

**BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI**  
**DEPARTMENT OF COMPUTER SCIENCE AND INFORMATION SYSTEMS**  
**Compiler Construction (CS F363)**  
**II Semester 2019-20**  
**Compiler Project (Stage-1 Submission)**  
**Coding Details**  
**(February 24, 2020)**

Group No.

**14**

1. IDs and Names of team members

**ID: 2016B2A70773                      Name: Ishan Sharma**

**ID: 2017A7PS0152P                  Name: Sanjeev Singla**

**ID: 2015B5A70749P                  Name: Sarthak Sahu**

**ID: 2017A7PS0142P                  Name: Anirudh Garg**

2. Mention the names of the Submitted files :

1. driver.c	2. lexer.c	3. lexer.h	4. lexerDef.h	5. makefile
6. parser.c	7. parser.h	8. parserDef.h	9. hash.c	10. hash.h
11. grammar.txt	12. first.txt	13. follow.txt	14. coding details stage1	15. t1.txt
16. t2.txt	17. t3.txt	18. t4.txt	19. t5.txt	20. t6.txt

3. Total number of submitted files: **20** (All files should be in **ONE folder** named exactly as Group\_#, # is your group number)

4. Have you mentioned your names and IDs at the top of each file (and commented well)? (Yes/ no) **YES**

[Note: Files without names will not be evaluated]

5. Have you compressed the folder as specified in the submission guidelines? (yes/no) **YES**

6. **Lexer Details:**

[A]. Technique used for pattern matching: **DFA**

[B]. DFA implementation (State transition using switch case, graph, transition table, any other (specify):

**Implemented using switch case**

[C]. Keyword Handling Technique: **Char array (Hash was also implemented but was taking more time.)**

[D]. Hash function description, if used for keyword handling: **Linear Probing DJB2**

[E]. Have you used twin buffer? (yes/ no) **NO**

[F]. Lexical error handling and reporting (yes/No): **YES/Reports the errors if any**

[G]. Describe the lexical errors handled by you **Invalid character / NUM or RNUM not in the language format / Identifier size more than 20 / Correctness of Identifier as per language**

[H]. Data Structure Description for tokenInfo (in maximum two lines):

**Structure Node which has a pointer to Structure Token. Structure token has 1. Token for token name, 2. Value for lexeme name and 3. Lineno for lexeme's line no**

[I]. Interface with parser: **The function parseInputSourceCode calls getNextToken() repeatedly to get next token and then parses the input file based on parse table**

## 7. Parser Details:

[A]. High Level Data Structure Description (in maximum three lines each, avoid giving C definitions used):

- i. grammar : Structure Grammar has Integer array of array as gnum
- ii. parse table : Structure ParseTable has Integer array of array as table[non terminal][terminal]
- iii. parse tree: (Describe the node structure also) Structure ParseTree containing
- iv. Parsing Stack node structure : Integer Array
- v. Any other (specify and describe)

First and Follow as a structure FirstAndFollow containing int first[][] and int follow[][]

[B].Parse tree

- i. Constructed (yes/no): YES
- ii. Printing as per the given format (yes/no): NO
- iii. Describe the order you have adopted for printing the parse tree nodes (in maximum two lines)  
Rather than printing parsetree was have printed whole parseInputSourceCode information in  
"stackinfo.txt" i.e Current Stack, Current Input, Pushing Elements to stack etc.

[C].Grammar and Computation of First and Follow Sets

Data structure for original grammar rules Structure Grammar has Integer array of array as gnum

FIRST and FOLLOW sets computation automated (yes /no) No

Data structure for representing sets First and Follow as a structure FirstAndFollow containing int first[][] and int follow[][]

Time complexity of computing FIRST sets  $O(n^2)$

Name the functions (if automated) for computation of First and Follow sets NA

If computed First and Follow sets manually and represented in file/function (name that) first.txt; follow.txt

[D]. Error Handling

- i. Attempted (yes/ no): Yes
- ii. Printing errors (All errors/ one at a time) : One at a time
- iii. Describe the types of errors handled  
Given input (a terminal) doesn't match the top of stack (a terminal) / Given input (a terminal)  
is not in the parsetable of the stack's top non terminal.
- iv. Synchronizing tokens for error recovery (describe) NA
- v. Total number of errors detected in the given testcase t6(with\_syntax\_errors).txt  
Detected all, printing one by one

## 8. Compilation Details:

[A]. Makefile works (yes/no): YES

[B]. Code Compiles (yes/ no): YES

[C]. Mention the .c files that do not compile: NONE

[D]. Any specific function that does not compile: printParseTree()

[E]. Ensured the compatibility of your code with the specified gcc version (yes/no) YES

## 9. Driver Details: Does it take care of the options specified earlier (yes/no): YES

## 10. Execution

[A]. status (describe in maximum 2 lines):

[B]. Execution time taken for

- t1.txt (in ticks) For Lexer only.
- t2.txt (in ticks) 214 and (in seconds) 0.000214s
- t3.txt (in ticks) 1159 and (in seconds) 0.001159s
- t4.txt (in ticks) 4285 and (in seconds) 0.004285s
- t5.txt (in ticks) 3657 and (in seconds) 0.003657s

[C]. Gives segmentation fault with any of the test cases (1-6) uploaded on the course page. If yes, specify the testcase file name: NO

## 11. Specify the language features your lexer or parser is not able to handle (in maximum one line) NONE

## 12. Are you availing the lifeline (Yes/No): YES

13. Declaration: We, Ishan Sharma, Sarthak Sahu, Sanjeev Singla, Anirudh Garg (your names) declare that we have put our genuine efforts in creating the compiler project code and have submitted the code developed only by our group. We have not copied any piece of code from any source. If our code is found plagiarized in any form or degree, we understand that a disciplinary action as per the institute rules will be taken against us and we will accept the penalty as decided by the department of Computer Science and Information Systems, BITS, Pilani. [Write your ID and names below]

ID: 2016B2A70773

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ID: 2017A7PS0152P

Name: Sanjeev Singla

ID: 2015B5A70749P

Name: Sarthak Sahu

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Name: Anirudh Garg

Date: 25<sup>th</sup> Feb 2020

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Should not exceed 4 pages.