

# CS 415 – Discussion Section Notes 4

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February 21, 2008

## 1 LR Parsing

We should practice.

Consider the following LR(0) grammar (borrowed from my recent CS 671 homework), with terminals  $\{- ()\}$ :

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$$S \rightarrow -S$$

$$S \rightarrow T$$

$$S \rightarrow \epsilon$$

$$T \rightarrow T-$$

$$T \rightarrow (S)$$

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Let's work out the DFA for this on the board. We begin by adding a new start symbol,  $S'$ , to our grammar...

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$$S' \rightarrow S$$

$$S \rightarrow -S$$

$$S \rightarrow T$$

$$S \rightarrow \epsilon$$

$$T \rightarrow T-$$

$$T \rightarrow (S)$$

---

The first state might look like:

$S'$	$\rightarrow \bullet S$
$S$	$\rightarrow \bullet -S$
$S$	$\rightarrow \bullet T$
$S$	$\rightarrow \bullet \epsilon$
$T$	$\rightarrow \bullet T-$
$T$	$\rightarrow \bullet (S)$

How do we do the rest?

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That was fun. Next up: let's make a parsing table from that DFA. (note:

numbers don't necessarily indicate how many states there should be)

State	Action			Goto	
	-	(	)	S	T
0					
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

Now, let's parse something. How about the string --(-(-)-)? We want to show the stack, the input, and the action taken.