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Question-4:

Given parse string "aabbaa"

In order to generate cky parsing table first we need to check whether the given grammar is in chomsky Normal form(CNF) or not. The given CFG is not in CNF so first Convert

CFG = {asa|bSb|aa|bb|a|b}

Step-1: Remove ∈-productions

There is no ∈-productions here

Step-2: Remove unit productions

There is no unit productions here

Step-3: Remove unusable productions

There is no unusable productions

Step-4: Convert the long productions

Non-Terminal → a Non-Terminals

Non-Terminal → Terminal.

S → ASA (A→a)
S → BSB (B→b)
S → AA (A→a)
S → BB (B→b)
S → a
S → b
A → a
B → b

$S \rightarrow XA$ $(X \rightarrow AS)$

$S \rightarrow YB$ $(Y \rightarrow BS)$

$S \rightarrow AA$

$S \rightarrow BB$

$S \rightarrow a$

$S \rightarrow b$

$A \rightarrow a$

$B \rightarrow b$

$X \rightarrow AS$

$Y \rightarrow BS$

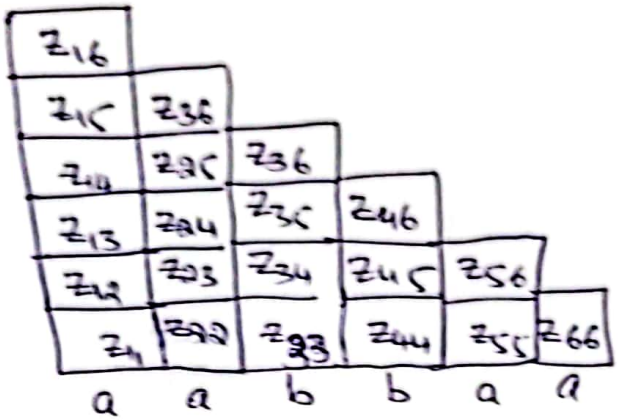
Step-1: CKY parsing Table

	a	a	b	b	a	a
a	A					
a		A				
b			B			
b				B		
a					A	
a						A

Step-2: Fill out all possible Combinations from the Lower diagonal

	a	a	b	b	a	a
a	A	AA				
a		A	AB			
b			B	BB	BA	
b				B	BB	
a					A	AA
a						A

Here we are finding out the all other possible substrings for given CKY Parsing table.



Here $S \to a$

$S \to b$

$\therefore Z_{12} = Z_{11}$

$\{S\}\{S\} = \{S\}$

So, the given string "aabbaa" derived from the given grammar. So it is accepted.

So, In Z_{16} we start with the Symbol "S" then generate the given string