Component Design:

Main

main (int argc, const char *argv[])
Create a scanner
Create a token
Have scanner start reading the file
Check for <identifiers>
Return 0

Print

Print (char source_name[], char date[])
Set the filename to source_name
get current time
set the page number to zero

printLine (char line[])
increment the line count
if line_count> page height Print header
print the string argument

PrintPageHeader ()
Print header (page number, source file name , current date)

PrintToken (Token *token)
Increment the line count
Default -> print token

printTreeRecursive (Identifier *identifier)

set LineNumberList
get TokenString
send identifier to binary tree

printTree (Identifier *identifier)

set proper labels and spaces
print identifier tree

Scanner

Scanner (FILE *source_file, char source_name[], char date[], Print printer)

Src_file= source_file
Copy (src_name, source name)
Copy (todays_date, date)
Initialize char table to identify what type of char we are looking at
Initialize Line numer=0
Source line [0] = '\0'

getSourceLine(char source_buffer)

create source buffer
create false Boolean
get a line from the filestream
if line received then true
return Boolean

getToken()

initialize a character code variable
skip past all the blanks
examine ch for LETTER, DIGIT, QUOTE, EOF, or SPECIAL
call appropriate function depending on ch
return new_token

getChar(char souce_buffer[])

set a temp char to EOF
if at the end of line ->return null character
    else return the char at the index

skipBanks (char source_buffer[])

skip past the blanks
return pointer to the first non blank character

skipComments (char source_buffer[])

skip past the comments
return pointer to the first non blank character
watch for the EOF character

getWord (char *str, char *token_ptr. Token *tok)

Extract the word
Downshift the word, to make it lower case
Check if the word is a reserved word
If is not a reserved word its an identifier
Set token to identifier

getNumber (char *str, char *token_ptr, Token *tok)

extract number and convert it to a literal number

check if real or float
temp string number
set the token type to NUMBER

getString (char *str, char *token_ptr, Token *tok)

Initialize a temporary string
Whie char ch is not a '\"
    Read more characters
    Append characters to temp string
Set the setType to STRING_LIT
Set the setCode to STRING

getSpecial (char *str, char *token_ptr, Token *tok)

initialize the temp string
check for character operators (:,<,>,.,|)
    read next character
        if (= or .) -> append both to temp string
        else -> append first character to the temp string

downshiftWord (char word[])

make all characters in the incoming word lower case

isReservedWord (char *str, Token *tok)

Scan the token table for reserved words
If it is a reserved word -> set the token code member ->return True
Else -> return False

getLineNumer ()

return line_number

Token

Token ()
Initialize variables for binary search tree (lines, left, righ)

setCode (TokenCode newCode)
set newCode

getCode ()
Return token code member

setTokenString (string s)
setTokenString = s

getTokenString (string s)
return Token code member

LineNumberList

LineNumberList ()
Set val to 0
Set next to NULL

setLineNumberList (int num)
Set lineNumber =num

getLineNumberList ()
return LineNumber

setNextLineNumberList (LineNumberList *next)
Set nextLineNumber =next
getNextLineNumberList ()
return nextLineNumber

Identifier

Identifier (string val)
Set list = NULL
Set literal equal to val
tokenString is equal to val

setLeftChild (Identifier *tok)
set leftChild = tok
getLeftChild()
return leftChild

setRightChild (Identifier *tok)
set RightChild = tok
getRightChild()
return rightChild

getTokenString()
return literal

addToLineNumberList (LineNumberList *listItem)
if tmp is NULL list is listItem
    else tmp= next line numner

setNextLineNumber to tmp

getLineNumberList()

return list

IdentifierBinaryTree

IdentifierBinaryTree()

Set value of treeRoot = NULL

depthFirstDeleteTree(Identifier *tok)

```
if tok->getLeftChild not NULL
        getLeftChild

if tok->getRightChild not NULL
        getRighChild
delete tok
```

setTreeRoot(Identifier *root)

Set value of treeRoot = root

getTreeRoot()

return treeRoot

addIdentifier2(Identifier* &head, Identifier* tok, int lineNum)

```
set false boolean called success
if head= NULL
        head= tok
        add head ToLineNumberList
        set success to true
getTokenString and set leftChild, rightChild or head appropriately
```

Integer

Integer()
Set value to “INTEGER”
Return int

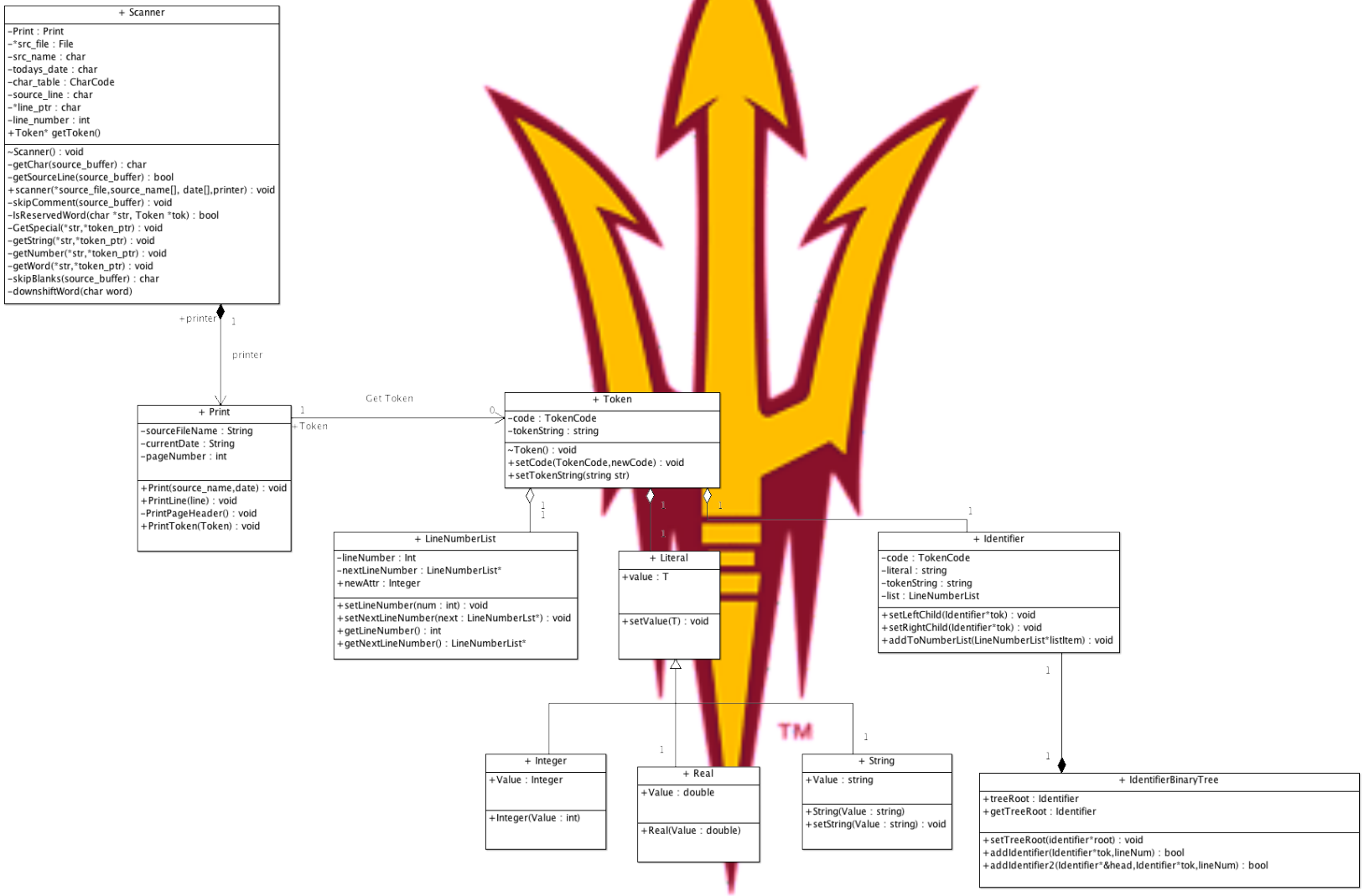
Real

Real()
Set value to “REAL”
Return double

String

setString(string value)
Set value to “String”
Return value

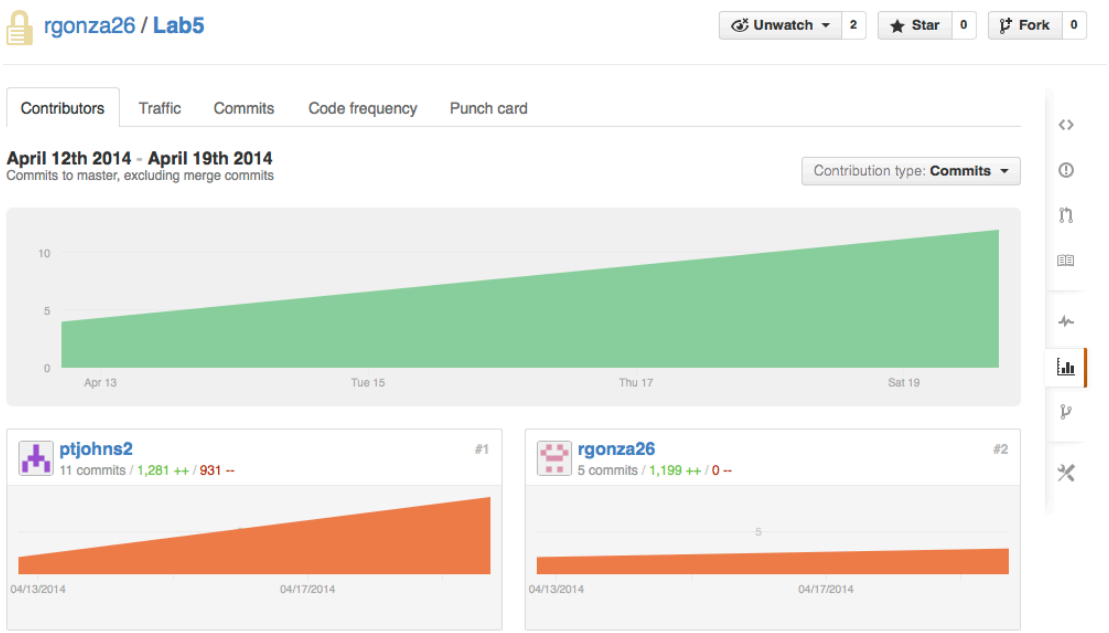
UML DIAGRAM


+ Scanner
-Print : Print
-*src_file : File
-src_name : char
-todays_date : char
-char_table : CharCode
-source_line : char
-*line_ptr : char
-line_number : int
+Token* getToken()
~Scanner() : void
-getChar(source_buffer) : char
-getSourceLine(source_buffer) : bool
+scanner(*source_file,source_name[], date[],printer) : void
-skipComment(source_buffer) : void
-IsReservedWord(char *str, Token *tok) : bool
-GetSpecial(*str,*token_ptr) : void
-getString(*str,*token_ptr) : void
-getNumber(*str,*token_ptr) : void
-getWord(*str,*token_ptr) : void
-skipBlanks(source_buffer) : char
-downshiftWord(char word)
+printer
1
printer
+ Print
-sourceFileName : String
-currentDate : String
-pageNumber : int
+Print(source_name,date) : void
+PrintLine(line) : void
-PrintPageHeader() : void
+PrintToken(Token) : void
1
+Token
Get Token
0..
+ Token
-code : TokenCode
-tokenString : string
~Token() : void
+setCode(TokenCode,newCode) : void
+setTokenString(string str)
+ LineNumberList
-lineNumber : Int
-nextLineNumber : LineNumberList*
+newAttr : Integer
+setLineNumber(num : int) : void
+setNextLineNumber(next : LineNumberLst*) : void
+getLineNumber() : int
+getNextLineNumber() : LineNumberList*
+ Literal
+value : T
+setValue(T) : void
+ Identifier
-code : TokenCode
-literal : string
-tokenString : string
-list : LineNumberList
+setLeftChild(Identifier*tok) : void
+setRightChild(Identifier*tok) : void
+addToNumberList(LineNumberList*listItem) : void
+ Integer
+Value : Integer
+Integer(Value : int)
+ Real
+Value : double
+Real(Value : double)
+ String
+Value : string
+String(Value : string)
+setString(Value : string) : void
+ IdentifierBinaryTree
+treeRoot : Identifier
+getTreeRoot : Identifier
+setTreeRoot(identifier*root) : void
+addIdentifier(Identifier*tok,lineNum) : bool
+addIdentifier2(Identifier*&head,Identifier*tok,lineNum) : bool

Team Contribution Table

Name	Login	Score (0= No contribution 2= good contribution)
Peter Johnson	ptjohns2	2
Roberto Gonzalez	rgonza26	2

URL to Repository: https://github.com/rgonza26/Lab5



Testing

Function	Parameter (V->Valid, I ->Invalid)	Expected Result	Acutal Result
main	argv		
Test 1	V	Program Produces Expected Results	Expected result
Test 2	I	Application Crashes	Expected result

Function	Parameter (V->Valid, I ->Invalid)	Expected Result	Acutal Result
print	sourceFileName		
Test 3	V	File Name matches valid flie name	Expected result
Test 4	I	File Name does not match valid file name	Expected result
printLine	line		
Test 5	V	prints line	Expected result
Test 6	I	prints nothing	Expected result
printPageHeader			
Test 7		prints header	Expected result
printToken	Token		
Test 8	V (4)	Prints the integer literal	Expected result
Test 9	V (3.1)	Prints the Float literal	Expected result
Test 10	V ("test")	Prints the STRING literal	Expected result
Test 11	V ("PROGRAM")	Prints the Token	Expected result
Test 12	I	Nothing Prints NO_Token type	Expected result
printTreeRecursive	Identifier		
Test	V	Identifier gets added to leftChild, RightChild	Expected Result
Test	I	tree error	

Function	Parameter (V->Valid, I ->Invalid)	Expected Result	Acutal Result
Scanner	Tested during Main		
getSourceLine	Tested during Main		
getToken	Tested during Main		
getChar	source_buffer		
Test 13	V ("test)	returns 't'	Expected result
Test 14	I ""	returns"	Expected result
skipBlanks	source_buffer		
Test 15	V (two spaces)	returns 2	Expected result
Test 16	I (spaces here"	returns 1	Expected result
skipComment	source_buffer		
Test 17	V "this is a {comment}"	Removes Comment from source line	Expected result
Test 18	I "this is a comment"	Prints the line	Expected result
getWord	ch		
Test 19	V 'a'	Tested during print	Expected result
Test 20	I '{'	Empty token string	Expected result
getNumber	ch		
Test 21	V '5'	Tested during print	Expected result
Test 22	I '{'	Empty token string	Expected result
getString	ch		
Test 23	V	Tested during print	Expected result
Test 24	I '{'	Empty token string	Expected result
getSpecial	str		
Test 25	V "program"	returns 1	Expected result
Test 26	I 'nothing"	returns false	Expected result

downshitfWord	char		
Test 27	V 'OK'	ok	Expected result
Test 28	I '{'	Empty token string	Expected result
isREservedWord	ch		
Test 29	V"DO"	Tested during print	Expected result
Test 30	I '{'	Empty token string	Expected result

Function	Parameter (V->Valid, I ->Invalid)	Expected Result	Acutal Result
Token	Tested during Main		
setCode	Tested during Main		
getcode	TokenCode		
Test 31	V	new code is set	Expected result
Test 32	I	error no code set	Expected result
setTokenString	Tested during Main		
getTokenString	String		
Test 33	V	val is set to token string	Expected result
Test 34	I	Val is not set error	Expected result

Function	Parameter (V->Valid, I ->Invalid)	Expected Result	Acutal Result
LineNumberList			
setLineNumber	int		
Test 35	V	lineNumber = num	Expected result
Test 36	I	invalid	Expected result
setNextLineNumber	LineNumberList		

Test 37	V	nextLineNumber = next	Expected result
Test 38	I	Invalid	Expected result

Function	Parameter (V->Valid, I ->Invalid)	Expected Result	Acutal Result
Identifier			
setLeftChild	Identifier		
Test 39	V	this leftChild	Expected result
Test 40	I	Error	Expected result
setRightChild	Identifier		
Test 41	V	set RightChild	Expected result
Test 42	I	Error	Expected result
addToLineNumberList	LineNumberList		
Test 43	V	get NextLineNumber	Expected result
Test 44	I	Error	Expected result

Function	Parameter (V->Valid, I ->Invalid)	Expected Result	Acutal Result
IdentifierBinaryTree			
depthFirstDeleteTree	identifier		
Test 45	V	getLeftChild or getRightChild	Expected result
Test 46	I	invalid	Expected result
setTreeRoot	Identifier		
Test 47	V	treeRoot=root	Expected result
Test 48	I	Invalid	Expected result

Function	Parameter (V->Valid, I ->Invalid)	Expected Result	Acutal Result
Integer	int		
Real	double		
String	String		