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CSC 135
Homework 1

function

$$\text{first}(x) \cap \text{first}(y)$$

$$\text{follow}(\text{function}) \cap \text{first}(\text{statemt})$$

$$\{E\} \cap \left[\text{first}(\text{assmnt}) \cup \text{first}(\text{ifstmt}) \cup \text{first}(\text{loop}) \cup \text{first}(\text{read}) \cup \text{first}(\text{output}) \cup \text{first}(\text{funcall})\right]$$

$$\text{first}(\text{assmnt}) = \text{first}(\text{ident}) = \text{first}(\text{letter}) = \{x, y, z\}$$

$$\{E\} \cap \left[\{x, y, z\} \cup \{I\} \cup \{w\} \cup \{R\} \cup \{0\} \cup \{c\}\right]$$

$$\{E\} \cap \{x, y, z, I, w, R, 0, c\}$$

$$\emptyset$$

$$\text{first}(a) \cap \text{first}(b)$$

$$\text{follow}(\text{function}) \cap \{\$\}$$

$$\{E\} \cap \{\$\}$$

$$\emptyset$$

statemt

$$\text{first}(u), \text{first}(v), \text{first}(w), \text{first}(x), \text{first}(y), \text{first}(z)$$

$$\text{first}(\text{assmnt}), \text{first}(\text{ifstmt}), \text{first}(\text{loop}), \text{first}(\text{read}), \text{first}(\text{output}), \text{first}(\text{funcall})$$

$$\{x, y, z\}, \{I\}, \{w\}, \{R\}, \{0\}, \{c\}$$

all pairwise disjoint $\quad \emptyset$

assmnt

Trivial

$First(x) \cap first(y)$

$\left[\{\&\} \cup \{\%\}\right] \cap first(statemt)$

$\{\&, \%\} \cap \{x, y, z, I, w, R, o, c\}$

$\emptyset$

$first(a) \cap first(b)$

$\{\&\} \cap \{\%\}$

$\emptyset$

$first(c) \cap first(d)$

$\{\&\} \cap first(statemt)$

$\{\&\} \cap \{x, y, z, I, w, R, o, c\}$

$\emptyset$

$First(x) \cap first(y)$

$\{T\} \cap first(statemt)$

$\{T\} \cap \{x, y, z, I, w, R, o, c\}$

$\emptyset$

$first(x) \cap first(y)$

$\{;\} \cap \{,\}$

$\emptyset$

$\text{first}(x) \cap \text{first}(y)$

$\{;\} \cap \{,\}$

$\emptyset$

Trivial

Trivial

$\text{first}(x) \cap \text{first}(y)$

$\text{follow}(\text{exprsn}) \cap \{+\}$

$\{;,)\} \cap \{+\}$

$\emptyset$

$\text{first}(x) \cap \text{first}(y)$

$\text{follow}(\text{factor}) \cap \{*\}$

$\text{follow}(\text{factor}) = \text{follow}(\text{exprsn}) \cup \{+\} \qquad = \{), ; +\}$

$\{), ; +\} \cap \{*\}$

$\emptyset$

oprnd

$\text{first}(x), \text{first}(y), \text{first}(z)$

$\text{first}(\text{integer}), \text{first}(\text{ident}), \{ (\}$

$\text{first}(\text{integer}) = \text{first}(\text{digit}) = \{0,1,2,3,4,5,6,7\}$

$\text{first}(\text{ident}) = \text{first}(\text{letter}) = \{x, y, z\}$

$\{0,1,2,3,4,5,6,7\}, \{x, y, z\}, \{ (\}$

    all pairwise disjoint $\emptyset$

Opratr

   Trivial

ident

$\text{first}(x) \cap \text{first}(y)$

$\text{follow}(\text{ident}) \cap \text{first}(\text{char})$

$\text{follow}(\text{ident}) = \big[\{ ; , \} \cup \text{follow}(\text{oprnd}) \cup \{ \sim \} \big]$

$\text{follow}(\text{oprnd}) = \big[\{) \} \cup \{ * \} \cup \text{follow}(\text{factor}) \cup \text{first}(\text{opratr}) \big]$

$\text{follow}(\text{factor}) = \big[\{ + \} \cup \text{follow}(\text{expr}sn) \big]$

$\text{follow}(\text{expr}sn) = \big[\{ ; \} \cup \{) \} \big]$

$\text{follow}(\text{ident}) = \big[\{ ; , \} \cup \{) \} \cup \{ * \} \cup \big[\{ + \} \cup \{ ;) \} \big] \big] \cup \{ < = > ! \} \cup \{ \sim \}$

$\text{follow}(\text{ident}) = \{ ; ,) * + < = > ! \}$

$\{ ; ,) * + < = > ! \sim \} \cap \text{first}(\text{char})$

$\text{first}(\text{char}) = \text{first}(\text{letter}) \cup \text{first}(\text{digit}) = \{ x \, y \, z \; 0 \, 1 \, 2 \, 3 \, 4 \, 5 \, 6 \, 7 \}$

$\{ ; ,) * + < = > ! \sim \} \cap \{ x \, y \, z \; 0 \, 1 \, 2 \, 3 \, 4 \, 5 \, 6 \, 7 \}$

       $\emptyset$

char

$first(x) \cap first(y)$

$first(letter) \cap first(digit)$

$\{x\ y\ z\} \cap \{0\ 1\ 2\ 3\ 4\ 5\ 6\ 7\}$

$$\emptyset$$

integer

$first(x) \cap first(y)$

$follow(integer) \cap first(digit)$

$follow(integer) = follow(oprnd) = \{)\} \cup \{*\} \cup \{+\} \cup \{;\ )\} \cup \{< = > !\}$

$\{)\ *\ +\ ;\ < = > !\ \} \cap \{0\ 1\ 2\ 3\ 4\ 5\ 6\ 7\}$

$$\emptyset$$

letter

Trivial

digit

Trivial