Compiler Design
编 译 器 构 造 实 验

Lab 5：Project-2
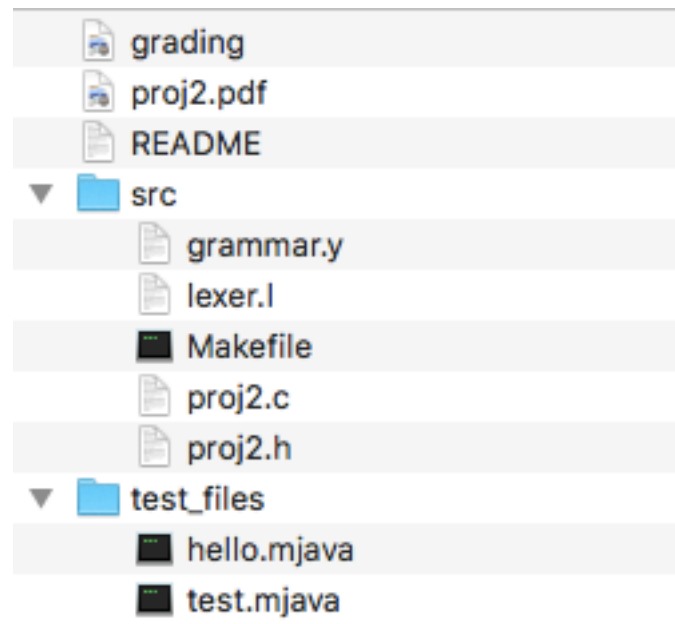
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DCS292, 4/1/2021

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/
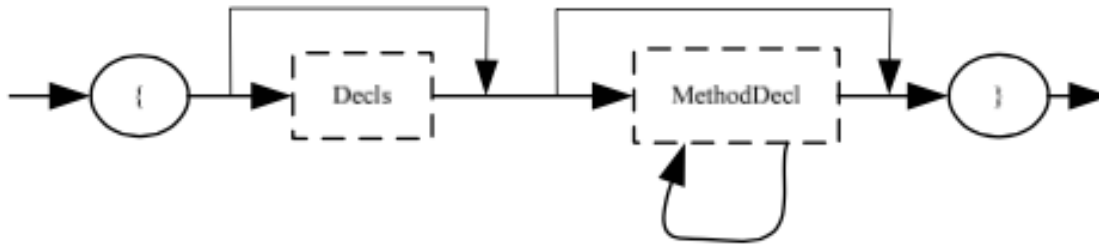 - Source code files

- test_files
  - Testing MINI-JAVA files

grading
proj2.pdf
README
▼ src
   grammar.y
   lexer.l
   Makefile
   proj2.c
   proj2.h
▼ test_files
   hello.mjava
   test.mjava

附录B - Syntax Diagram

ClassBody → LBRACEnum _Decls _MethodDecl RBRACEnum

_Decls → Decls | ε

_MethodDecl → _MethodDecl MethodDecl | ε

… … …

ClassBody

附录B - Syntax Diagram (cont.)

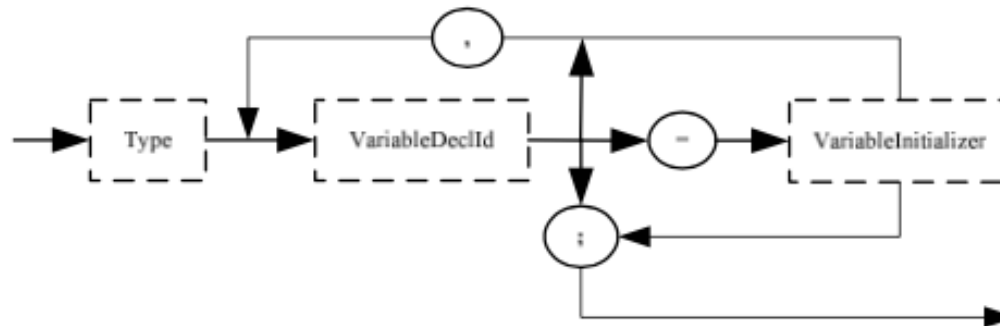FieldDecl → Type _VariableDecl SEMInum

_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 <tptr>: identify the types of non-terminals (i.e., LHS of each production rule)

%token <intg> PROGRAMnum IDnum …. SCONSTnum
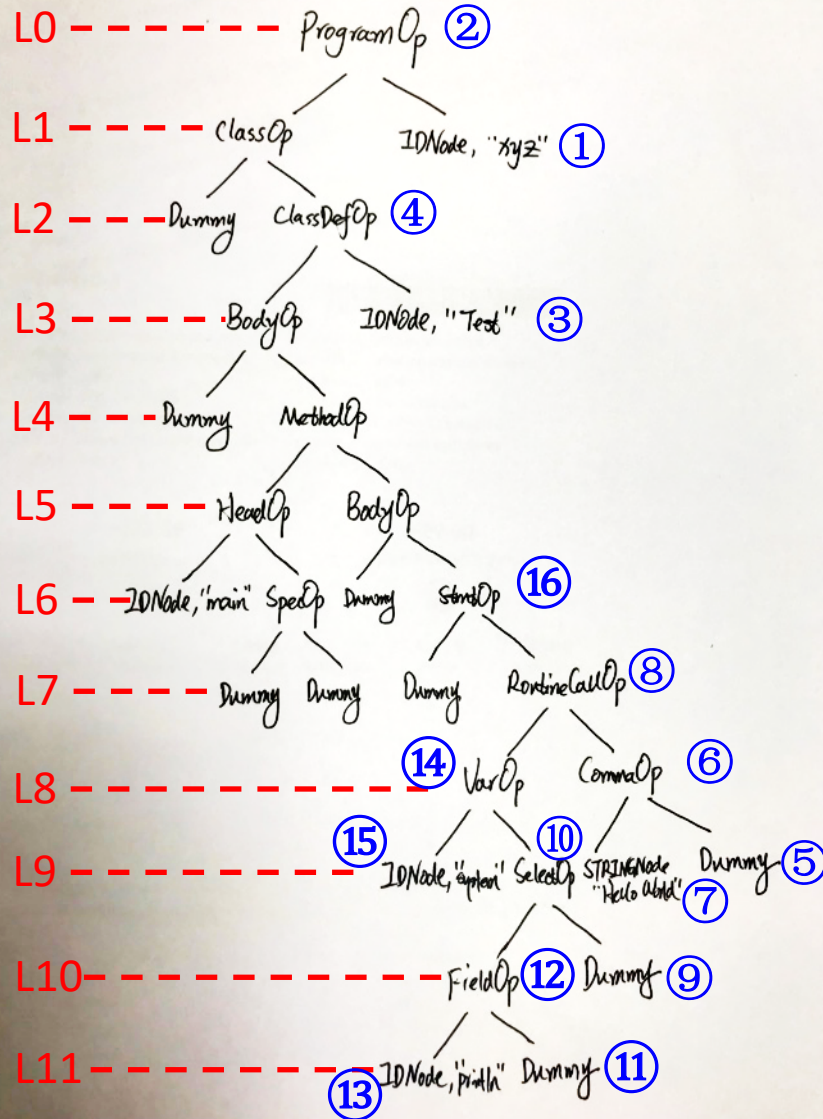%type <tptr> Program ClassDecl   …. Variable

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]
```

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**

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