**Joshua Wilkes  
Programming Languages  
Project 1  
Functional Decomposition**

**User-defined data structures used as parameters in the functions**

struct lexemeNode

{

int line;

char word[30];

char whatAmI[15];

lexemeNode \*next;

};

struct errorNode

{

int line;

char message[75];

errorNode \*next;

};

**Files and Functions in the Program**

/\* This file creates a linked list to store errors found in the code.

\* Author: Joshua Wilkes

\* Version: 1.0

\* Last Updated: 02/07/2019

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**errorList.h**

/\* Method to initially create the error linked list \*/

**errorNode\* createErrorList(int line, char message[]);**

/\* Method to push new data into error linked list \*/

**void pushToErrors(int line, char message[]);**

/\* Method to print all nodes and node data in error linked list \*/

**void printErrorList();**

/\* Returns head of error linked list \*/

**errorNode\* getErrorHead();**

/\* This file analyzes a text file one character at a time, identifies tokens, and inserts the identified tokens into the linked list.

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\* Version: 1.0

\* Last Updated: 02/07/2019

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**lexicalAnalyzer.h**

/\* Begins analysis of the file. To be called in the main method. \*/

**void beginAnalysis(FILE \*file);**

/\* A char is passed in from the file and when it is identified by the method, the rest of the token is gathered, identified, and passed into the linked list \*/

**int analyzeChar(char c);**

/\* Clears the string variable responsible for storing the token to be passed to the linked list \*/

**void clearLexeme(int length);**

/\* Checks a string against an array of reserved words. If not found, token is put into linked list as an identifier \*/

**bool isReservedWord(char word[]);**

/\* Checks a character against an array of operators. \*/

**bool isOperator(char c);**

/\* Pushes a token into the linked list \*/

**void pushToLL(int line, char lexeme[], char whatAmI[]);**

/\* Checks a character against an array of delimiters. \*/

**bool isDelimiter(char c);**

/\* This file creates a linked list to store tokens found in the given text file.

\* Author: Joshua Wilkes

\* Version: 1.0

\* Last Updated: 02/07/2019

\*/

**linkedList.h**

/\* Method to initially create the token linked list \*/

**lexemeNode\* createList(int line, char word[], char whatAmI[]);**

/\* Method to push new data into token linked list \*/

**void push(int line, char newWord[], char whatAmI[]);**

/\* Method to print all nodes and node data in token linked list \*/

**void printList();**

/\* Prints all identifiers in linked list \*/

**void printIdentifiers();**

/\* Gets current token based on the iterator’s current position \*/

**char\* getCurrentWord();**

/\* Gets current identifier based on the iterator’s current position \*/

**char\* getCurrentIdentifier();**

/\* Returns head of token linked list \*/

**lexemeNode\* getHead();**

/\* This file iterates through the token linked list and checks if the order of tokens/types is valid based on the rules set forth in the project.

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\* Version: 1.0

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\*/

**parser.h**

/\* Returns result of parsing through program. \*/

**bool isValidProgram();**

/\* Pushes an error with a message into the error linked list \*/

**void errorPush(int line, char \*errorMessage);**

/\* Begins the process for identifying an assignment statement in program \*/

**void assignmentStatement();**

/\* Identifies an expression in an assignment statement \*/

**bool expression();**

/\* Identifies a term in an expression \*/

**bool term();**

/\* Identifies a factor in a term \*/

**bool factor();**