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## SSC Problem Solving

### 2. Given Grammar.

$$A \rightarrow sa | bB.$$

$$S \rightarrow c | \epsilon.$$

$$B \rightarrow d.$$

to find :  $\text{first}()$  &  $\text{follow}()$  of  $\{A, S, B\}$ .

Soln:

$\text{first}()$

$$\text{first}(B) \rightarrow \{d\}$$

$$\text{first}(S) \rightarrow \{c, \epsilon\}$$

$$\text{first}(A) \rightarrow \{\text{first}(S), \text{first}(b)\}$$

$$\rightarrow \{c, \text{first}(\epsilon), b\}$$

$$\rightarrow \{c, a, b\}.$$

$\rightarrow \text{follow}()$

$$\text{follow}(A) \rightarrow \{\$ \}$$

$$\text{follow}(S) \rightarrow \{a\}$$

$$\text{follow}(B) \rightarrow \text{follow}(A) \rightarrow \{\$ \}$$

## Representation Table

| Grammer                      | First()           | Follow()  |
|------------------------------|-------------------|-----------|
| $A \rightarrow Sa   bB$      | $\{a, c, a, b\}$  | $\{\$ \}$ |
| $S \rightarrow c   \epsilon$ | $\{c, \epsilon\}$ | $\{a\}$   |
| $B \rightarrow d$            | $\{d\}$           | $\{\$ \}$ |

1. For given grammer construct self parsing table and parse string "ca, (a, a))"

$$S \rightarrow (L) / a$$

$$L \rightarrow L, S / S.$$

| Stack       | Input Buffer   | Parsing Action              |
|-------------|----------------|-----------------------------|
| \$          | (a, (a, a)) \$ | shift                       |
| \$(         | a, (a, a)) \$  | shift                       |
| \$(a        | , (a, a)) \$   | Reduce $S \rightarrow a$ .  |
| \$(S        | , (a, a)) \$   | Reduce $L \rightarrow S$    |
| \$(L        | , (a, a)) \$   | shift                       |
| \$(L,       | (a, a)) \$     | shift                       |
| \$(L, L     | a, a)) \$      | shift                       |
| \$(L, (a    | , a)) \$       | Reduce $S \rightarrow a$ .  |
| \$(L, (S    | , a)) \$       | Reduce $L \rightarrow S$    |
| \$(L, (L    | , a)) \$       | shift                       |
| \$(L, (L,   | a)) \$         | shift                       |
| \$(L, (L, a | ) \$           | Reduce $S \rightarrow a$ .  |
| \$(L, (L, S | ) \$           | Reduce $L \rightarrow L, S$ |
| \$(L, (L    | ) \$           | shift                       |
| \$(L, (L)   | ) \$           | Reduce $S \rightarrow (L)$  |
| \$(L, S     | ) \$           | Reduce $L \rightarrow L, S$ |
| \$(L        | ) \$           | shift                       |
| \$(         | \$             | Reduce $S \rightarrow (L)$  |
| \$S         | \$             | Accept                      |