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**Compilers Assignment Phase 2**

**LANGUAGE NAME: TReK**

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**LL(1) Class Language Specifications**

**Grammar Rules:**

1. PROGRAM -> OTHERFUNC MAINFUNC
2. MAINFUNC -> tk\_main tk\_lcurlybracket\_operator STMTS tk\_rcurlybracket\_operator
3. OTHERFUNC -> FUNCTION OTHERFUNC
4. OTHERFUNC -> ''
5. FUNCTION -> tk\_funid tk\_lcurlybracket\_operator INPUT\_PAR OUTPUT\_PAR tk\_semicol\_operator STMTS tk\_rcurlybracket\_operator
6. INPUT\_PAR -> tk\_input\_keyword tk\_parameter tk\_lsquarebracket\_operator PARAMETER\_LIST tk\_rsquarebracket\_operator
7. OUTPUT\_PAR -> tk\_output\_keyword tk\_parameter tk\_lsquarebracket\_operator PARAMETER\_LIST tk\_rsquarebracket\_operator
8. OUTPUT\_PAR -> ''
9. PARAMETER\_LIST -> DATA\_TYPE tk\_ident REMAINING\_LIST
10. DATA\_TYPE -> tk\_int\_keyword
11. DATA\_TYPE -> tk\_float\_keyword
12. DATA\_TYPE -> tk\_string\_keyword
13. REMAINING\_LIST -> tk\_comma\_operator PARAMETER\_LIST
14. REMAINING\_LIST -> ''
15. STMTS -> STMT STMTS
16. STMTS -> ''
17. STMT -> DECLSTMT
18. STMT -> LOOPSTMT
19. STMT -> ASSIGNSTMT
20. STMT -> FUNCALSTMT
21. STMT -> IOSTMT
22. STMT -> CONDSTMT
23. STMT -> RETSTMT
24. DECLSTMT -> tk\_int\_keyword tk\_ident tk\_semicol\_operator
25. DECLSTMT -> tk\_float\_keyword tk\_ident tk\_semicol\_operator
26. DECLSTMT -> tk\_string\_keyword tk\_ident tk\_semicol\_operator
27. ASSIGNSTMT -> tk\_ident tk\_assignment\_operator ARITHEXP tk\_semicol\_operator
28. ARITHEXP -> TERM EXPPRIME
29. EXPPRIME -> LOWPOP TERM EXPPRIME
30. EXPPRIME -> ''
31. TERM -> FACTOR TERMPRIME
32. TERMPRIME -> HIGHPOP FACTOR TERMPRIME
33. TERMPRIME -> ''
34. FACTOR -> tk\_lparen\_operator ARITHEXP tk\_rparen\_operator
35. FACTOR -> VAR
36. HIGHPOP -> tk\_mul\_operator
37. HIGHPOP -> tk\_div\_operator
38. LOWPOP -> tk\_plus\_operator
39. LOWPOP -> tk\_minus\_operator
40. VAR -> tk\_ident
41. VAR -> tk\_int\_literal
42. VAR -> tk\_float\_literal
43. VAR -> tk\_string\_literal
44. LOOPSTMT -> tk\_for\_keyword tk\_lparen\_operator BOOLEXP tk\_rparen\_operator tk\_lcurlybracket\_operator STMTS tk\_rcurlybracket\_operator
45. BOOLEXP -> tk\_lparen\_operator BOOLEXP tk\_rparen\_operator LOGOP tk\_lparen\_operator BOOLEXP tk\_rparen\_operator
46. BOOLEXP -> tk\_ident RELOP VAR
47. BOOLEXP -> tk\_int\_literal RELOP VAR
48. BOOLEXP -> tk\_float\_literal RELOP VAR
49. BOOLEXP -> tk\_string\_literal RELOP VAR
50. RELOP -> tk\_lt\_operator
51. RELOP -> tk\_lteq\_operator
52. RELOP -> tk\_equal\_operator
53. RELOP -> tk\_gteq\_operator
54. RELOP -> tk\_gt\_operator
55. LOGOP -> tk\_and
56. LOGOP -> tk\_or
57. CONDSTMT -> tk\_if\_keyword BOOLEXP tk\_lcurlybracket\_operator STMTS tk\_rcurlybracket\_operator CONDSTMTPRIME
58. CONDSTMTPRIME -> tk\_else\_keyword tk\_lcurlybracket\_operator STMTS tk\_rcurlybracket\_operator
59. CONDSTMTPRIME -> ''
60. IOSTMT -> tk\_read\_keyword tk\_lparen\_operator tk\_ident tk\_rparen\_operator tk\_semicol\_operator
61. IOSTMT -> tk\_write tk\_lparen\_operator VAR tk\_rparen\_operator tk\_semicol\_operator
62. FUNCALSTMT -> OUTPUT\_PARAM tk\_funid INPUT\_PARAM tk\_semicol\_operator
63. OUTPUT\_PARAM -> tk\_lsquarebracket\_operator IDLIST tk\_rsquarebracket\_operator tk\_assignment\_operator
64. INPUT\_PARAM -> tk\_lsquarebracket\_operator IDLIST tk\_rsquarebracket\_operator
65. IDLIST -> tk\_ident MOREID
66. MOREID -> tk\_comma\_operator IDLIST
67. MOREID -> ''
68. RETSTMT -> tk\_return\_keyword OPRESTMT tk\_semicol\_operator
69. OPRESTMT -> tk\_lsquarebracket\_operator IDLIST tk\_rsquarebracket\_operator
70. OPRESTMT -> ''

**Non-Terminals:** { PROGRAM, MAINFUNC, OTHERFUNC, FUNCTION, INPUT\_PAR, OUTPUT\_PAR, PARAMETER\_LIST, DATA\_TYPE, REMAINING\_LIST, STMTS, STMT, DECLSTMT, ASSIGNSTMT, ARITHEXP, EXPPRIME, TERM, TERMPRIME, FACTOR, HIGHPOP, LOWPOP, VAR, LOOPSTMT, BOOLEXP, RELOP, LOGOP, CONDSTMT, CONDSTMTPRIME, IOSTMT, FUNCALSTMT, OUTPUT\_PARAM, INPUT\_PARAM, IDLIST, MOREID, RETSTMT, OPRESTMT }

**Terminals:** {tk\_main, tk\_lcurlybracket\_operator, tk\_rcurlybracket\_operator, tk\_funid, tk\_semicol\_operator, tk\_input\_keyword, tk\_parameter, tk\_lsquarebracket\_operator, tk\_rsquarebracket\_operator, tk\_output\_keyword, tk\_ident , tk\_int\_keyword, tk\_float\_keyword, tk\_string\_keyword, tk\_comma\_operator, tk\_assignment\_operator, tk\_lparen\_operator, tk\_rparen\_operator, tk\_mul\_operator , tk\_div\_operator, tk\_plus\_operator, tk\_minus\_operator, tk\_int\_literal, tk\_float\_literal, tk\_string\_literal, tk\_for\_keyword, tk\_lt\_operator, tk\_lteq\_operator, tk\_equal\_operator, tk\_gteq\_operator, tk\_gt\_operator, tk\_and, tk\_or, tk\_if\_keyword, tk\_else\_keyword, tk\_read\_keyword, tk\_write, tk\_return\_keyword, $}

**Start Symbol:** PROGRAM

**Keywords** = {main,void,int,float,string,input,output,read,write,for,if,else,return,and,or,parameter}

**Regex:**

fun\_id =[\_][a-zA-Z][.a-zA-Z0-9]\*

id = [a-zA-Z][.a-zA-Z0-9]\*

int\_lit = [+-]?[1-9][0-9]\*

float\_lit = [+-]?[0-9]\*[.][0-9]\*

string\_lit = ["][a-zA-Z\t\n\r\"\\]\*["]

comment = [#][\s\S]\*