Lecture 7

Syntax Analysis

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Take aways from the last class

- Overview of Syntax Analysis

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- Derivation of string from a grammer

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- Parse Tree

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- Recursive Descent Parsing

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  - In practice LL(1) is used

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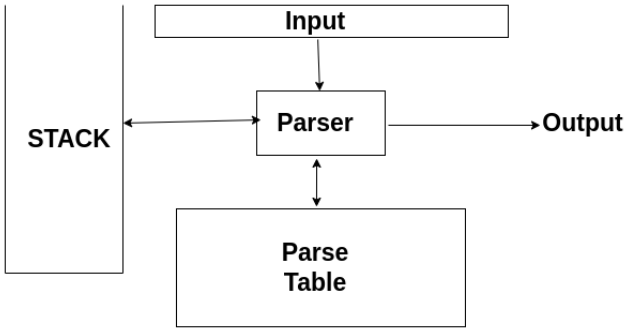

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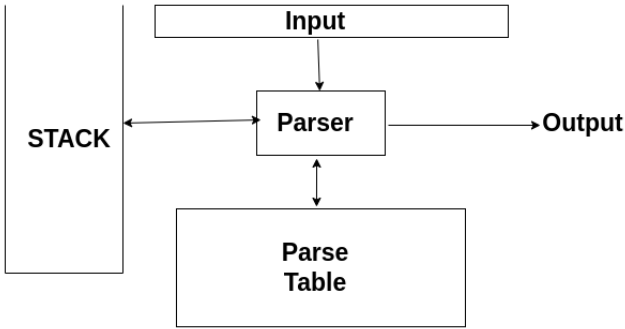

Parse table is a two dimensional array $M[X, a]$ where "X" is a non terminal and "a" is a terminal of the grammar

Example

Consider the following grammar:

$E \rightarrow TE'$

$E' \rightarrow +TE'|\epsilon$

$T \rightarrow FT'$

$T' \rightarrow *FT'|\epsilon$

$F \rightarrow (E)|id$

Parse table for the grammar

	id	+	*	(	)	$
E	$E \rightarrow TE^{'}$			$E \rightarrow TE^{'}$		
E'		$E^{'} \rightarrow +TE^{'}$			$E^{'} \rightarrow \epsilon$	$E^{'} \rightarrow \epsilon$
T	$T \rightarrow FT^{'}$			$T \rightarrow FT^{'}$		
T'		$T^{'} \rightarrow \epsilon$	$T^{'} \rightarrow *FT^{'}$		$T^{'} \rightarrow \epsilon$	$T^{'} \rightarrow \epsilon$
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Blank entries are error states.

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  `then begin pop(X); push(W,V,U)`
  `end`
  `else error`

Example

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$E	id+id*id $	expand by $E \rightarrow TE'$

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$E'	$	expand by $E' \rightarrow \epsilon$
$	$	halt

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- Table can be constructed if for every non terminal, every lookahead symbol can be handled by at most one production
- **First(a)** for a string of terminals and non terminals *a* is Set of symbols that might begin the fully expanded (made of only tokens) version of *a*
- **Follow(X)** for a non terminal X is set of symbols that might follow the derivation of X in the input stream

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