Parser 3.2

G_{expr}= ({⟨prog⟩, ⟨statlist⟩, ⟨statlistp⟩, ⟨stat⟩, ⟨assignlist⟩, ⟨assignlistp⟩, ⟨idlist⟩, ⟨idlistp⟩, ⟨bexpr⟩, ⟨expr⟩, ⟨exprlist⟩, ⟨exprlistp⟩}, {+, -, *, /, (,), NUM, ID, RELOP, EOF}, P, ⟨prog⟩)

Produzioni:

⟨prog⟩ ::= ⟨statlist⟩ EOF

⟨statlist⟩ ::= ⟨stat⟩ ⟨statlistp⟩

⟨statlistp⟩ ::= ; ⟨stat⟩ ⟨statlistp⟩ | ε

⟨stat⟩ ::= assign ⟨assignlist⟩

| print(⟨exprlist⟩)

| read(⟨idlist⟩)

| for(ID := ⟨expr⟩ ; ⟨bexpr⟩) do ⟨stat⟩

| for(⟨bexpr⟩) do ⟨stat⟩

| if(⟨bexpr⟩) ⟨stat⟩ else ⟨stat⟩ end

| if(⟨bexpr⟩) ⟨stat⟩ end

| { ⟨statlistp⟩ }

⟨assignlist⟩ ::= [⟨expr⟩ to ⟨idlist⟩] ⟨assignlistp⟩

⟨assignlistp⟩ ::= [⟨expr⟩ to ⟨idlist⟩] ⟨assignlistp⟩ | ε

⟨idlist⟩ ::= ID ⟨idlistp⟩

⟨idlistp⟩ ::= , ID ⟨idlistp⟩ | ε

⟨bexpr⟩ ::= RELOP ⟨expr⟩ ⟨expr⟩

⟨expr⟩ ::= + (⟨exprlist⟩) | * (⟨exprlist⟩)

| - ⟨expr⟩ ⟨expr⟩ | / ⟨expr⟩ ⟨expr⟩

| NUM | ID

⟨exprlist⟩ ::= ⟨expr⟩ ⟨exprlistp⟩

⟨exprlistp⟩ ::= , ⟨expr⟩ ⟨exprlistp⟩ | ε

NULL:

NULL(⟨statlistp⟩)
NULL(⟨exprlistp⟩)
NULL(⟨idlistp⟩)
NULL(⟨exprlistp⟩)

FIRST:

FIRST(⟨prog⟩) = FIRST(⟨statlist⟩ EOF) = {assign, print, read, for, if, '{'}
FIRST(⟨statlist⟩) = FIRST(⟨stat⟩ ⟨statlistp⟩) = {assign, print, read, for, if, '{'}
FIRST(⟨stat⟩) = FIRST(assign) ∪ FIRST(print) ∪ FIRST(read) ∪ FIRST(for) ∪
FIRST(for) ∪ FIRST(if) ∪ FIRST(if) ∪ FIRST('}') = {assign, print,
read, for, if, '{'}
FIRST(⟨statlistp⟩) = FIRST(';') = {';'}
FIRST(⟨assignlist⟩) = FIRST('[') = {'['}
FIRST(⟨assignlistp⟩) = FIRST('[') = {'['}
FIRST(⟨idlist⟩) = FIRST(ID) = {ID}
FIRST(⟨idlistp⟩) = FIRST(',') = {','}
FIRST(⟨bexpr⟩) = FIRST(RELOP) = {RELOP}
FIRST(⟨expr⟩) = FIRST('+') ∪ FIRST('-') ∪ FIRST('*') ∪ FIRST('/') ∪ FIRST(NUM)
∪ FIRST(ID) = {'+', '-', '*', '/', NUM, ID}
FIRST(⟨exprlist⟩) = FIRST(⟨expr⟩) = {'+', '-', '*', '/', NUM, ID}
FIRST(⟨exprlistp⟩) = FIRST(',') = {','}

FOLLOW:

FIRST(EOF) ⊆ FOLLOW(⟨prog⟩)

FIRST(EOF) ⊆ FOLLOW(⟨statlist⟩)
FIRST('}') ⊆ FOLLOW(⟨statlist⟩)

FOLLOW(⟨statlist⟩) ⊆ FOLLOW(⟨statlistp⟩)

FOLLOW(⟨stat⟩) ⊆ FOLLOW(⟨assignlist⟩)

FIRST(else) ⊆ FOLLOW(⟨stat⟩)
FIRST(end) ⊆ FOLLOW(⟨stat⟩)

FOLLOW(⟨statlistp⟩) ⊆ FOLLOW(⟨stat⟩)
FOLLOW(⟨statlist⟩) ⊆ FOLLOW(⟨stat⟩)
FOLLOW(⟨assignlist⟩) ⊆ FOLLOW(⟨assignlistp⟩)

FOLLOW(⟨exprlist⟩) ⊆ FOLLOW(⟨exprlistp⟩)

FIRST(']') ⊆ FOLLOW(⟨idlist⟩)
FIRST(')') ⊆ FOLLOW(⟨idlist⟩)

FOLLOW(⟨idlist⟩) ⊆ FOLLOW(⟨idlistp⟩)

FIRST(')') ⊆ FOLLOW(⟨bexpr⟩)

FIRST(';') ⊆ FOLLOW(⟨expr⟩)
FIRST('to') ⊆ FOLLOW(⟨expr⟩)
FIRST(⟨expr⟩) ⊆ FOLLOW(⟨expr⟩)
FIRST(⟨exprlistp⟩) ⊆ FOLLOW(⟨expr⟩)
FOLLOW(⟨bexpr⟩) ⊆ FOLLOW(⟨expr⟩)

FIRST(')') ⊆ FOLLOW(⟨exprlist⟩)

INSIEMI GUIDA:

GUIDA(⟨prog⟩ → ⟨statlist⟩ EOF) = FIRST(⟨statlist⟩) = {assign, print, read, for, if, '{'}

GUIDA(⟨statlist⟩ → ⟨stat⟩ ⟨statlistp⟩) = FIRST(⟨stat⟩) = {assign, print, read, for, if,

'{'}

GUIDA(⟨statlistp⟩ → ; ⟨stat⟩ ⟨statlistp⟩) = FIRST(';') = {';'}
GUIDA(⟨statlistp⟩ → ε) = FOLLOW(⟨statlistp⟩) = {'}', EOF}

GUIDA(⟨stat⟩ → assign ⟨assignlist⟩) = {assign}
GUIDA(⟨stat⟩ → print(⟨exprlist⟩)) = {print}
GUIDA(⟨stat⟩ → read(⟨idlist⟩)) = {read}
GUIDA(⟨stat⟩ → for(ID := ⟨expr⟩ ; ⟨bexpr⟩) do ⟨stat⟩) = {for}
GUIDA(⟨stat⟩ → for(⟨bexpr⟩) do ⟨stat⟩) = {for}
GUIDA(⟨stat⟩ → if(⟨bexpr⟩) ⟨stat⟩ else ⟨stat⟩ end) = {if}

GUIDA(⟨stat⟩ → if(⟨bexpr⟩) ⟨stat⟩ end) = {if}
GUIDA(⟨stat⟩ → { ⟨statlist⟩ }) = {'{'}

GUIDA(⟨assignlist⟩ → [⟨expr⟩ to ⟨idlist⟩] ⟨assignlistp⟩) = {'['}
GUIDA(⟨assignlistp⟩ → [⟨expr⟩ to ⟨idlist⟩] ⟨assignlistp⟩) = {'['}
GUIDA(⟨assignlistp⟩ → ε) = FOLLOW(⟨assignlistp⟩) = {'}', else, end, ';', EOF}

GUIDA(⟨idlist⟩ → ID ⟨idlistp⟩) = {ID}

GUIDA(⟨idlistp⟩ → , ID ⟨idlistp⟩) = {','}
GUIDA(⟨idlistp⟩ → ε) = FOLLOW(⟨idlistp⟩) = {']', ')'}

GUIDA(⟨bexpr⟩ → RELOP ⟨expr⟩ ⟨expr⟩) = {RELOP}

GUIDA(⟨expr⟩ → + (⟨exprlist⟩)) = {'+'}
GUIDA(⟨expr⟩ → - (⟨exprlist⟩)) = {'-'}
GUIDA(⟨expr⟩ → * ⟨expr⟩ ⟨expr⟩) = {'*'}
GUIDA(⟨expr⟩ → / ⟨expr⟩ ⟨expr⟩) = {'/'}
GUIDA(⟨expr⟩ → NUM) = {NUM}
GUIDA(⟨expr⟩ → ID) = {ID}

GUIDA(⟨exprlist⟩ → ⟨expr⟩ ⟨exprlistp⟩) = FIRST(⟨expr⟩) = {'+', '-', '*', '/', NUM, ID}

GUIDA(⟨exprlistp⟩ → , ⟨expr⟩ ⟨exprlistp⟩) = {','}
GUIDA(⟨exprlistp⟩ → ε) = {')'}

PRODUZIONI AGGIUNTIVE:

⟨statfor⟩ ::= ID := ⟨expr⟩ ; ⟨bexpr⟩ | ⟨bexpr⟩
⟨statelse⟩ ::= else ⟨stat⟩ end | end

⟨stat⟩ ::= for(⟨statfor⟩) do ⟨stat⟩
⟨stat⟩ ::= if(⟨bexpr⟩) ⟨stat⟩ ⟨statelse⟩

INSIEMI GUIDA AGGIUNTIVI:

GUIDA(⟨stat⟩ → assign ⟨assignlist⟩) = {assign}
GUIDA(⟨stat⟩ → print(⟨exprlist⟩)) = {print}

GUIDA(⟨stat⟩ → read(⟨idlist⟩)) = {read}
GUIDA(⟨stat⟩ → for(⟨statfor⟩) do ⟨stat⟩) = {for}
GUIDA(⟨stat⟩ → if(⟨bexpr⟩) ⟨stat⟩ ⟨statelse⟩) = {if}
GUIDA(⟨stat⟩ → { ⟨statlist⟩ }) = {'{'}

GUIDA(⟨statelse⟩ → else ⟨stat⟩ end) = {else}
GUIDA(⟨statlese⟩ → end) = {end}

GUIDA(⟨statfor⟩ → ID := ⟨expr⟩ ; ⟨bexpr⟩) = {ID}
GUIDA(⟨statfor⟩ → ⟨bexpr⟩) = FIRST(⟨bexpr⟩ =
{RELOP}