



40-414 Compiler Design

Bottom-Up Parsing

Lecture 6

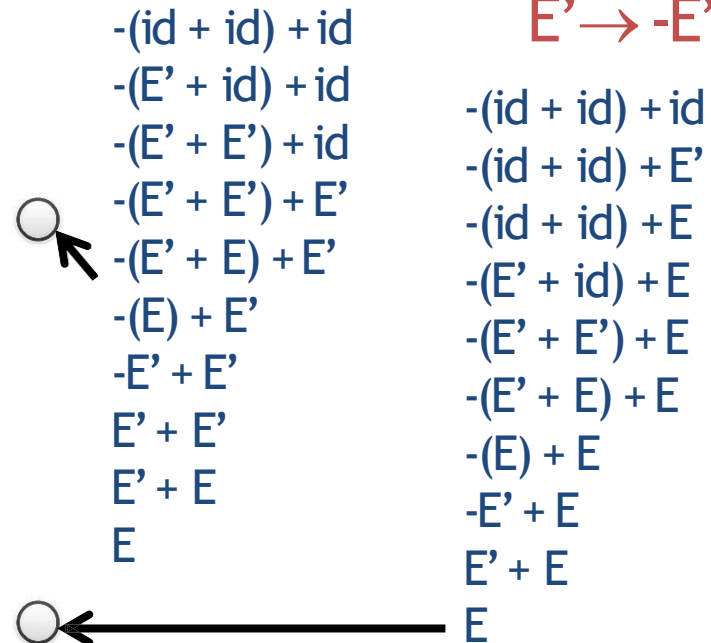
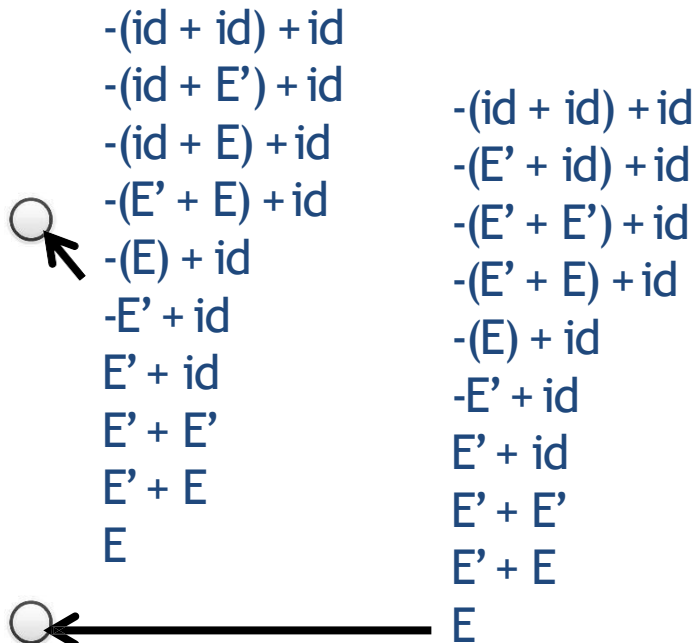
Exercise

Question?

For the given grammar, what is the correct series of reductions for the string: $-(id + id) + id$

$$E \rightarrow E' \mid E' + E$$

$$E' \rightarrow -E' \mid id \mid (E)$$

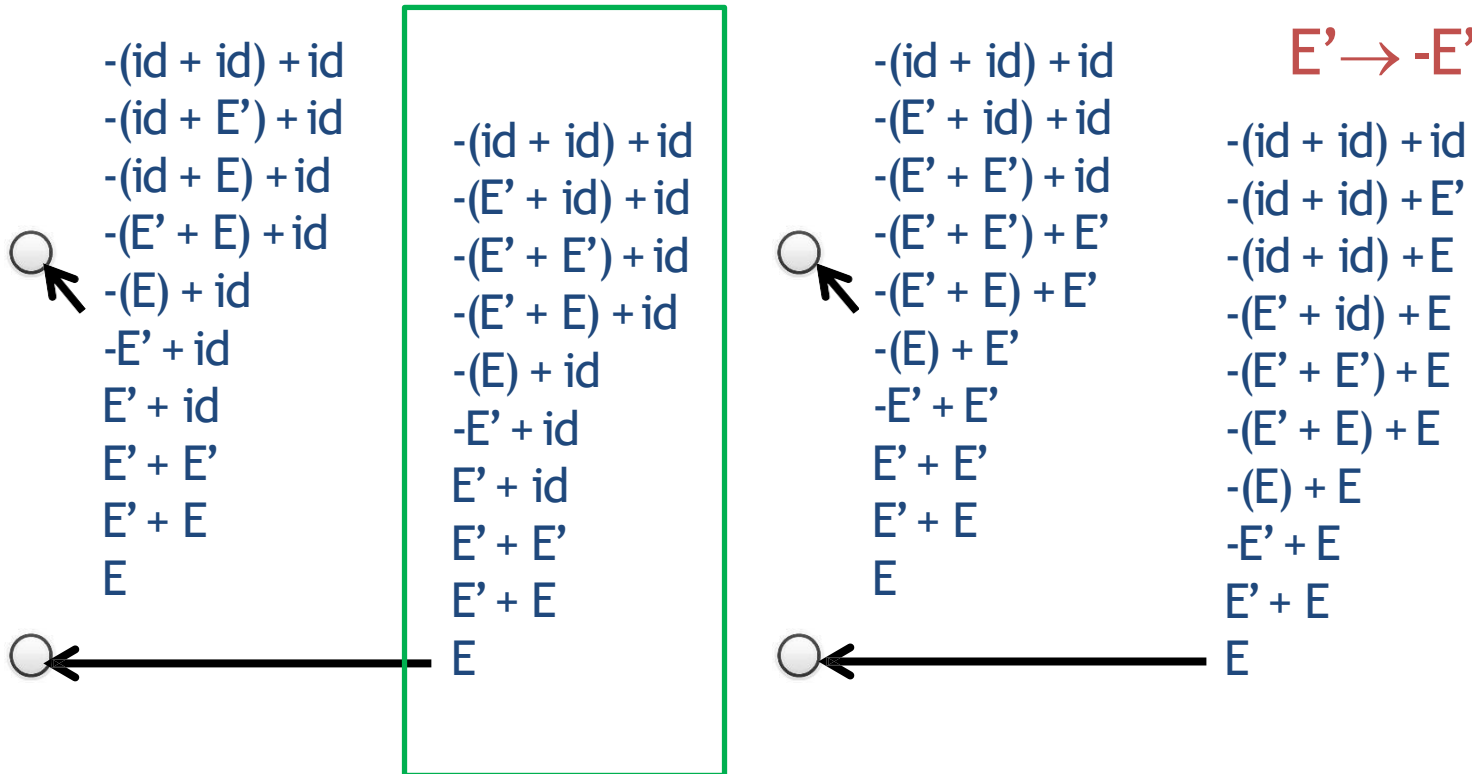


Answer!

For the given grammar, what is the correct series of reductions for the string: $-(id + id) + id$

$$E \rightarrow E' \mid E' + E$$

$$E' \rightarrow -E' \mid id \mid (E)$$



Question?

For the given grammar, what is the correct shift-reduce parse for the string: $id + -id$

```

|id +-id
id|+ -id
E'+|-id
E'+-|id
E'+-id|
E'+-E'|
E'+E'|
E'+E|
E|
  
```



```

|id +-id
id|+ -id
id+|-id
id+-|id
id+-id|
id+-E'|
id+E'|
id+E|
E'+E|
E|
  
```

```

|id +-id
|E' + -id
E'|+ -id
E' +|-id
E' + -|id
E'+-|E'
E'+|-E'
E'+|E'
E'+|E
E'|+ E
|E' +E
|E
  
```



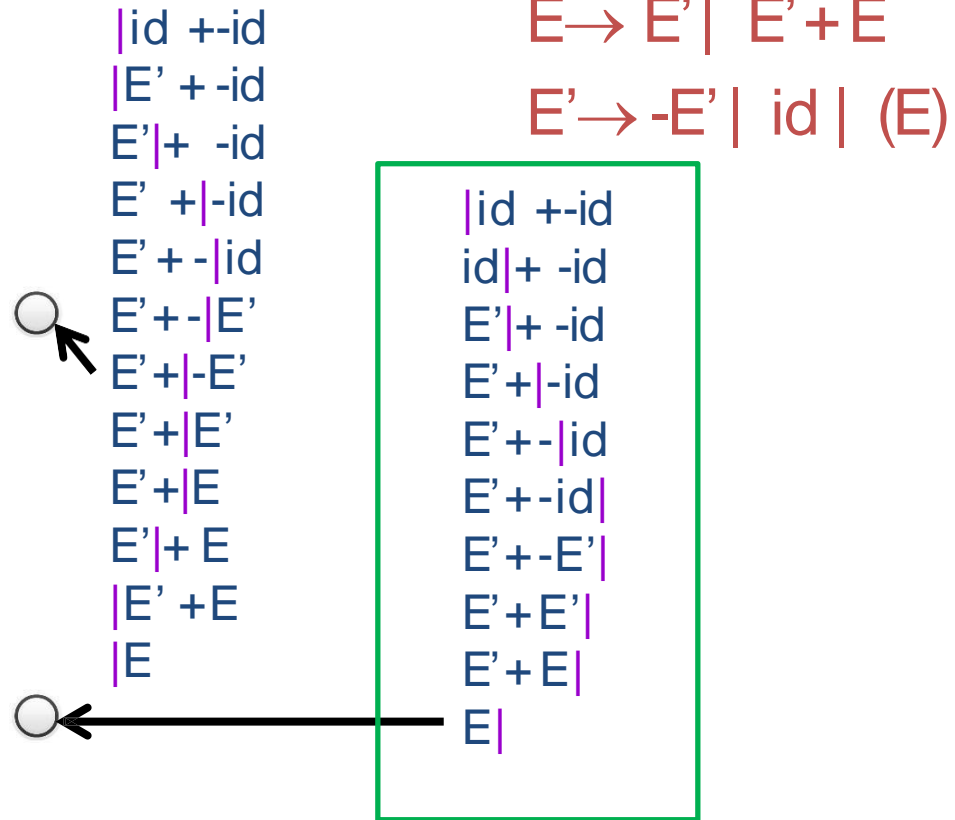
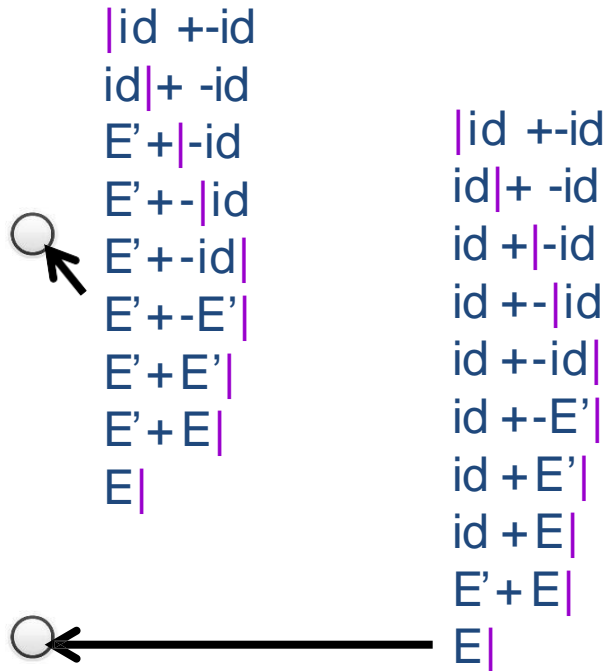
$E \rightarrow E' \mid E' + E$
 $E' \rightarrow -E' \mid id \mid (E)$

```

|id +-id
id|+ -id
E'|+ -id
E'+|-id
E'+-|id
E'+-id|
E'+-E'|
E'+E'|
E'+E|
E|
  
```

Answer!

For the given grammar, what is the correct shift-reduce parse for the string: id + -id



Question?

Given the grammar at right, identify the handle for the following shift-reduce parse state: $E' + -id \mid + -(id + id)$

$$E \rightarrow E' \mid E' + E$$

$$E' \rightarrow - E' \mid id \mid (E)$$

- $E' + -id$
- id
- $-id$
- $E' + -E'$

Answer!

Given the grammar at right, identify the handle for the following shift-reduce parse state: $E' + -id \mid + -(id + id)$

$E \rightarrow E' \mid E' + E$
 $E' \rightarrow -E' \mid id \mid (E)$

$E' + -id$

id

$-id$

$E' + -E'$

Question?

Using the DFA on page 62 in Lecture Note 6,
choose the next action for the given parse state

<u>Configuration</u>	<u>DFA Current State</u>
int * int + int \$	4

- shift
- red. $T \rightarrow \text{int}$
- red. $T \rightarrow \text{int} * T$
- accept

Answer!

Using the DFA on page 62 in Lecture Note 6,
choose the next action for the given parse state

<u>Configuration</u>	<u>DFA Current State</u>
int * int + int \$	4

- shift
- red. $T \rightarrow int$
- red. $T \rightarrow int * T$
- accept

Question?

What are the items in the initial state of the SLR(1) parsing automaton of the following grammar? Do not add extra symbol to the grammar. [Choose all that apply]

$S \rightarrow A(S)B \mid \varepsilon$
 $A \rightarrow S \mid SBx \mid \varepsilon$
 $B \rightarrow SB \mid y$

- | | |
|---------------------------------------------------|-----------------------------------------------------|
| <input type="radio"/> $A \rightarrow \bullet x$ | <input type="radio"/> $S \rightarrow \bullet A(S)B$ |
| <input type="radio"/> $A \rightarrow \bullet$ | <input type="radio"/> $B \rightarrow \bullet y$ |
| <input type="radio"/> $B \rightarrow \bullet$ | <input type="radio"/> $A \rightarrow \bullet S$ |
| <input type="radio"/> $A \rightarrow \bullet SBx$ | <input type="radio"/> $S \rightarrow \bullet$ |
| <input type="radio"/> $B \rightarrow \bullet SB$ | <input type="radio"/> $A \rightarrow S \bullet Bx$ |

Answer!

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 $A \rightarrow S \mid SBx \mid \varepsilon$
 $B \rightarrow SB \mid y$

$A \rightarrow \bullet x$

$S \rightarrow \bullet A(S)B$

$A \rightarrow \bullet$

$B \rightarrow \bullet y$

$B \rightarrow \bullet$

$A \rightarrow \bullet S$

$A \rightarrow \bullet SBx$

$S \rightarrow \bullet$

$B \rightarrow \bullet SB$

$A \rightarrow S \bullet Bx$

Question?

Which of the followings are true for the initial state of the SLR(1) parsing automaton from the last question? [Choose all that apply]

$S \rightarrow A (S) B \mid \varepsilon$
 $A \rightarrow S \mid S B x \mid \varepsilon$
 $B \rightarrow S B \mid y$

- The state has a reduce-reduce conflict on input x.
- The state has shift-reduce conflict on transition S.
- The state has a reduce-reduce conflict on transition S.
- The state has a shift-reduce conflict on input x.
- The state has a reduce-reduce conflict on input (.

Answer!

Which of the followings are true for the initial state of the SLR(1) parsing automaton from the last question? [Choose all that apply]

$S \rightarrow A (S) B \mid \varepsilon$
 $A \rightarrow S \mid S B x \mid \varepsilon$
 $B \rightarrow S B \mid y$

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- The state has shift-reduce conflict on transition S.
- The state has a reduce-reduce conflict on transition S.
- The state has a shift-reduce conflict on input x.
- The state has a reduce-reduce conflict on input (.

Question?

Consider the following grammar:

$$S \rightarrow A b \mid B c$$

$$A \rightarrow a B \mid \varepsilon$$

$$B \rightarrow b A \mid \varepsilon$$

This grammar is:

- LL(1) but not SLR(1)
- SLR(1) but not LL(1)
- Not SLR(1) or LL(1)
- Both LL(1) and SLR(1)

Answer!

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