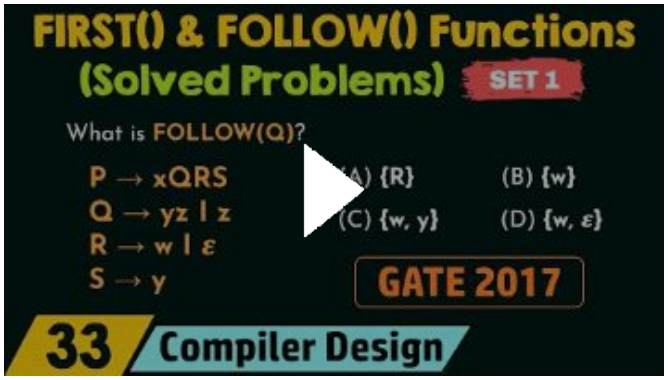
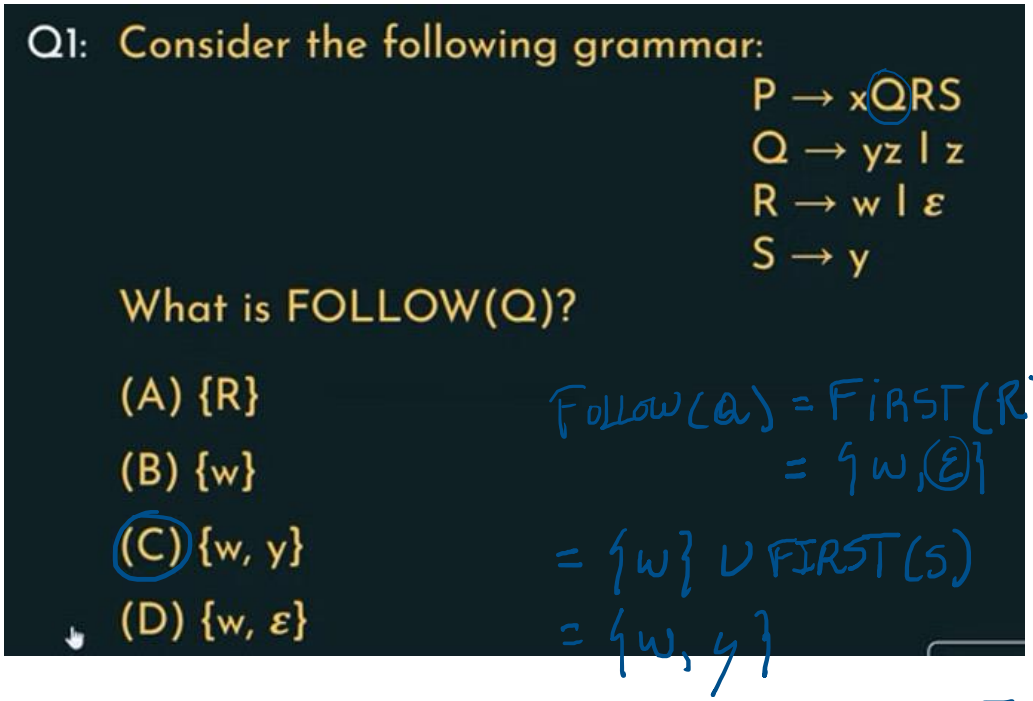
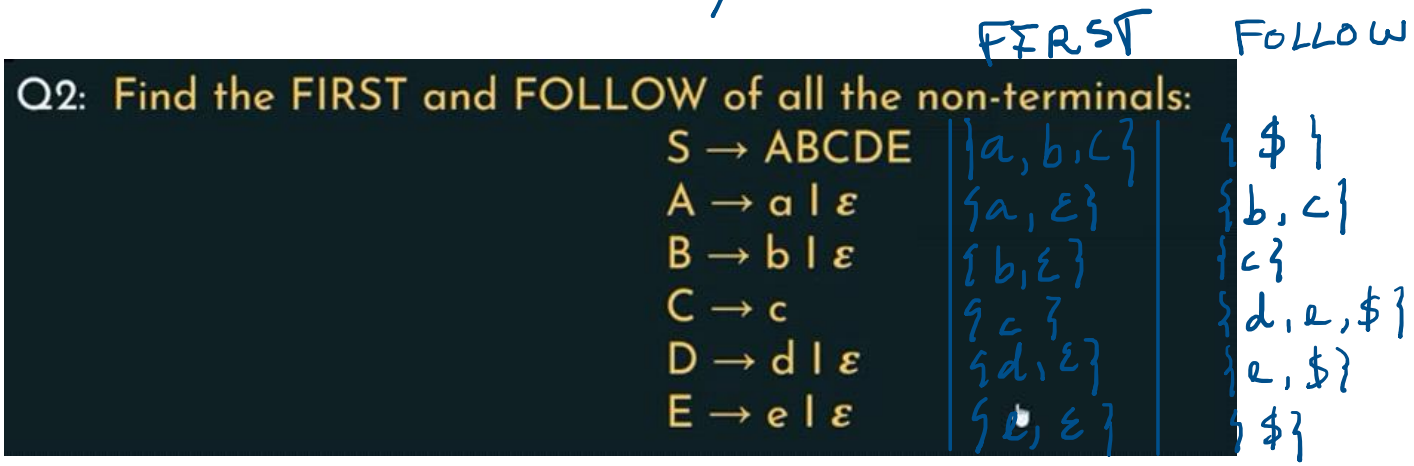
First & Follow function - solved problems (set 1 & 2)

2 de junho de 2024 13:26

FIRST() and FOLLOW() Functions – Solved Problems (Set 1)







Q3: Find the FIRST and FOLLOW of all the non-terminals:

$S \rightarrow Bb \mid Cd$
$B \rightarrow aB \mid \varepsilon$
$C \rightarrow cC \mid \varepsilon$

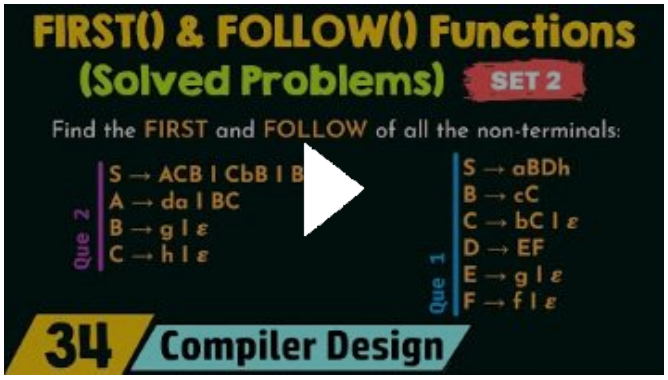
	FIRST	FOLLOW
$S \rightarrow Bb \mid Cd$	$\{a, b, c, d\}$	$\{\$\}$
$B \rightarrow aB \mid \varepsilon$	$\{a, \varepsilon\}$	$\{b\}$
$C \rightarrow cC \mid \varepsilon$	$\{c, \varepsilon\}$	$\{d\}$

$FIRST(S) = \{a, \varepsilon\} \cup \{c, \varepsilon\}$
$= \{a, b\} \cup \{c, d\}$
$= \{a, b, c, d\}$

$FIRST(B) = \{a, \varepsilon\}$
$FIRST(C) = \{c, \varepsilon\}$

$FOLLOW(B) = \{b\}$
$FOLLOW(C) = \{d\}$

[FIRST() and FOLLOW() Functions – Solved Problems (Set 2)]



Q1: Find the FIRST and FOLLOW of all the non-terminals:

$S \rightarrow aBDh$
$B \rightarrow cC$
$C \rightarrow bC \mid \varepsilon$
$D \rightarrow EF$

Q1: Find the FIRST and FOLLOW of all the non-terminals:

$S \rightarrow aBDh$
$B \rightarrow cC$
$C \rightarrow bC \mid \varepsilon$
$D \rightarrow EF$
$E \rightarrow g \mid \varepsilon$
$F \rightarrow f \mid \varepsilon$

	FIRST	FOLLOW
$S \rightarrow aBDh$	$\{a\}$	$\{\$\}$
$B \rightarrow cC$	$\{c\}$	$\{g, f, h\}$
$C \rightarrow bC \mid \varepsilon$	$\{b, \varepsilon\}$	$\{g, f, h\}$
$D \rightarrow EF$	$\{g, f, \varepsilon\}$	$\{h\}$
$E \rightarrow g \mid \varepsilon$	$\{g, \varepsilon\}$	$\{f, h\}$
$F \rightarrow f \mid \varepsilon$	$\{f, \varepsilon\}$	$\{h\}$

Follow(B) = First(D)
$= \{g, f, \varepsilon\}$
$= \{g, f\} \cup \{h\}$

Follow(C) = Follow(B) ∪ Follow(C)

Follow(E) = First(F)
$= \{f, \varepsilon\}$
$= \{f\} \cup$ FOLLOW(D)
$= \{f, h\}$

Q2: Find the FIRST and FOLLOW of all the non-terminals:

$S \rightarrow ACB \mid CbB \mid Ba$
$A \rightarrow da \mid BC$
$B \rightarrow g \mid \varepsilon$
$C \rightarrow h \mid \varepsilon$

	FIRST	FOLLOW
$S \rightarrow ACB \mid CbB \mid Ba$	$\varepsilon, d, g, h, b, a$	$\$$

$S \rightarrow ACB \mid CbB \mid Ba$	$\varepsilon, d, g, h, b, a$	$\$$
$A \rightarrow da \mid BC$	d, g, h, ε	$h, g, \$$
$B \rightarrow g \mid \varepsilon$	g, ε	$\$, a, h, g$
$C \rightarrow h \mid \varepsilon$	h, ε	$g, \$, b, h$

First(ABC)
= {d, g, ε}
= {d, g} ∪ First(C) = {d, g} ∪ {h, ε}
= {d, g, h} ∪ First(B) = {d, g, h, ε}

First(CbB) = {h, b} ; First(Ba) = {g, a}

Follow(A) = First(C) = {h, ε}
= {h} ∪ First(B)
= {h, g, ε} = {h, g} ∪ Follow(S)
= {h, g, $}

Follow(B) = {$, a} ∪ First(C)
= {$, a, h} ∪ Follow(A)

Follow(C) = {g, $} ∪ Follow(A) ∪ {b}