Edward Prokopik
CSC 135
Homework 1

function

first(x) ∩ first(y)

follow(function) ∪ {$} ∩ first(statement)

{E$} ∩ [first(assmnt) ∪ first(ifstmt) ∪ first(loop) ∪ first(read) ∪ first(output) ∪ first(funcall)]

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

{E$} ∩ [{x, y, z} ∪ {I} ∪ {W} ∪ {R} ∪ {O} ∪ {C}]

{E$} ∩ {x, y, z, I, W, R, O, C}

∅

first(a) ∩ first(b)

follow(function) ∩ {$}

{E} ∩ {$}

∅

statement

first(u), first(v), first(w), first(x), first(y), first(z)

first(assmnt), first(ifstmt), first(loop), first(read), first(output), first(funcall)

{x, y, z}, {I}, {W}, {R}, {O}, {C}

all pairwise disjoint ∅

assmnt

Trivial

ifstmt

first(x) ∩ first(y)

[{&} ∪ {%}] ∩ first(statemnt)

{&, %} ∩ {x, y, z, I, w, R, 0, c}

∅

first(a) ∩ first(b)

{&} ∩ {%}

∅

first(c) ∩ first(d)

{&} ∩ first(statemnt)

{&} ∩ {x, y, z, I, w, R, 0, c}

∅

loop

first(x) ∩ first(y)

{T} ∩ first(statemnt)

{T} ∩ {x, y, z, I, w, R, 0, c}

∅

read

first(x) ∩ first(y)

{;} ∩ {,}

∅

output

first(x) ∩ first(y)

{;} ∩ {,}

∅

funcall

Trivial

comprsn

Trivial

exprsn

first(x) ∩ first(y)

follow(exprsn) ∩ {+}

{;,)} ∩ {+}

∅

factor

first(x) ∩ first(y)

follow(factor) ∩ {*}

follow(factor) = follow(exprsn) ∪ {+} = {),;+}

{),;+} ∩ {*}

∅

oprnd

first(x) , first(y) , first(z)

first(integer) , first(ident) , { (}

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

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

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

all pairwise disjoint $\emptyset$

Oprator

Trivial

ident

first(x) ∩ first(y)

follow(ident) ∩ first(char)

follow(ident) = [{ ; , } ∪ follow(oprnd) ∪ { ~ }]

follow(oprnd) = [{) } ∪ { * } ∪ follow(factor) ∪ first(oprator)]

follow(factor) = [{ + } ∪ follow(exprsn)]

follow(exprsn) = [{ ; } ∪ {) }]

follow(ident) = [{ ; , } ∪ [{) } ∪ { * } ∪ [{ + } ∪ { ;)]] ∪ { < = > ! } ∪ { ~ }]

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

{ ; ,) * + < = > ! ~ } ∩ first(char)

first(char) = first(letter) ∪ first(digit) = { x y z 0 1 2 3 4 5 6 7 }

{ ; ,) * + < = > ! ~ } ∩ { x y z 0 1 2 3 4 5 6 7 }

$\emptyset$

Char

first(x) ∩ first(y)

first(letter) ∩ first(digit)

{x y z} ∩ {0 1 2 3 4 5 6 7}

$\emptyset$

integer

first(x) ∩ First(y)

follow(integer) ∩ first(digit)

follow(integer) = follow(oprnd) = {)} ∪ {*} ∪ {+} ∪ {;)} ∪ {<=>!}

{)*+;<=>!} ∩ {0 1 2 3 4 5 6 7}

$\emptyset$

letter

Trivial

digit

Trivial