

$$S \rightarrow SS \mid AB \mid BA \mid AC \mid BD$$
 $A \rightarrow a$ 
 $B \rightarrow b$ 
 $C \rightarrow SB$ 
 $D \rightarrow SA$ 

$x = \underline{a} \underline{a} \underline{b} \underline{b} \underline{a} \underline{b}$   
 $x \in L(G)?$

$\downarrow \quad \downarrow$   
 $\underline{a} \underline{a} \underline{b} \rightarrow AS$

$\downarrow \quad \downarrow$   
 $\underline{a} \underline{a} \underline{b} \rightarrow \epsilon \rightarrow \square$

$S \rightarrow AC$   
 $\underline{a} \underline{a} \underline{b} \underline{b} \underline{a} \underline{b}$ ,  $l=4$ ,  $i=1$

CKY-Algorithm:

Initialize  $T_{i:j} = \emptyset \quad \forall i, j$ .

For  $i=0$  to  $|x|-1$

For all productions  $M \rightarrow c$

If  $c = X_{i:i+1}$

Then Add  $M$  to  $T_{i:i+1}$

For  $l = 2$  to  $|x|$

For  $i = 0$  to  $|x|-l$

For  $k = i+1$  to  $i+l-1$

$T_{i,j}$

$i \backslash j$	0	1	2	3	4	5	6
0	$\emptyset$						
1	$\{A\}$	$\emptyset$					
2	$\emptyset$	$\{A\}$	$\emptyset$				
3	$\emptyset$	$\{S\}$	$\{B\}$	$\emptyset$			
4			$\emptyset$	$\{B\}$	$\emptyset$		
5				$\{S\}$	$\{A\}$	$\emptyset$	
6					$\{S\}$	$\{B\}$	$\emptyset$

For all productions  $M \rightarrow PQ$

if  $(p \in T_{i:k})$  and  $(Q \in T_{k:i+l})$

Then add  $M$  to  $T_{i:i+l}$