

Grammar 2:

$P \rightarrow \text{prog DL SL end}$

$DL \rightarrow D DL \mid \epsilon$

$D \rightarrow \text{TY VL};$

$\text{TY} \rightarrow \text{int} \mid \text{float}$

$VL \rightarrow \text{id VL}'$

$VL' \rightarrow VL \mid \epsilon$

$SL \rightarrow S SL \mid \epsilon$

$S \rightarrow \text{ES} \mid \text{IS} \mid \text{WS} \mid \text{IOS}$

$\text{ES} \rightarrow \text{id} := E;$

$\text{IS} \rightarrow \text{if BE then SL IS}'$

$\text{IS}' \rightarrow \text{end} \mid \text{else SL end}$

$\text{WS} \rightarrow \text{while BE do SL end}$

$\text{IOS} \rightarrow \text{print PE} \mid \text{scan id}$

$\text{PE} \rightarrow E \mid \text{str}$

$\text{BE} \rightarrow \text{AE BE}'$

$\text{BE}' \rightarrow \text{or AE BE}' \mid \epsilon$

$\text{AE} \rightarrow \text{NE AE}'$

$\text{AE}' \rightarrow \text{and NE AE}' \mid \epsilon$

$\text{NE} \rightarrow \text{not NE} \mid \{ \text{BE} \} \mid \text{RE}$

$\text{RE} \rightarrow E \text{ RE}'$

$\text{RE}' \rightarrow =E \mid <E \mid >E$

$E \rightarrow T E'$

$E' \rightarrow + T E' \mid - T E' \mid \epsilon$

$T \rightarrow F T'$

$T' \rightarrow *FT' \mid /FT' \mid \epsilon$

$F \rightarrow (E) \mid \text{id} \mid \text{ic} \mid \text{fc}$

First Set:

$\text{First}(P) = [\text{prog}]$

$\text{First}(DL) = [\text{int}, \text{float}, \epsilon]$

$\text{First}(D) = [\text{int}, \text{float}]$

$\text{First}(TY) = [\text{int}, \text{float}]$

$\text{First}(VL) = [\text{id}]$

$\text{First}(VL') = [\text{id}, \epsilon]$

$\text{First}(SL) = [\text{id}, \text{if}, \text{while}, \text{print}, \text{scan}, \epsilon]$

$\text{First}(S) = [\text{id}, \text{if}, \text{while}, \text{print}, \text{scan}, \epsilon]$

$\text{First}(ES) = [\text{id}]$

$\text{First}(IS) = [\text{if}]$

$\text{First}(IS') = [\text{end}, \text{else}]$

$\text{First}(WS) = [\text{while}]$

$\text{First}(IOS) = [\text{print}, \text{scan}]$

$\text{First}(PE) = [(\text{, id, ic, fc, str}]$

$\text{First}(BE) = [\text{not}, \{, (\text{, id, ic, fc}]$

$\text{First}(BE') = [\text{or}, \epsilon]$

$\text{First}(AE) = [\text{not}, \{, (\text{, id, ic, fc}]$

$\text{First}(AE') = [\text{and}, \epsilon]$

$\text{First}(NE) = [\text{not}, \{, (\text{, id, ic, fc}]$

$\text{First}(RE) = [(\text{, id, ic, fc}]$

$\text{First}(RE') = [<, >, =]$

$\text{First}(E) = [(\text{, id, ic, fc}]$

$\text{First}(E') = [+ , - , \epsilon]$

$\text{First}(T) = [(\text{, id, ic, fc}]$

$\text{First}(F) = [(\text{, id, ic, fc}]$

$\text{First}(T') = [* , / , \epsilon]$

Follow Set:

Follow(SL) = [end ,else]

Follow(DL) = [id, if, white, print, scan, end, else]

Follow(VL') = [;]

Follow(BE') = [do, then, }]

Follow(AE') = [or, do, then, }]

Follow(E') = [<, >, =, and, or, do, then, }, id, if, while, print, scan, end, else, ;]

Follow(T') = [+ , - , <, >, =, and, or, do, then, }, id, if, while, print, scan, end, else, ;]