} \mid n \geq 0\}$$

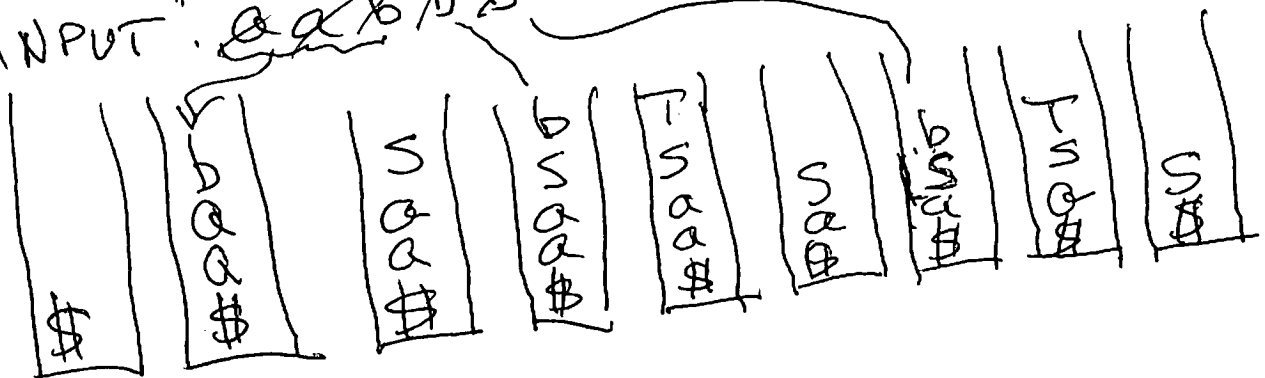
$$T \rightarrow b$$

INPUT: aa bbb



Bottom Up

INPUT: aa b b b



3 SHIFTS REDUCE

LM DERIVATION

LM DERIVATION
 $S \Rightarrow aST \Rightarrow aaSTT \Rightarrow aabTT \Rightarrow aabbT \Rightarrow aabbb$

RM DERIVATION

RM DERIVATION

$S \Rightarrow aST \Rightarrow aSb \Rightarrow \underline{aASTb} \Rightarrow \underline{aASb}b \Rightarrow aAbbb$

stock remains