Compiler Design Parser Project

Topic : Python: Defining List of list (with nesting)

Submitted By :
Parag Dudeja (20234757030)

Submitted to:
Dr. Ankit Rajpal

Project Overview

This project presents a simple parser to validate list of list (nested list) in Python with limited use cases and tokens supported. It's made for academic purposes and learning purposes.

The source file of yacc is defined in code.y The source file of lex is defined in code.l

What does the parser do?

The parser analyses the syntax of a list expression entered by the user and tells whether the statement is a nested list in Python or not.

The parser works perfectly for all the ideal test cases of the following syntax :

1. [[[34,5667], 23, "Parag"], 45.67]

Strengths of Parser

1. Validates valid nested lists in Python.
2. Handles varied levels of nesting across multiple elements in the ist
3. Handles all types string, integer, float data type.

Limitations of Parser

1. Can’t handle list slices.
2. Can’t handle arithmetic expressions, complex strings (composing of characters other than whitespace and alphanumeric characters and variables used as elements

Commands to run code :

Windows

1. flex code.l
2. bison -vdy code.y
3. gcc lex.yy.c y.tab.c
4. ./a.exe

Linux

1. yacc -d –verbose code.y
2. lex code.l
3. gcc lex.yy.c y.tab.c
4. ./a.out

Sample execution:

```
parag@dell:~/Documents/DU/sem4/compiler-design/Parser-Project$ flex code.l
parag@dell:~/Documents/DU/sem4/compiler-design/Parser-Project$ yacc -d --verbose code.y
parag@dell:~/Documents/DU/sem4/compiler-design/Parser-Project$ gcc lex.yy.c y.tab.c
parag@dell:~/Documents/DU/sem4/compiler-design/Parser-Project$ ./a.out

Enter statement to test for nested list in Python:
```

Examples of Valid Test Cases

1. [[]] , the smallest valid accepted statement

```
parag@dell:~/Documents/DU/sem4/compiler-design/Parser-Project$ ./a.out

Enter statement to test for nested list in Python: [[]]

Entered statement is a VALID NESTED LIST example in Python

parag@dell:~/Documents/DU/sem4/compiler-design/Parser-Project$
```

2. [[34, 89, 45.67],[],]

```
parag@dell:~/Documents/DU/sem4/compiler-design/Parser-Project$ ./a.out

Enter statement to test for nested list in Python: [[34, 89, 45.67],[],]

Entered statement is a VALID NESTED LIST example in Python

parag@dell:~/Documents/DU/sem4/compiler-design/Parser-Project$
```

3. [[[34,5667], 23, "Parag"], 45.67]

```
parag@dell:~/Documents/DU/sem4/compiler-design/Parser-Project$ ./a.out

Enter statement to test for nested list in Python: [[[34,5667], 23, "Parag"], 45.67]

Entered statement is a VALID NESTED LIST example in Python

parag@dell:~/Documents/DU/sem4/compiler-design/Parser-Project$
```

4. [[], [], [[], [[2,]],]]

```
parag@dell:~/Documents/DU/sem4/compiler-design/Parser-Project$ ./a.out

Enter statement to test for nested list in Python: [[], [], [[], [[2,]],   ]]

Entered statement is a VALID NESTED LIST example in Python

parag@dell:~/Documents/DU/sem4/compiler-design/Parser-Project$
```

Examples of Invalid Test Cases

1. [23, 45, 67,] (list with no nesting)

```
parag@dell:~/Documents/DU/sem4/compiler-design/Parser-Project$ ./a.out

Enter statement to test for nested list in Python: [23, 45, 67,]

NOT A VALID NESTED LIST example in Python...

parag@dell:~/Documents/DU/sem4/compiler-design/Parser-Project$
```

2. [[45,] (unmatched brackets)

```
parag@dell:~/Documents/DU/sem4/compiler-design/Parser-Project$ ./a.out

Enter statement to test for nested list in Python: [[45, ]

NOT A VALID NESTED LIST example in Python...

parag@dell:~/Documents/DU/sem4/compiler-design/Parser-Project$
```

3. [[35,45,,56]] (Missing element between commas)

```
parag@dell:~/Documents/DU/sem4/compiler-design/Parser-Project$ ./a.out

Enter statement to test for nested list in Python: [[35,45,,56]]

NOT A VALID NESTED LIST example in Python...

parag@dell:~/Documents/DU/sem4/compiler-design/Parser-Project$
```

4. [parag, []] (variables used within lists)

```
 parag@dell:~/Documents/DU/sem4/compiler-design/Parser-Project$ ./a.out

 Enter statement to test for nested list in Python: [parag, []]

 NOT A VALID NESTED LIST example in Python...

 parag@dell:~/Documents/DU/sem4/compiler-design/Parser-Project$
```