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Csc 135 – 2

Assignment 2 proofs

<varlist>, <vardef>, <varname>, <method>, <ifstatemt>, <assignstatemt>, <factor>, <getvarref>

The two rules of Predictive Parsing are:

1. For every production A ::= α 1 | α 2 | α 3 | ... | α n , we must have

   FIRST (αi) ∩ FIRST (αj) = ∅ for each pair i, j, i ≠ j

2. For every nonterminal A such that FIRST (A) contains λ, we must have

   FIRST (A) ∩ FOLLOW (A) = ∅

There are no methods (non-terminals) in the Java Class grammar where the FIRST(A) contains λ . The { } metasymbol, which represents "0 or more" is never in the FIRST of any non-terminal. Thus, rule #2 is satisfied.

<varlist>
<varlist> ::= **<vardef>** {, <vardef>}
<vardef> ::= **<type>** <varname> | **<classname>** <varref>
FIRST(<type>)={I,S} ∩ FIRST(<classname>)={C,D} = ∅

Same can be proven with **<vardef>**.
<vardef> ::= **<type>** <varname> | **<classname>** <varref>
FIRST(<type>)={I,S} ∩ FIRST(<classname>)={C,D} = ∅

<varname>
<varname> ::= **<letter>** {<char>}
FIRST(<letter>) = { Y , Z } no intersection

<method>
<method> ::= **<accessor>** <type> <methodname> ([<varlist>]) B {<statemt>} <returnstatemt> E
FIRST(<accessor>) = { P , V } no intersection

<ifstatemt>
<ifstatemt> ::= **F** <cond> T B {<statemt>} E [L B {<statemt>} E]
FIRST<ifstatemt> is a terminal

<assignstatemt>
<assignstatemt> ::= **<varname>** = <mathexpr> | **<varref>** = <getvarref>
<varname> ::= **<letter>** {<char>}

FIRST(<letter>)={Y,Z} ∩ FIRST(<varref>)={J,K} = ∅

<factor>
<factor> ::= **<oprnd>** {* oprnd}
<oprnd> ::= **<integer>** | **<varname>** | **(** <mathexpr>) | **<methodcall>**
<integer> ::= **<digit>** {<digit>}
<varname> ::= **<letter>** {<char>}
<methodcall> ::= **<varref>** . <methodname>([<varlist>])
FIRST(<digit>) = {0, 1, 2, 3}
FIRST(<letter>) = {Y, Z}
(
FIRST(<varref>) = {J, K}
FIRST(<factor>) = { 0, 1, 2, 3, Y, Z, (, J, K }
αi and αj do not intersect. There is no intersection between all the options.

<getvarref>
<getvarref> ::= O <classname>() | <methodcall>
FIRST(<getvarref>) = O which is a terminal. <getvarref> cannot have any other FIRST