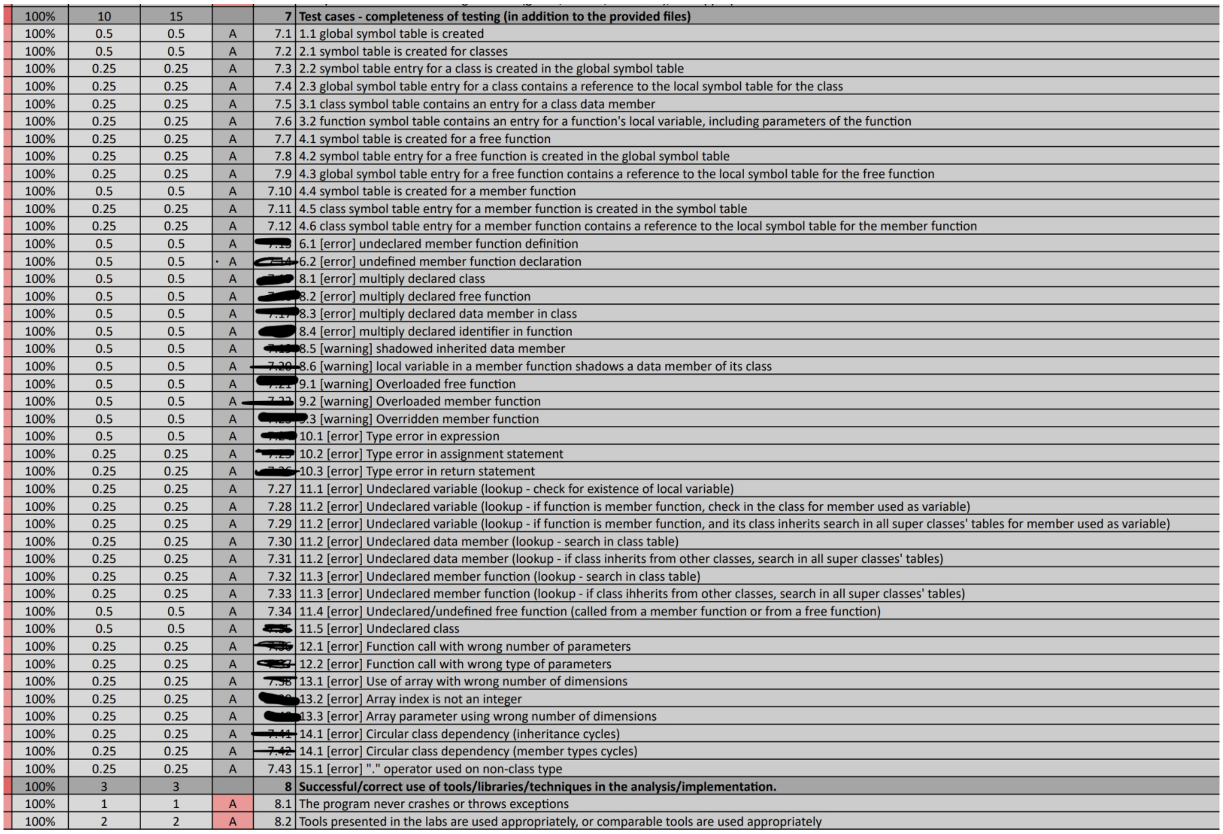
Maira Malhi (40128269)
Assignment 4 - COMP 442

Section 1 - List of Implemented



100%	10	15		7	**Test cases - completeness of testing (in addition to the provided files)**
100%	0.5	0.5	A	7.1	1.1 global symbol table is created
100%	0.5	0.5	A	7.2	2.1 symbol table is created for classes
100%	0.25	0.25	A	7.3	2.2 symbol table entry for a class is created in the global symbol table
100%	0.25	0.25	A	7.4	2.3 global symbol table entry for a class contains a reference to the local symbol table for the class
100%	0.25	0.25	A	7.5	3.1 class symbol table contains an entry for a class data member
100%	0.25	0.25	A	7.6	3.2 function symbol table contains an entry for a function's local variable, including parameters of the function
100%	0.25	0.25	A	7.7	4.1 symbol table is created for a free function
100%	0.25	0.25	A	7.8	4.2 symbol table entry for a free function is created in the global symbol table
100%	0.25	0.25	A	7.9	4.3 global symbol table entry for a free function contains a reference to the local symbol table for the free function
100%	0.5	0.5	A	7.10	4.4 symbol table is created for a member function
100%	0.25	0.25	A	7.11	4.5 class symbol table entry for a member function is created in the symbol table
100%	0.25	0.25	A	7.12	4.6 class symbol table entry for a member function contains a reference to the local symbol table for the member function
100%	0.5	0.5	A	[redacted]	6.1 [error] undeclared member function definition
100%	0.5	0.5	· A	[redacted]	6.2 [error] undefined member function declaration
100%	0.5	0.5	A	[redacted]	8.1 [error] multiply declared class
100%	0.5	0.5	A	[redacted]	8.2 [error] multiply declared free function
100%	0.5	0.5	A	[redacted]	8.3 [error] multiply declared data member in class
100%	0.5	0.5	A	[redacted]	8.4 [error] multiply declared identifier in function
100%	0.5	0.5	A	[redacted]	8.5 [warning] shadowed inherited data member
100%	0.5	0.5	A	~~7.20~~	8.6 [warning] local variable in a member function shadows a data member of its class
100%	0.5	0.5	A	[redacted]	9.1 [warning] Overloaded free function
100%	0.5	0.5	A	[redacted]	9.2 [warning] Overloaded member function
100%	0.5	0.5	A	[redacted]	9.3 [warning] Overridden member function
100%	0.5	0.5	A	[redacted]	10.1 [error] Type error in expression
100%	0.25	0.25	A	[redacted]	10.2 [error] Type error in assignment statement
100%	0.25	0.25	A	[redacted]	10.3 [error] Type error in return statement
100%	0.25	0.25	A	7.27	11.1 [error] Undeclared variable (lookup - check for existence of local variable)
100%	0.25	0.25	A	7.28	11.2 [error] Undeclared variable (lookup - if function is member function, check in the class for member used as variable)
100%	0.25	0.25	A	7.29	11.2 [error] Undeclared variable (lookup - if function is member function, and its class inherits search in all super classes' tables for member used as variable)
100%	0.25	0.25	A	7.30	11.2 [error] Undeclared data member (lookup - search in class table)
100%	0.25	0.25	A	7.31	11.2 [error] Undeclared data member (lookup - if class inherits from other classes, search in all super classes' tables)
100%	0.25	0.25	A	7.32	11.3 [error] Undeclared member function (lookup - search in class table)
100%	0.25	0.25	A	7.33	11.3 [error] Undeclared member function (lookup - if class ihherits from other classes, search in all super classes' tables)
100%	0.5	0.5	A	7.34	11.4 [error] Undeclared/undefined free function (called from a member function or from a free function)
100%	0.5	0.5	A	[redacted]	11.5 [error] Undeclared class
100%	0.25	0.25	A	[redacted]	12.1 [error] Function call with wrong number of parameters
100%	0.25	0.25	A	[redacted]	12.2 [error] Function call with wrong type of parameters
100%	0.25	0.25	A	~~7.38~~	13.1 [error] Use of array with wrong number of dimensions
100%	0.25	0.25	A	[redacted]	13.2 [error] Array index is not an integer
100%	0.25	0.25	A	[redacted]	13.3 [error] Array parameter using wrong number of dimensions
100%	0.25	0.25	A	~~7.41~~	14.1 [error] Circular class dependency (inheritance cycles)
100%	0.25	0.25	A	~~7.42~~	14.1 [error] Circular class dependency (member types cycles)
100%	0.25	0.25	A	7.43	15.1 [error] "." operator used on non-class type
100%	3	3		8	**Successful/correct use of tools/libraries/techniques in the analysis/implementation.**
100%	1	1	A	8.1	The program never crashes or throws exceptions
100%	2	2	A	8.2	Tools presented in the labs are used appropriately, or comparable tools are used appropriately

Section 2 - Design

When designing this portion of the Symbol Table generations and Semantic Checking, the visitor pattern was used in order to perform a depth-first search traversal along the AST stack and create the correct ordering for the symbol table creations + entries and semantic error reporting.

I used an “accept” method in each of my inherited ASTNode’s classes in order to trigger the correct visit methods each node would create different entries / tables / semantic checks.

I have two visitor classes, for the first traversal of the AST, the SymbolTableVisitor will generate the symbol tables and respective entries. For the second traversal, the TypeCheckVisitor traverses the AST and similar to the other visitor class, it triggers different visits depending on the inherited node that accepted it.

My Symbol Table classes are organized based on the following: a symbol table consists of symbol table entries (var, func, class, inherit list) and this is created and stored at the node in which the var / func / class requires it.

For error reporting, I simply append within the visit methods (each one triggers it depending on the error found) to a string P_error and print it to the file at the end.

Section 3 - Tools

In terms of tools, IntelliJ IDE has been used to debug and catch the instantiation of symbol tables / entries / semantic errors. No new tools were used as the grammar was already defined in the last two assignments, generated csv with UCalgary Tool.