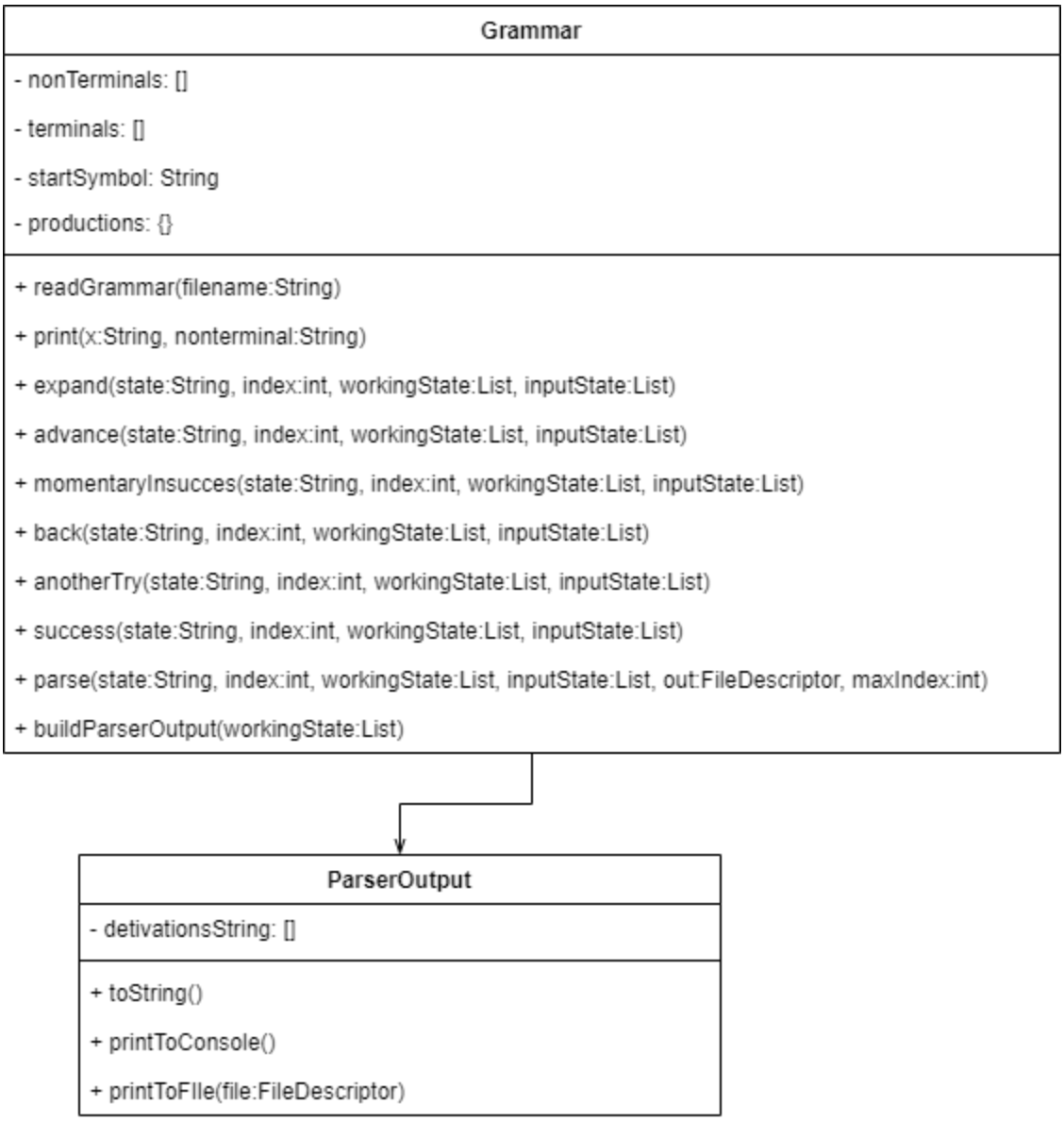
Lab 5 documentation

Link GitHub: https://github.com/timoteicopaciu/LFCD/tree/main/Lab%2005




```
class Grammar:

def readGrammar(self, filename):
    """
    Read a Grammar from a file
    :param filename: string, the name of the name where Grammar is stored
    :preconditions: filename must to be a string, representing a file name
    :postconditions: the Grammar object's attributes will be completed
    :return: none
    """
def print(self, x, nonterminal = None):
    """
```

```
    Print some attributes of Grammar
    :param x: char, representing an option in order to know what to return
    :param nonterminal: string, a nonterminal, production starting from it
will be printed, is optional
    :preconditions: x must be a string, x is from A = {'1', '2', '3', '4'}
    :postconditions: a string is returned, representing an attribute as a
string, or '' if x is not in A
    :return: a string
    """
def expand(self, state, index, workingStack, inputStack):
    """
    Expand function
    :param state: a char
        :pre: 'q'
        :post: 'q'
    :param index: integer
        :pre: some integer i
        :post: same i
    :param workingStack: a list, representing the working stack, stores the
way the parse is built
        :pre: some list W
        :post: list W U A_0, where A_0 is a name for first prod of non-
terminal A
    :param inputStack: a list, representing  input stack, part of the tree to
be built
        :pre: A U I, where A is a non-terminal and I is a list
        :post: first prod of A U I
    :return: a configuration, all input params but updated
    """
def advance(self, state, index, workingStack, inputStack):
    """
    Advance function
    :param state: a char
        :pre: 'q'
        :post: 'q'
    :param index: integer
        :pre: some integer i
        :post: i + 1
    :param workingStack: a list, representing the working stack, stores the
way the parse is built
        :pre: some list W
        :post: list W U a, where a is the first terminal from the input stack
    :param inputStack: a list, representing  input stack, part of the tree to
be built
        :pre: a U I, where a is a terminal, a terminal = current symbol from
input, and I is a list
        :post: I
    :return: a configuration, all input params but updated
    """
def momentaryInsuccess(self, state, index, workingStack, inputStack):
    """
    MomentaryInsuccess function
    :param state: a char
        :pre: 'q'
        :post: 'b' back/previous state
    :param index: integer
        :pre: some integer i
```

```
        :post: same i
    :param workingStack: a list, representing the working stack, stores the
way the parse is built
        :pre: some list W
        :post: same W
    :param inputStack: a list, representing  input stack, part of the tree to
be built
        :pre: a U I, where a is a terminal and I is a list, a is different
from current symbol from input
        :post: same a U I
    :return: a configuration, all input params but updated
    """
def back(self, state, index, workingStack, inputStack):
    """
   Back function
   :param state: a char
       :pre: 'b'
       :post: 'b'
   :param index: integer
       :pre: some integer i
       :post: i - 1
   :param workingStack: a list, representing the working stack, stores the
way the parse is built
       :pre: some list W U a, where a is a terminal
       :post: list W, without terminal a
   :param inputStack: a list, representing  input stack, part of the tree to
be built
       :pre: I
       :post: a U I, where a is a terminal and I is a list
   :return: a configuration, all input params but updated
   """
def anotherTry(self, state, index, workingStack, inputStack):
    """
   AntoherTry function
   :param state: a char
       :pre: 'b'
       :post: 'q' or 'b' or 'e'
   :param index: integer
       :pre: some integer i
       :post: same i
   :param workingStack: a list, representing the working stack, stores the
way the parse is built
       :pre: list W U A_j, where A_j is a name for the j-th prod of non-
terminal A
       :post: list W U A_j+1 or just W
   :param inputStack: a list, representing  input stack, part of the tree to
be built
       :pre: j-th prod of A U I
       :post: j+1-th prod of A U I or A or just I
   :return: a configuration, all input params but updated
   """

def success(self, state, index, workingStack, inputStack):
    """
   Success function
   :param state: a char
       :pre: 'q'
```

```
        :post: 'f'
    :param index: integer
        :pre: some integer (n + 1)
        :post: same integer (n + 1)
    :param workingStack: a list, representing the working stack, stores the
way the parse is built
        :pre: some list W
        :post: same list W
    :param inputStack: a list, representing  input stack, part of the tree to
be built
        :pre: empty list
        :post: empty list
    :return: a configuration, all input params but updated
    """
def parse(self, state, index, workingStack, inputStack, out, maxIndex):
    """
     This function parse the word set in self.__word item and check if is a
accepted sequence using recursion
     :param state: a char
         :pre: 'q'
         :post: any state
     :param index: integer
         :pre: 0
         :post: some integer
     :param workingStack: a list, representing the working stack, stores the
way the parse is built
         :pre: []
         :post: same list W
     :param inputStack: a list, representing  input stack, part of the tree
to be built
         :pre: a list containing just starting symbol
         :post: empty list
     :param out: a file descriptor to the file where the track of operations
to be printed
         :pre: a file descriptor
         :post: same file descriptor
     :param maxIndex: a number, integer, representing an index in word, the
best parse matches all untill that index in word
     :return: a ParserOutput object
     """

def buildParserOutput(self, workingStack):
    """
    This function make an object of type ParserOutput from the working stack
given as result of parser
    :param workingStack: a list, the working stack given as result from
parser
    :return: an object of type ParserOutput
    """
```

```
class ParserOutput:
    """
    Represent the output of a parser as a derivations string
    """
```

```
def toString(self):
    """
    Represent the parser output object as a string
    :return: a string, representing the parser output object as a string
    """
def printToConsole(self):
    """
    Print to the console the out of the parser as a derivations string
    :return: None
    """
def printToFile(self, file):
    """
    Print to the file the out of the parser as a derivations string
    :param file: a file descriptor, representing the file where to write
    :return: None
    """
```

For examples below I use the grammar from g2.txt.

Example 1: Error

PIF.out

```
main -> -1
{ -> -1
define -> -1
Integer -> -1
IDENTIFIER -> 1
, -> -1
IDENTIFIER -> 3
, -> -1
IDENTIFIER -> 2
, -> -1
IDENTIFIER -> 5
} -> -1
```

out2.txt

```
The word to be matched is:
['main', '{', 'define', 'Integer', 'IDENTIFIER', ',', 'IDENTIFIER', ',',
'IDENTIFIER', ',', 'IDENTIFIER', '}']
Max sequence that was matched is:
['main', '{', 'define', 'Integer', 'IDENTIFIER', ',', 'IDENTIFIER', ',',
'IDENTIFIER', ',', 'IDENTIFIER']
E r r o r !
```

Example 2: Success

PIF.out

```
main -> -1
{ -> -1
define -> -1
Integer -> -1
IDENTIFIER -> 1
, -> -1
IDENTIFIER -> 3
, -> -1
IDENTIFIER -> 2
, -> -1
IDENTIFIER -> 5
; -> -1
} -> -1
```

out2.txt

```
The word to be matched is:
['main', '{', 'define', 'Integer', 'IDENTIFIER', ',', 'IDENTIFIER', ',',
'IDENTIFIER', ',', 'IDENTIFIER', ';', '}']
Max sequence that was matched is:
['main', '{', 'define', 'Integer', 'IDENTIFIER', ',', 'IDENTIFIER', ',',
'IDENTIFIER', ',', 'IDENTIFIER', ';', '}']
The derivations string is:
program => main { declarationList } => main { declaration } => main { define
type declarationBody } => main { define mainTypes declarationBody } => main {
define Integer declarationBody } => main { define Integer IDENTIFIER ,
declarationBody } => main { define Integer IDENTIFIER , IDENTIFIER ,
declarationBody } => main { define Integer IDENTIFIER , IDENTIFIER ,
IDENTIFIER , declarationBody } => main { define Integer IDENTIFIER ,
IDENTIFIER , IDENTIFIER , IDENTIFIER ; }
```