

$D =$  “On input  $w = w_1 \cdots w_n$ :

1. For  $w = \varepsilon$ , if  $S \rightarrow \varepsilon$  is a rule, *accept*; else, *reject*.  $\llbracket w = \varepsilon \text{ case} \rrbracket$
2. For  $i = 1$  to  $n$ :  $\llbracket \text{examine each substring of length 1} \rrbracket$
3.     For each variable  $A$ :
4.         Test whether  $A \rightarrow b$  is a rule, where  $b = w_i$ .
5.         If so, place  $A$  in  $table(i, i)$ .
6. For  $l = 2$  to  $n$ :  $\llbracket l \text{ is the length of the substring} \rrbracket$
7.     For  $i = 1$  to  $n - l + 1$ :  $\llbracket i \text{ is the start position of the substring} \rrbracket$
8.         Let  $j = i + l - 1$ .  $\llbracket j \text{ is the end position of the substring} \rrbracket$
9.         For  $k = i$  to  $j - 1$ :  $\llbracket k \text{ is the split position} \rrbracket$
10.         For each rule  $A \rightarrow BC$ :
11.             If  $table(i, k)$  contains  $B$  and  $table(k + 1, j)$  contains  $C$ , put  $A$  in  $table(i, j)$ .
12. If  $S$  is in  $table(1, n)$ , *accept*; else, *reject*.”