

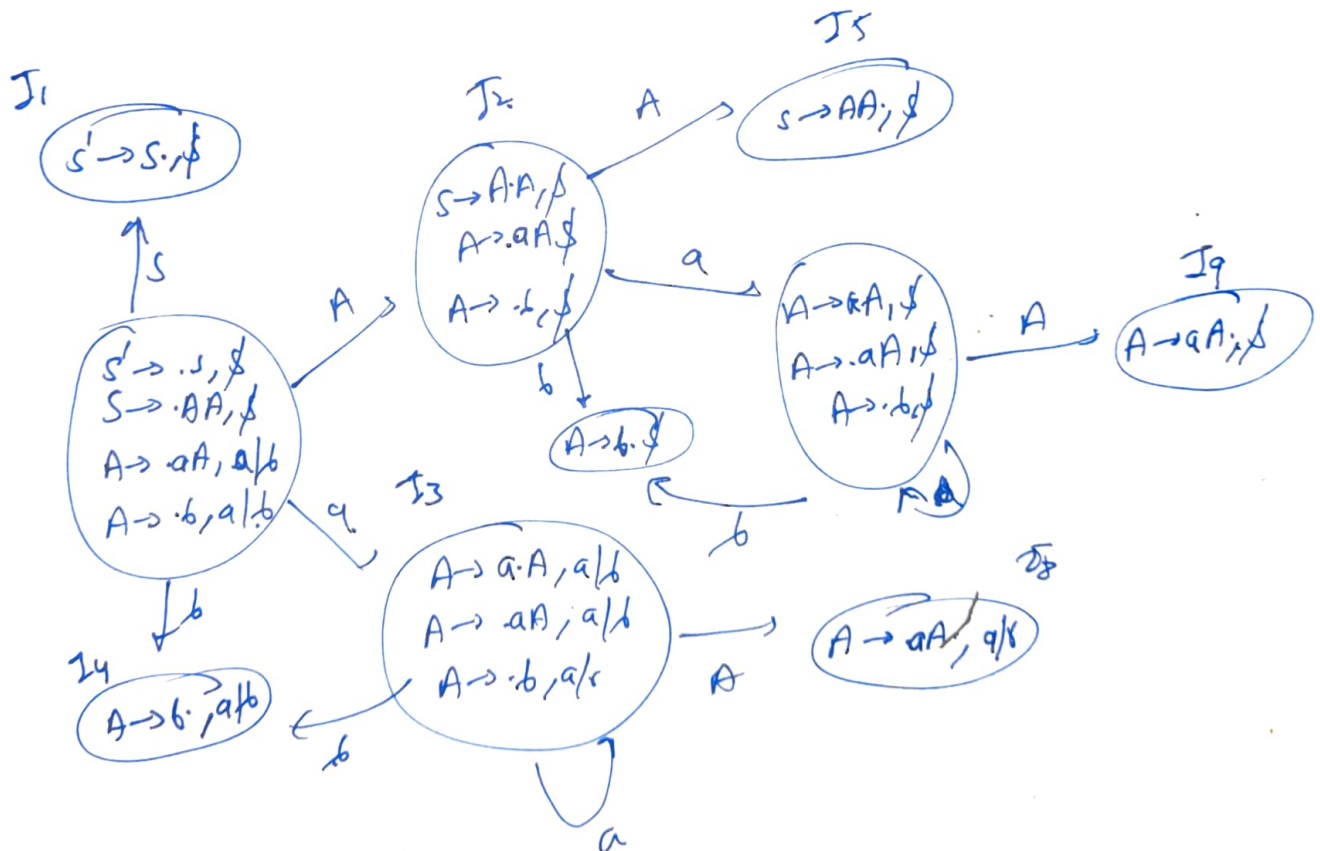
# Compiler Assignment - 5

## 1) CLR Grammar (Canonical LR)

eg:  $S \rightarrow AA$   
 $A \rightarrow aA \mid b$

Augmented Grammar :-

$S' \rightarrow .S, \$$  (0th production)  
 $S \rightarrow .AA, \$$  (1st production)  
 $A \rightarrow .aA, a/b$  (2nd production)  
 $A \rightarrow .b, a/b$  (3rd production)



|   |    | Action |        | goto |   |
|---|----|--------|--------|------|---|
|   | a  | b      | \$     | A    | S |
|   | S3 | S4     |        | 2    | 1 |
| 0 |    |        | accept | 5    |   |
| 1 |    | S7     |        | 8    |   |
| 2 | S6 | S4     |        |      |   |
| 3 | S3 | R3     |        |      |   |
| 4 | R3 |        | R1     |      |   |
| 5 |    |        |        | 9    |   |
| 6 | S6 | S7     |        |      |   |
| 7 |    |        | R3     |      |   |
| 8 | R3 | R2     | R2     |      |   |
| 9 |    |        |        |      |   |

SLR Grammar

$S \rightarrow AA$

$A \rightarrow aA | b$

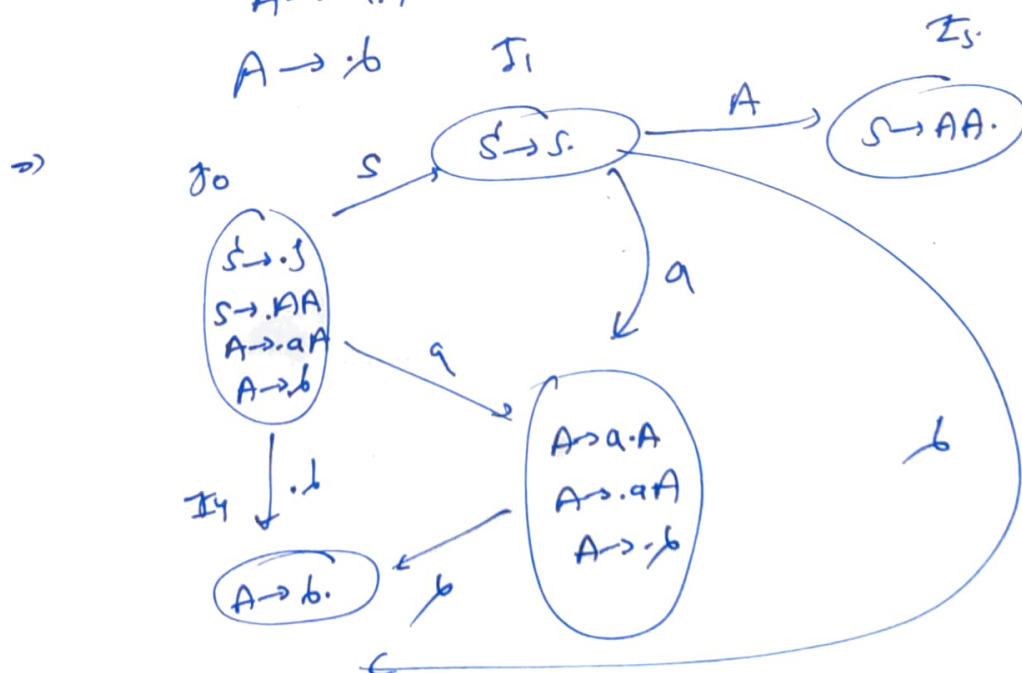
Augmented Grammar

$S' \rightarrow \cdot S$

$S \rightarrow \cdot AA$

$A \rightarrow \cdot aA$

$A \rightarrow \cdot b$



|   |    | ACTION |    | GOTO |    |
|---|----|--------|----|------|----|
|   |    | a      | b  | A    | \$ |
| 0 | S3 |        | S4 | 2    | 1  |
| 1 |    |        |    | 5    |    |
| 2 | S3 |        | S4 | 6    |    |
| 3 | S3 |        | S4 |      |    |
| 4 | R3 |        | R3 |      | R3 |
| 5 |    |        |    |      | R1 |
| 6 | R2 |        | R2 |      | R2 |

accept

③ LALR example :-

$S \rightarrow AA$

$A \rightarrow aA | b$

Augmented Grammar

$S' \rightarrow S$

$S \rightarrow \cdot AA$

$A \rightarrow \cdot aA$

$A \rightarrow \cdot b$

{ We combine the similar ~~the~~ values in Table }

Table - 1  $\rightarrow$  Table - 2  $\rightarrow$

|    |     | ACTION |     | GOTO |    |
|----|-----|--------|-----|------|----|
|    |     | a      | b   | A    | \$ |
| 0  | S36 |        | S47 | 2    | 1  |
| 1  |     |        |     | 5    |    |
| 2  | S36 |        | S47 | 89   |    |
| 36 | S36 |        | S47 |      |    |
| 47 | R3  |        | R3  |      | R1 |
| 5  |     |        |     |      |    |
| 63 | S36 |        | S47 | 89   |    |
| 74 |     |        |     |      |    |
| 89 | R2  |        | R2  |      | R2 |
| 98 |     |        |     |      |    |

# final LALR Table :

| ACTION |     |     |        | GOTO |   |
|--------|-----|-----|--------|------|---|
|        | a   | b   | \$     | A    | S |
| 0      | S36 | S47 | accept | 2    | 1 |
| 1      |     |     |        | 5    |   |
| 2      | S36 | S47 |        | 89   |   |
| 36     | S36 | S47 |        |      |   |
| 47     | R3  | R3  | R3     |      |   |
| 5      |     |     | R1     |      |   |
| 89     | R2  | R2  | R2     |      |   |