Stage 3

Part 1- Type checking rules

1) The type of a variable is the same as the type assigned to it during declaration. The possible data types are- int, float, vector or string.
2) The token intliteral is of type int
3) The token floatliteral is of type float
4) Vector is a composite data type made up of three components each of type float
5) The type of an expression (E1 <operator> E2) is governed by the following rules-
   a) If <operator> is DOT and E1,E2 are variable of type vector the expression will have type float.
   b) If operator is CROSS and E1,E2 are vectors the expression will be of type vector.
   c) For other arithmetic operators-
      i) If both operands are vectors the expression will be of vector type.
      ii) If one operand is of type int and the other is of type float the expression will be a float.
      iii) If both operands are of floating type the resulting expression will also be a float.
      iv) If both operands are of int type the expression will also be of type int.
   d) For Logical operators if all operands are Boolean the expression is Boolean.
   e) For Relational operators if both operators are either int or float, or if both the operands are of type vector, the expression has a Boolean value.
   f) Type of the parameter returned by a function is the same as the return type of the function.
   g) If none of the above rules are applicable then there is a type error in the program.

Part 2- Semantic Rules

1) Identifiers should be declared before use.
2) Multiple declarations for the same identifier(same name and scope) will be ignored and only the first declaration will be counted.
3) Every program must have a main function.
4) All user defined functions must be defined and declared before the main function.
5) An if/while statement must have the expression of boolean type.
6) Any identifier not initialized before use will be assigned a default value of 0.
7) The type and number of parameters declared in the function definition should be the same as that in the function call.
8) During assignment, a float can be assigned to a float or int, an int can be assigned to another int, a vector can be assigned to another vector.
9) Function overloading is not allowed.In case there is one,the first declaration would be considered the final one.
10) The expression inside log(x) i.e x should be a scalar.