

COVER PAGE

CS323 Programming Assignments

Fill out all entries 1 - 7. If not, there will be deductions!

1. Names [1. Tiffany Hernaez]

[2. Sagar Joshi]

[3. Holland Ho]

2. Assignment Number [1]

3. Due Date [October 4th, 2020]

4. Submission Date [October 2nd, 2020]

5. Executable File name [main.exe]

(A file that can be executed without compilation by the instructor, such as .exe, .jar, etc - NOT a source file such as .cpp

6. Names of the test case files -	input test file	output test file
test 1. [test-file-1.txt]	[1-test-output.txt]
test 2. [test-file-2.txt]	[2-test-output.txt]
test 3. [text-file-3.txt]	[3-test-output.txt]

7. Operating System [Window]

To be filled out by the Instructor:

Comments and Grade:

CS323 Documentation

1. Problem Statement

- a. As a group we must create a lexical analyzer that is based on a language called “Rat20F” which is a language that is designed to be easy to understand due to its short grammar and relatively clean semantics

2. How to use your program

<#> == the file number that you want to input or output (ie for “test-file-<#>.txt” file number 1 it would be “test-file-1.txt”)

Step #	Description
1	Download the executable file, test inputs, and outputs
2	Navigate to the directory where the executable is downloaded
3	Start the executable
4	Upon the command line prompt, enter in “test-file-<#>.txt”
5	In the same directory, open “<#>-test-output.txt” to view the output file

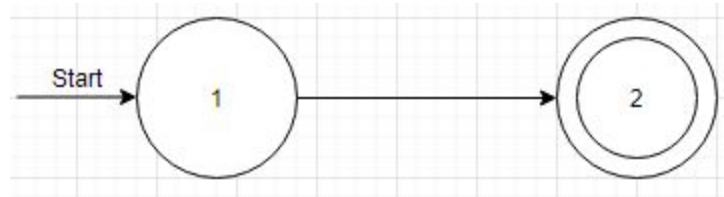
3. Design of Your Program

Lexical.cpp

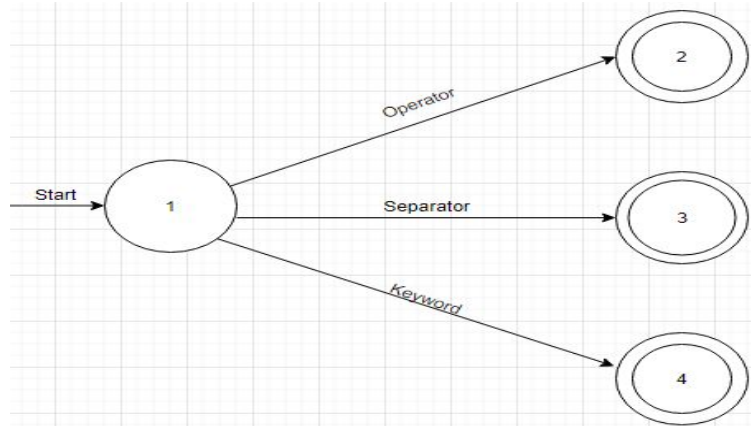
a. lexer

- i. The main lexical analyzer function that checks each character by calling isSeparator, isOperator, identifierDFSM and intDFSM
- ii. For loop will go through each character in the test file and will go through a series of if-statements that will check if characters are a keyword, separator, operator, integer and reals. If-statements will do the following:
 1. Call isOperator to check if the input is an operator
 2. Call isSeparator to check if the input is a separator
 3. Call inDFSM to check if the input is an integer or real number
 - a. Within the if statement will be a while loop that will check if the input is a real number by calling isDecimal. Otherwise the token will be an integer.
 4. Call identifierDFSM to check if the input is a keyword or an identifier

b. intDFSM



- i. This function changes the state of the input for integers and the reals
- c. identifierDFSM



- i. This function is used to change the states of each string by doing several checks for keywords, operators and separators.
- ii. Creating a boolean variable that calls the isKeyword function. This variable is used in a for loop and changes the starting state of the string to accepting state in if statements.
- iii. The function utilizes a for loop for isOperator to do a check in an if statement and make changes on the state of the string if isOperator returns true.
- iv. The function utilizes a for loop for isSeparator to do a check in an if statement and make changes on the state of the string if isSeparator returns true.
- d. isSeparator
 - i. The isSeparator function utilizes an if statement that will check whether the string in the user input is included in the list of separators we have in our if statement.
 1. Function will return true if string is found in our separator list
 2. Function will return false if the if statement fails.
- e. isOperator
 - i. The isOperator function utilizes an if statement that will check whether the string in the user input is included in the list of operators we have in our if statement.
 1. Function will return true if string is found in our operator list
 2. Function will return false if the if statement fails.
- f. isKeyword
 - i. Utilizing an if statement that will check whether the string in the user input is included in the list of keywords we have in our if statement
 1. Function returns true if string is found in our keyword list

2. Function returns false if the if statement fails.

g. isDecimal

- i. The isDecimal function utilizes an if statement that will check whether character is a decimal
 - 1. Function returns true if the if statement passes the comparison
 - 2. Function returns false if the if statement fails

main.cpp

h. getFile

- i. Grabs the test file by asking the user for the filename and opens the file.
- ii. Returns an error message to the user if file is not found

i. scanFile

- i. Reads the file that was grabbed in getFile and calls the lexer function
- ii. Prints out the record list after the lexical analysis that occurred in the lexer function.

j. Utilizes Non-extendable Vectors

k. Vectors

- i. Created a records list to hold the the results of the lexer analyzer.

l. Utilizes Greedy Algorithm in creating lexer analyzer.

4. Any Limitation

- a. None

5. Any Shortcomings

- a. None