PVZM85 - Compiler Design Documentation

Installation

This Program requires Python3, anytree and graphviz

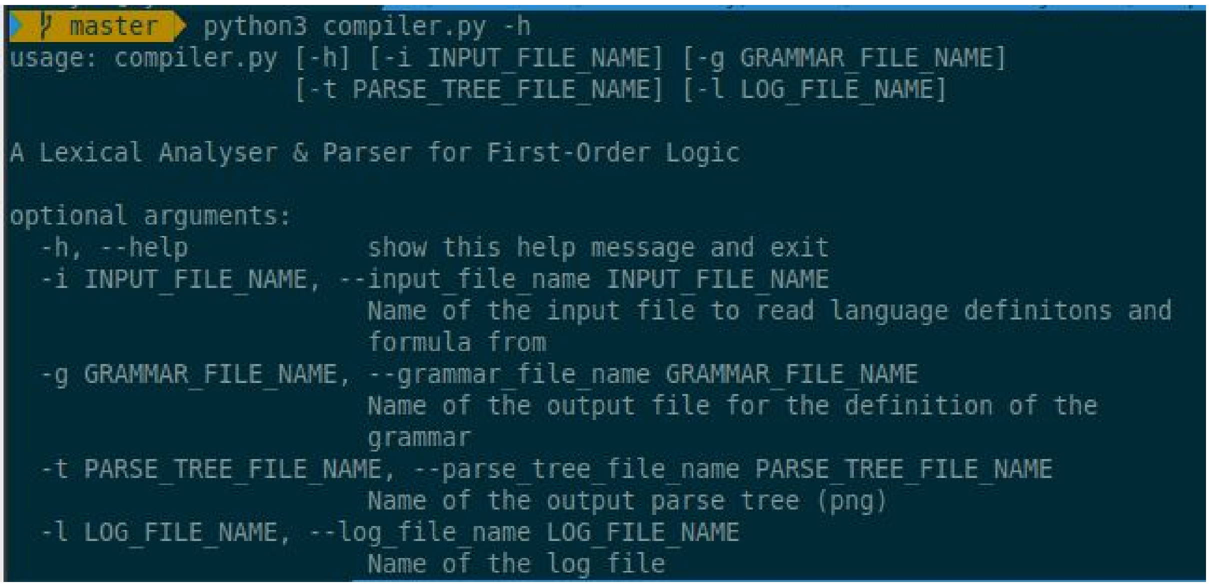
To install anytree from the command line use command:

Pip install anytree (or ‘pip3 install anytree’ if pip doesn’t work)

Graphviz can be installed for windows following this link: https://graphviz.gitlab.io/download/

Running the program

From the command line type ‘python compiler.py’ or ‘python3 compiler.py’ (if you have python2 installed also. The Program has various options outlined here:



```
 master  python3 compiler.py -h
usage: compiler.py [-h] [-i INPUT_FILE_NAME] [-g GRAMMAR_FILE_NAME]
                   [-t PARSE_TREE_FILE_NAME] [-l LOG_FILE_NAME]

A Lexical Analyser & Parser for First-Order Logic

optional arguments:
  -h, --help            show this help message and exit
  -i INPUT_FILE_NAME, --input_file_name INPUT_FILE_NAME
                        Name of the input file to read language definitons and
                        formula from
  -g GRAMMAR_FILE_NAME, --grammar_file_name GRAMMAR_FILE_NAME
                        Name of the output file for the definition of the
                        grammar
  -t PARSE_TREE_FILE_NAME, --parse_tree_file_name PARSE_TREE_FILE_NAME
                        Name of the output parse tree (png)
  -l LOG_FILE_NAME, --log_file_name LOG_FILE_NAME
                        Name of the log file
```

The program has defaults, so running:

Python3 compiler.py

Is equivalent to:

Python3 compiler.py -i example.txt -g grammar.txt -t tree.png -l log.txt

Input and output files are expected to be in the same directory as the python file. NOTE, when specifying the parse tree file name, please give a full name i.e. picture.png (including the png extension)

Outputs

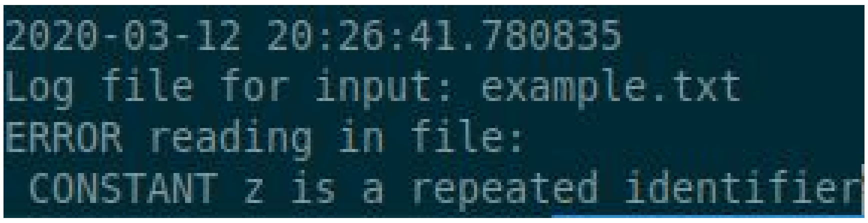
The program will output a png of the parse tree (if the formula is valid), the grammar of the first-order logic (if the input file is valid) and a log file. The log file is always appended to when the program is ran. It will specify:

- Date and time of running of the program
- The input file used
- Error message (if error occurred)
- PASS or FAIL

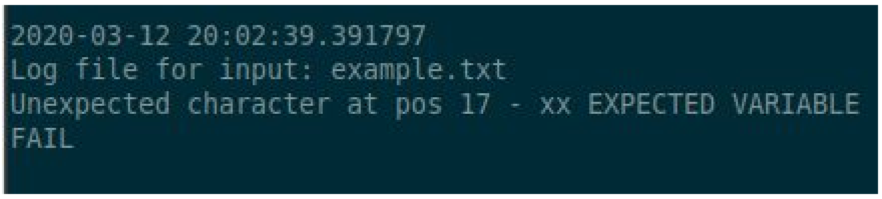
Whenever my compiler detects an error in either the definition of the First Order language or the formula, it returns a non zero exit code.

Types of errors:

1. ERROR reading in file
    a. Wrong number of input symbols (e.g. only 1 connective)
    b. Repeated variable / constant / predicate
    c. Variable / constant / predicate identifier is a reserved string (e.g. and identifier)
    d. Malformed predicate definition
    e. Predicate arity not a number
    f. Variable / constant / predicate not consisting of only alphanumeric and underscore
2. Unexpected character (parsing):
    a. Provides position (in terms of lexemes starting at 1), what it found and the type of symbol it expected to find (e.g. variable, constant etc.)



```
2020-03-12 20:26:41.780835
Log file for input: example.txt
ERROR reading in file:
 CONSTANT z is a repeated identifier
```



```
2020-03-12 20:02:39.391797
Log file for input: example.txt
Unexpected character at pos 17 - xx EXPECTED VARIABLE
FAIL
```

Example 1 - valid input
Example 2 - valid input
Example 3 - Invalid input file (hence no tree, no grammar)
Example 4 - Invalid formula (hence grammar no tree)