⇒ In this chapter we'll discuss :-

1. LR(0) Context.
2. LR(0) item.
3. Non-Oetermnistic.
4. Oetermnistic.

⇒ LR(0) Context :-

In original parsing if we have $S \to aSb / A$

$A \to aA / a$ then :-

$S \Rightarrow aSb \to a^n S b^n \to a^n a^m b^n \to a^{n+m} b^n$, $n \geq 0$, $m > 0$.

$\Rightarrow aaAb / aab$

But in Context if we have $A \to aAb$ then :-

$A \Rightarrow aAb \to$ Delete any terminal or non terminal in the Symbols "A" right side.

$\Rightarrow aaAb$

$\Rightarrow aaaAb \to a^i Ab$, $i > 0$

Ex 1 :-

	Rule	LR(0) Context
$S \to AB$	$S \to AB$	$\{AB\}$
$A \to Aa / a$ $\Rightarrow$	$A \to aA$	$\{aA\}$
$B \to bBa / ba$	$A \to a$	$\{a\}$
	$B \to bBa$	$\{Ab^iBa, i > 0\}$
	$B \to ba$	$\{Ab^iba, i \geq 0\}$ or $\{Ab^ia, i > 0\}$

1. $A \to Aa \to S \Rightarrow AB$
   $\Rightarrow A$
   $\Rightarrow Aa$
   $\Rightarrow Aa$

2. $A \to a \to S \Rightarrow AB$
   $\Rightarrow A$
   $\Rightarrow a$

3. $B \to bBa$
   $\to S \Rightarrow AB$
   $\Rightarrow AbBa$
   $\Rightarrow Abbba$

4. $B \to ba \to S \Rightarrow AB$
   $\Rightarrow AbBa \Rightarrow Abba$

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Ex2:-

	Rule	LR(0) Context
$S \to aA \mid aB$	$S \to aA$	$\{aA\}$
$A \to aAb \mid a$	$S \to aB$	$\{aB\}$
$B \to bBa \mid b$	$A \to aAb$	$\{aa^iAb, i>0\}$
	$A \to a$	$\{aa^ib, i \geq 0\}$
	$B \to bBa$	$\{ab^iBa, i>0\}$
	$B \to b$	$\{ab^ib, i \geq 0\}$

[1] $A \to aAb \rightsquigarrow S \Rightarrow aA \Rightarrow aaAb \Rightarrow aaaAb$

[2] $B \to bBa \rightsquigarrow S \Rightarrow aB \Rightarrow abBa \Rightarrow abbBa$

Ex3:-

	Rule	LR(0) Context
$S \to aA \mid bB$	$S \to aA$	$\{aA\}$
$A \to abA \mid bB$	$S \to bB$	$\{bB\}$
$B \to bBC \mid bC$	$A \to abA$	$\{a(ab)^iA, i>0\}$
	$A \to bB$	$\{a(ab)^ibB, i \geq 0\}$
	$B \to bBC$	$\{bb^iBC, a(ab)^ibb^jBC, i \geq 0, j>0\}$
	$B \to bC$	$\{bb^ibC, a(ab)^ibb^jbC, i \geq 0, j \geq 0\}$

[1] $A \to abA \rightsquigarrow S \Rightarrow aA \Rightarrow aabA \Rightarrow aababA$

[2] $A \to bB \rightsquigarrow S \Rightarrow aA \Rightarrow aabA \Rightarrow aabB$

[3] $B \to bBC \rightsquigarrow S \Rightarrow aA \Rightarrow aababA \Rightarrow aababbB \Rightarrow aababbbBC$

$S \Rightarrow bB \Rightarrow bbBC \Rightarrow bbbBC$

[4] $B \to bC \rightsquigarrow S \Rightarrow aA \Rightarrow aababA \Rightarrow aababbB \Rightarrow aababbbC$

$S \Rightarrow bB \Rightarrow bbBC \Rightarrow bbbC$