“Mini Compiler in Gujarati Language”

Special Assignment Report

Submitted in Partial Fulfillment of the

Requirements for completion of

Course on

2CS701 Compiler Construction

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Project Description:

A mini-compiler for a programming language written in Gujarati. This mini-compiler has its own lexical, syntactic and semantic analyzer. It is based mostly on Python, which is also used as an intermediate language to generate the machine language by using python ply.

Use:

You can start using it by executing the following commands:

- Python parser.py for interpreted mode
- Python parser.py file.dr to compile a file.

Keywords and equivalent in python:

Keyword	Python
Chappo	print
Mahiti	input
Jo	if
Athva	else
Karo	do
Jya	while
Mate	for
Bahar	break
Chalu	continue
Ane	and
Ya	or
Khotu	false
Sachu	true
Nahi	not
Banavo	def
Moklo	return
Prayas	try
Sivay	except

Jodo	append

Hatavo	pop
Kul	length

Features:

- Variables
- Comments
- Control flow statements
  - Loop (while, do-while, for)
  - Conditional statements
  - Function calls
  - Exceptions
- Operators
  - Arithmetic: +, -, *, /, %, ^
  - Logical: and, or, not
  - Comparison: >, >=, <, <=, ==, !=
  - Assignment: =
  - Unary: ++, --

Data Types:

- Numbers:
  You can use either integers or floating points numbers in this language.
  - int: 123
  - float: 1.23

- Strings:
  You can choose either 'string' or "string" to represent a string. We can use the slicing operator [:] to extract an item or parts of the string:
  - a= "hello world!"
    chhapo(a[0:5])
    hello

- Lists:
  A list is created by placing all the items (elements) inside square brackets [ ], separated by commas.
  - a = [5,10,15,20,25,30,35,40]
    chhapo(a[0:3])

Output: [5, 10, 15]

- List slicing:
  my_list = ['p','r','o','g','r','a','m','i','z']

  chhapo(my_list[2:5])
  Output: elements 3rd to 5th

  chhapo(my_list[:-5])
  Output: elements beginning to 4th

  chhapo(my_list[5:])
  Output: elements 6th to end

  chhapo(my_list[:])
  Output: elements beginning to end

- List indexing:
  my_list = ['p', 'r', 'o', 'b', 'e']

  chhapo(my_list[0])
  Output: p

  chhapo(my_list[2])
  Output: o

  n_list = ["Happy", [2, 0, 1, 5]]

Operators:

- Arithmetic operators:
  - x = 15
    y = 4

    chhapo(x+y)
    Output: 19

    chhapo(x-y)
    Output: 11

    chhapo(x*y)
    Output: 60

    chhapo(x/y)

Output: 3.75

chhapo(x%y)
Output: 3

chhapo(x^y)
Output: 50625

- Comparison operators
  - x = 10
    y = 12

    chhapo(x>y)
    Output: khotu

    chhapo(x<y)
    Output: sachu
    chhapo(x==y)
    Output: khotu

    chhapo(x!=y)
    Output: sachu

    chhapo(x>=y)
    Output: khotu

    chhapo(x<=y)
    Output: sachu

- Logical Operators:
  - x = sache
    y = khotu

    chhapo(x ane y)
    Output: khotu

    chhapo(x ya y)
    Output: sache

Flow Control:

- jo..athva (if..else):
  - The jo..athva statement evaluates test expression and will execute the body of jo only when the test condition is sachu (True).

- If the condition is khotu(false), the body of athva is executed.
  - num=5 #or num=-5
    jo(num >= 0){
    chhapo('The number is positive')
    }
    athva{
    chhapo('The number is negative')
    }

- mate (for loop): The mate loop is used to iterate over a sequence.

  - mate(i=0;i<5;i++){
    chhapo("Iteration:",i)
    }

- jya(while loop): The jya loop is used to iterate over a block of code as long as the test expression (condition) is true.
  - n = 10
    sum = 0
    i=1
    jya(i<n){
    sum = sum + i
    i = i+1
    }

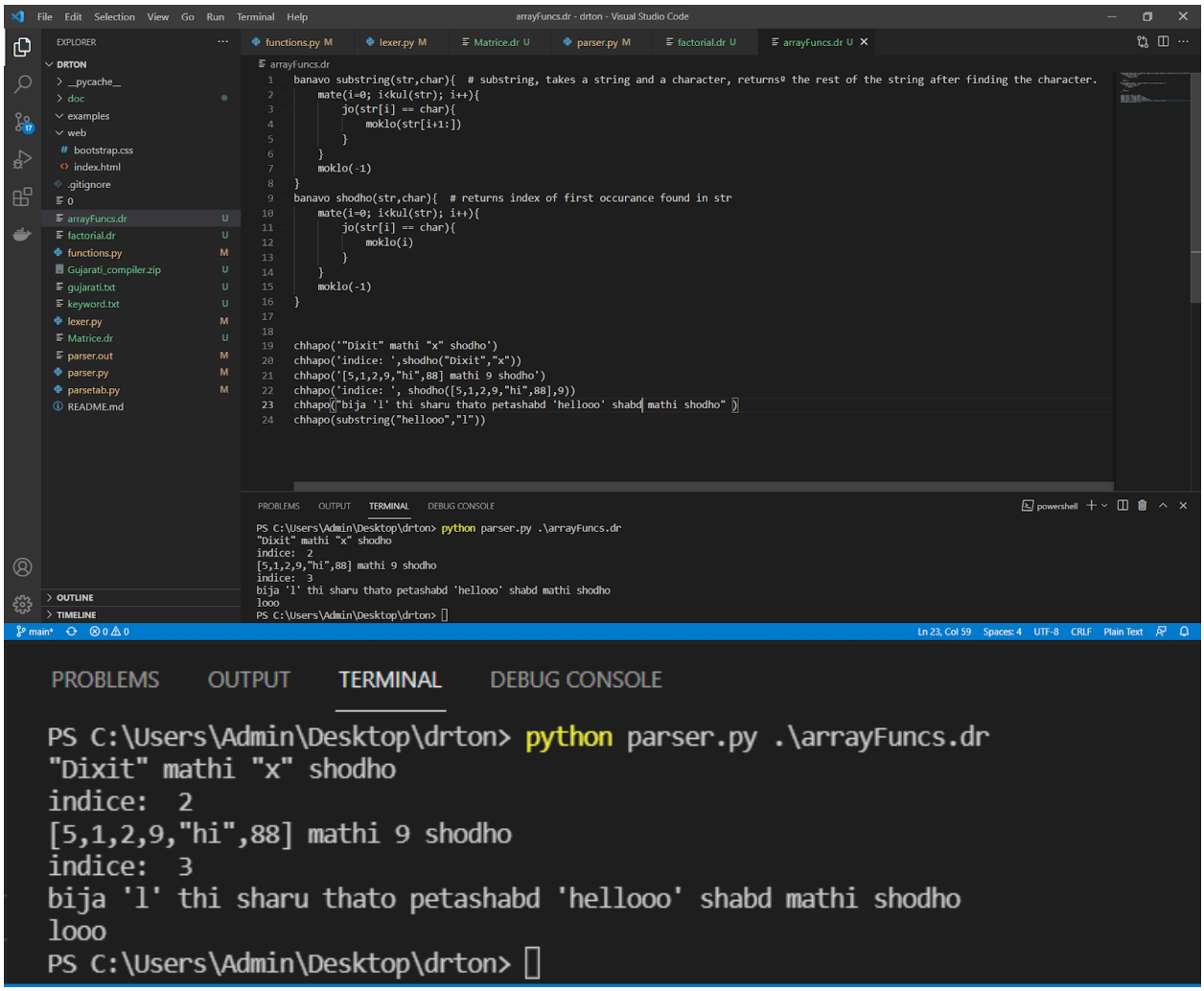
    chhapo("The sum is", sum)
    Output: The sum is 45

- bahar (break): The bahar statement terminates the loop containing it. Control of the program flows to the statement immediately after the body of the loop.
  - str="string"
    mate (a=0;a<tol(str);a++){
    jo(str[a] == "i"){
    bahar
    }
    chhapo(str[a])
    }
    chappo("The end")
    Output:
    #s
    #t
    #r
    #The end

- chalu(continue): The chalu statement is used to skip the rest of the code inside a loop for the current iteration only. Loop does not terminate but continues on with the next iteration.
    - str="string"
      mate(a=0;a<tol(str);a++){
        jo(str[a] == "i"){
          chalu
        }
        chhapo(str[a])
      }
      chhapo("The end")
      Output:
      #s
      #t
      #r
      #n
      #g
      #The end

- banavo (function def): A function is a group of related statements that performs a specific task.

Screenshots:


File Edit Selection View Go Run Terminal Help
arrayFuncs.dr - drton - Visual Studio Code
EXPLORER
DRTON
functions.py M
lexer.py M
Matrice.dr U
parser.py M
factorial.dr U
arrayFuncs.dr U
banavo substring(str,char){ # substring, takes a string and a character, returnsº the rest of the string after finding the character.
mate(i=0; i<kul(str); i++){
jo(str[i] == char){
moklo(str[i+1:])
}
}
moklo(-1)
}
banavo shodho(str,char){ # returns index of first occurance found in str
mate(i=0; i<kul(str); i++){
jo(str[i] == char){
moklo(i)
}
}
moklo(-1)
}
chhapo('"Dixit" mathi "x" shodho')
chhapo('indice: ',shodho("Dixit","x"))
chhapo('[5,1,2,9,"hi",88] mathi 9 shodho')
chhapo('indice: ', shodho([5,1,2,9,"hi",88],9))
chhapo("bija 'l' thi sharu thato petashabd 'hellooo' shabd mathi shodho")
chhapo(substring("hellooo","l"))
PROBLEMS OUTPUT TERMINAL DEBUG CONSOLE
PS C:\Users\Admin\Desktop\drton> python parser.py .\arrayFuncs.dr
"Dixit" mathi "x" shodho
indice: 2
[5,1,2,9,"hi",88] mathi 9 shodho
indice: 3
bija 'l' thi sharu thato petashabd 'hellooo' shabd mathi shodho
looo
PS C:\Users\Admin\Desktop\drton>
OUTLINE
TIMELINE
main*
Ln 23, Col 59 Spaces: 4 UTF-8 CRLF Plain Text

PROBLEMS OUTPUT TERMINAL DEBUG CONSOLE
PS C:\Users\Admin\Desktop\drton> python parser.py .\arrayFuncs.dr
"Dixit" mathi "x" shodho
indice: 2
[5,1,2,9,"hi",88] mathi 9 shodho
indice: 3
bija 'l' thi sharu thato petashabd 'hellooo' shabd mathi shodho
looo
PS C:\Users\Admin\Desktop\drton>