VIETNAM NATIONAL UNIVERSITY - HO CHI MINH CITY
HO CHI MINH CITY UNIVERSITY OF TECHNOLOGY
FACULTY OF COMPUTER SCIENCE AND ENGINEERING

PRINCIPLES OF PROGRAMMING LANGUAGES - CO3005

ASSIGNMENT 2
AST Generation

HO CHI MINH CITY, 01/2024

ASSIGNMENT 2
Version 1.0

After completing this assignment, you will be able to

- explain the structure of parser generated by ANTLR

- manipulate (traverse, create) on tree, which has different types of node, using Visitor

- write a short program in Python to generate intermediate code (AST) for a valid ZCode program.

1 Specification

A parser will check if the input is grammatically correct or not. If the input is grammatically wrong, an error message is released. This is what you did in the assignment 1. In the case the input is grammatically correct, an intermediate code is generated. This is the requirement of this assignment. As AST is selected to be the intermediate code, you are required to write an AST generator for a program written in ZCode. To complete this assignment, you need to watch the lecture of AST to:

- investigate the structure of a parser generated by ANTLR

- try to find out how to generate an AST from a parse tree.

- investigate the AST classes defined in Python.

- modify ASTGeneration.py to generate an AST.

- check your code to make sure it right.

To complete this assignment, you need to:

- download initial code (assignment2-initial.zip) and unzip it.

- copy your ZCode.g4, your solution of assignment 1, into folder src/main/zcode/parser.

- have a look at folder src/main/zcode/utils in the code of assignment 2 where there are file AST.py which defines all classes in AST used as the output of this assignment. You are NOT allowed to modify this file.

- modify ASTGeneration.py in folder src/main/zcode/astgen to generate AST from a parse tree, i.e. the result of assignment 2, generated from ANTLR.

- modify ASTGenSuite.py in folder src/test to create at least 100 tests in total for this assignment.

2   Submissions

This assignment requires you submit your code in 10 files: ZCode.g4, ASTGeneration.py and ASTGenSuite.py together with 7 files generated by ANTLR. ZCode.g4 is often modified to complete this assignment but even when it is not modified, it must also be submitted. Note that you must NOT compress your files when submitting them.

All the test-cases for this assignment are grammatically correct.

You must complete the assignment by yourself and do not let your work seen by someone else as well as do not use the work of someone else as your work, otherwise, you will be punished by the university rule for plagiarism.

3   Change log