



中山大學
SUN YAT-SEN UNIVERSITY



国家超级计算广州中心
NATIONAL SUPERCOMPUTER CENTER IN GUANGZHOU

Compiler Design 编译器构造实验

Lab 5: Project-2

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xianweiz.github.io

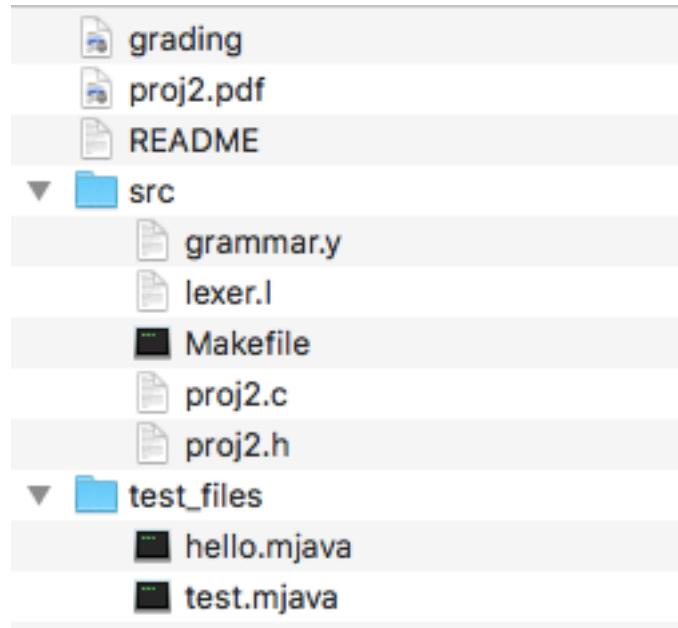
DCS292, 4/1/2021

Project 2: 语法分析

- 基于YACC实现一个语法分析器
 - 输入: token序列 (由Project 1提供)
 - 输出: 抽象语法树
- 总体流程
 - 引入Project1的lexer.l (需要简单修改)
 - 理解附录-B语法图, 构建上下文无关文法 (CFG) 规则
 - 使用YACC表示CFG文法
 - 实现错误处理, 调用提供的函数输出结果
- 截止时间
 - 4/15/2021

文件结构

- grading
 - Grading sheet of proj2
- proj2.pdf
 - Description of proj2
- README
 - Descriptions of the files
- src/
 - Source code files
- test_files
 - Testing MINI-JAVA files



附录B - Syntax Diagram

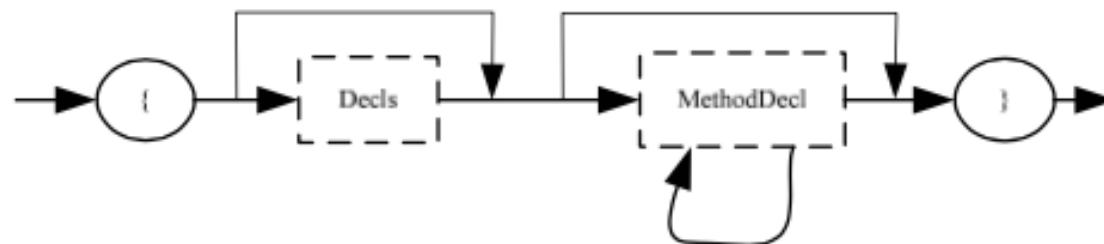
ClassBody → LBRACE Decls MethodDecl RBRACE

Decls → Decls | ε

MethodDecl → MethodDecl MethodDecl | ε

...

ClassBody



附录B - Syntax Diagram (cont.)

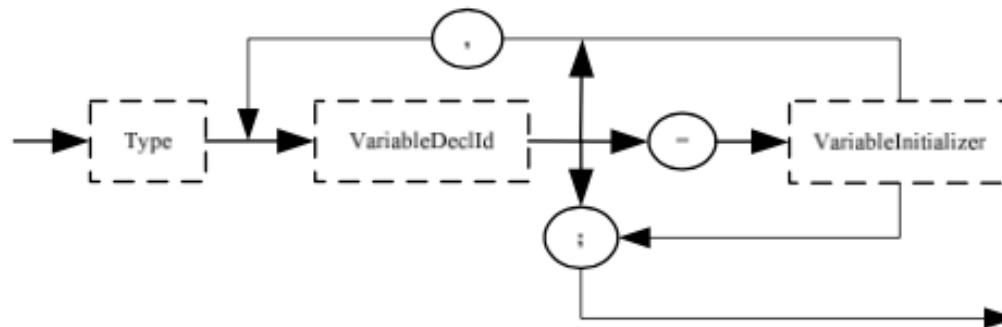
FieldDecl → Type _VariableDecl SEMInum

_VariableDecl → VariableDecl | _VariableDecl COMMAnum
VariableDecl

VariableDecl → VariableDeclId | VariableDeclId EQUALnum
VariableInitializer

...

FieldDecl



yylval/YYSTYPE

- yylval is of type YYSTYPE
 - YYSTYPE is a union to accommodate both token values and tree nodes
- grammar.y
 - %token <intg>: declare tokens (i.e., terminals) to be used by YACC
 - You'll no longer need token.h from Project 1
 - %type <tptx>: identify the types of non-terminals (i.e., LHS of each production rule)

```
%token <intg> PROGRAMnum IDnum .... SCONSTnum  
%type <tptx> Program ClassDecl ..... Variable
```

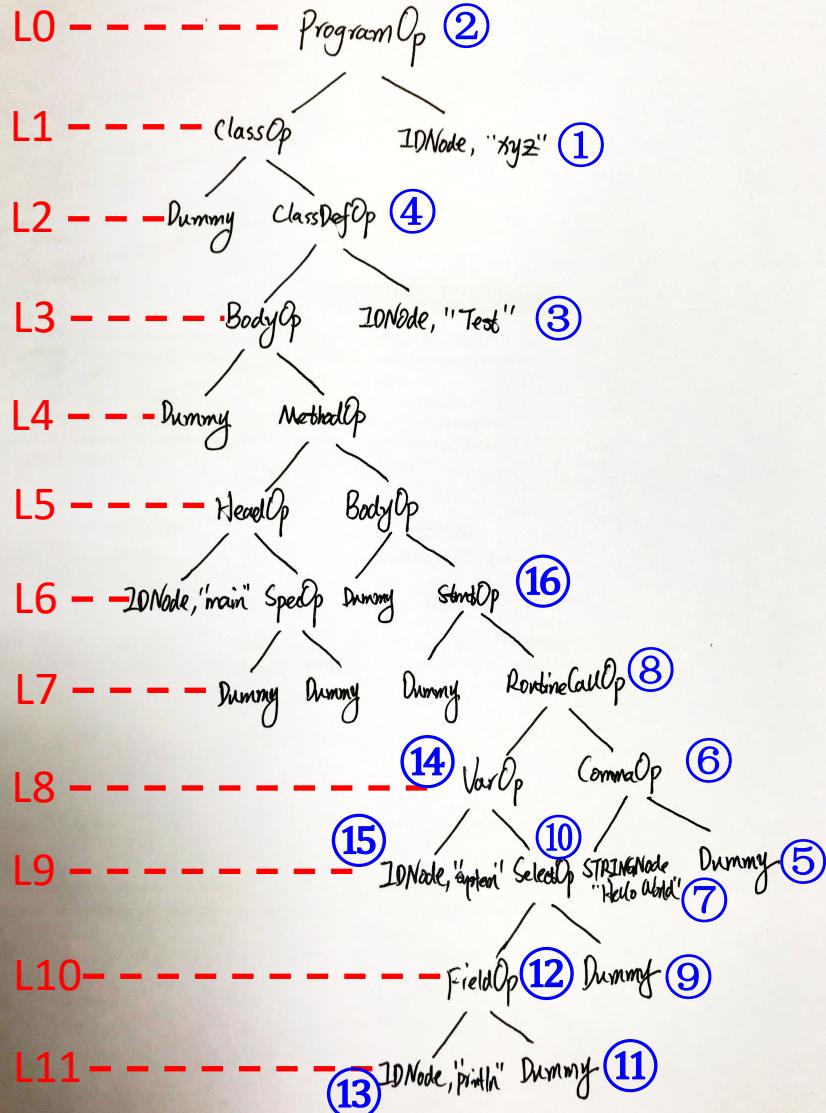
Input --> Output

```
/* Example 1: A hello world program */
program xyz;
class Test {
    method void main() {
        System.println('Hello World !!!');
    }
}
```



```
+-[IDNode, 0, "xyz"]
R-[ProgramOp]
|   +-[IDNode, 4, "Test"]
|   +-[ClassDefOp]
|       |   +- [DUMMYnode]
|       |   +- [CommaOp]
|       |   |   +- [STRINGNode, 29, "Hello World !!!"]
|       +- [RoutineCallOp]
|           |   +- [DUMMYnode]
|           |   +- [SelectOp]
|               |   |   +- [DUMMYnode]
|               |   |   +- [FieldOp]
|               |   |   +- [IDNode, 21, "println"]
|               |   +- [VarOp]
|                   |   +- [IDNode, 14, "System"]
|               +- [StmtOp]
|                   |   +- [DUMMYnode]
|               +- [BodyOp]
|                   |   +- [DUMMYnode]
|               +- [MethodOp]
|                   |   +- [DUMMYnode]
|                   |   +- [SpecOp]
|                       |   |   +- [DUMMYnode]
|                       |   |   +- [HeadOp]
|                           |   |   +- [IDNode, 9, "main"]
|                       +- [BodyOp]
|                           |   +- [DUMMYnode]
+-[ClassOp]
    +- [DUMMYnode]
```

Output



```

+- [IDNode, 0, "xyz"]
R-[ProgramOp]
|   +- [IDNode, 4, "Test"]
|   +- [ClassDefOp]
|   |   +- [DUMMYnode]
|   |   +- [CommaOp]
|   |   | +- [STRINGNode, 29, "Hello World !!!"]
|   +- [RoutineCallOp]
|   |   +- [DUMMYnode]
|   |   +- [SelectOp]
|   |   |   +- [DUMMYnode]
|   |   |   +- [FieldOp]
|   |   |   +- [IDNode, 21, "println"]
|   +- [VarOp]
|   |   +- [IDNode, 14, "System"]
|   +- [StmtOp]
|   |   +- [DUMMYnode]
|   +- [BodyOp]
|   |   +- [DUMMYnode]
|   +- [MethodOp]
|   |   |   +- [DUMMYnode]
|   |   |   +- [SpecOp]
|   |   |   |   +- [DUMMYnode]
|   |   |   +- [HeadOp]
|   |   |   |   +- [IDNode, 9, "main"]
|   |   +- [BodyOp]
|   |   |   +- [DUMMYnode]
+- [ClassOp]
|   +- [DUMMYnode]

```

关于迟交和抄袭

- 未在截至时间前提交
 - 晚[1, 2]天：每天扣除5分（从最后得分中）
 - 晚[3, 5]天：每天扣除10分
 - 如有适当理由，需提前申请，可减少分数扣除
- 讨论、抄袭
 - 鼓励讨论，鼓励参看网络资料
 - 但具体实现需独立完成
 - 发现抄袭，扣除一半得分
- 尽早开始，如有困难，请及时寻求帮助