Lec02 作业

1、根据 P49-P50 中 BNF 所描述的“program”文法，针对上述每个产生式，给出一组满足规则的语言实例，要求覆盖基本分支。既一个产生式至少给出一个满足该文法的字符串。

```
program ::= <program-heading> '; ' <program-block> '.'
program-heading ::= 'program' <identifier>
                    ['('<program-parameters> ')']
program-parameters ::= <identifier-list>
identifier-list ::= <identifier> {', ' <identifier>}
program-block ::= <block>
block ::= <label-declaration-part> <constant-declaration-part>
          <type-declaration-part><variable-declaration-part>
          <procedure-and-function-declaration-part><statement-part>.
variable-declaration-part ::= ['var' <variable-declaration> '; '
                               {<variabe-declaration> '; '}]
variable-declaration ::= <identifier-list> '; ' <type-denoter>
statement-part ::= compound-statement.
```

```
compound-statement ::= 'begin' <statement-sequence> 'end'
statement-sequence ::= <statement> {'; ' <statement>}
statement::=[<label> ': ']<simple-statement>|<structured-statement>)
simple-statement ::= <empty-statement> | <assignment-statement> |
                     <procedure-statement> | < goto-statement>
structured-statement ::= <compound-statement>|<conditional-statement>
                         |<repetitive-statement> | <with-statement>
```

实例：

```
program id0 (id1, id2, id3, id4);
    label-declaration-part
    constant-declaration-part
    type-declaration-part
    var id1, id2; td1; id3, id4; td2;
    paf-declaration-part
    begin
        label: empty; assignment; procedure; goto
    end.
```

附录：

program ::= program id0 (id1, id2); label-declaration-part constant-declaration-part type-declaration-part var id1, id2; td1; id3, id4; td2; paf-declaration-part begin label: empty; assignment; procedure; goto end.

program-heading ::= program id0 (id1, id2)

program-parameters ::= id1, id2

identifier-list ::= id1, id2

program-block ::= label-declaration-part constant-declaration-part type-declaration-part var id1, id2; td1; id3, id4; td2; paf-declaration-part begin label: empty; assignment; procedure; goto end.

block ::= label-declaration-part constant-declaration-part type-declaration-part var id1, id2; td1; id3, id4; td2; paf-declaration-part begin label: empty; assignment; procedure; goto end.

variable-declaration-part ::= var id1, id2; td1; id3, id4; td2;

variable-declaration ::= id1, id2; td1

statement-part::= begin label: empty; assignment; procedure; goto end.

compound-statement ::= begin empty; assignment; procedure; goto end

statement-sequence ::= empty; assignment; procedure; goto

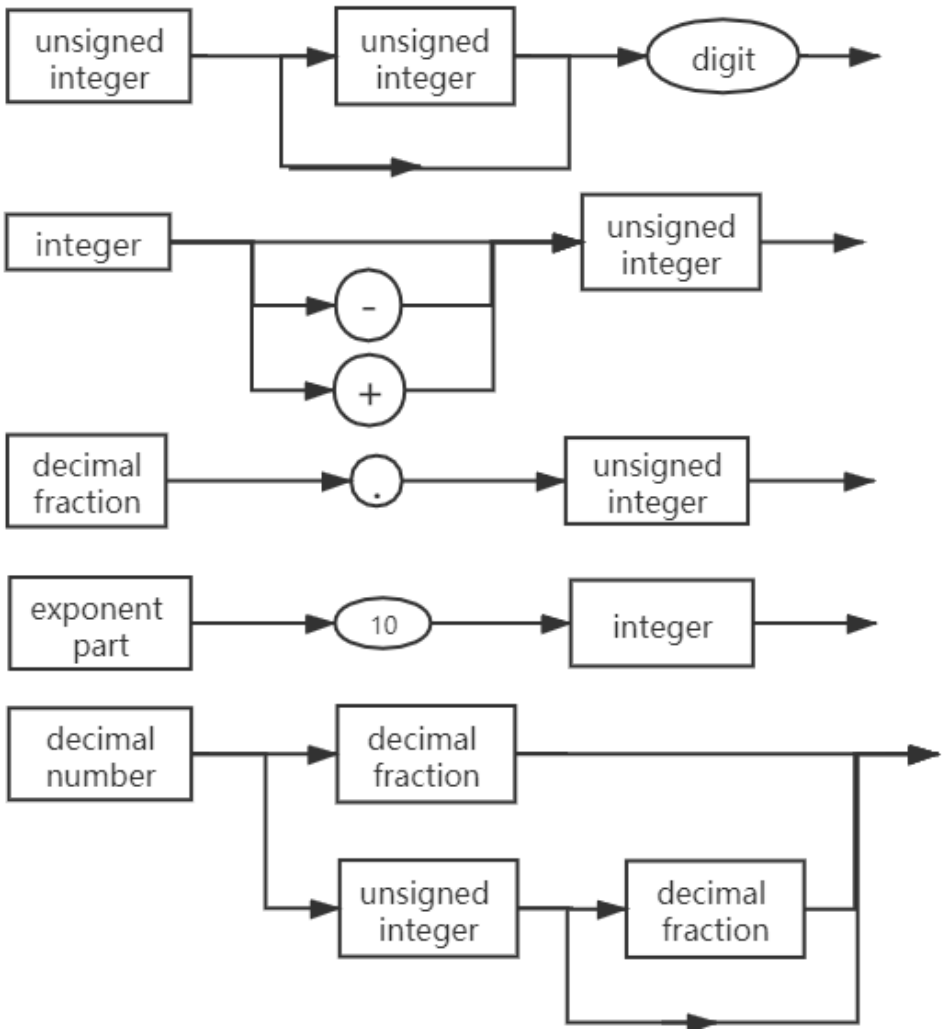
statement ::= label: empty

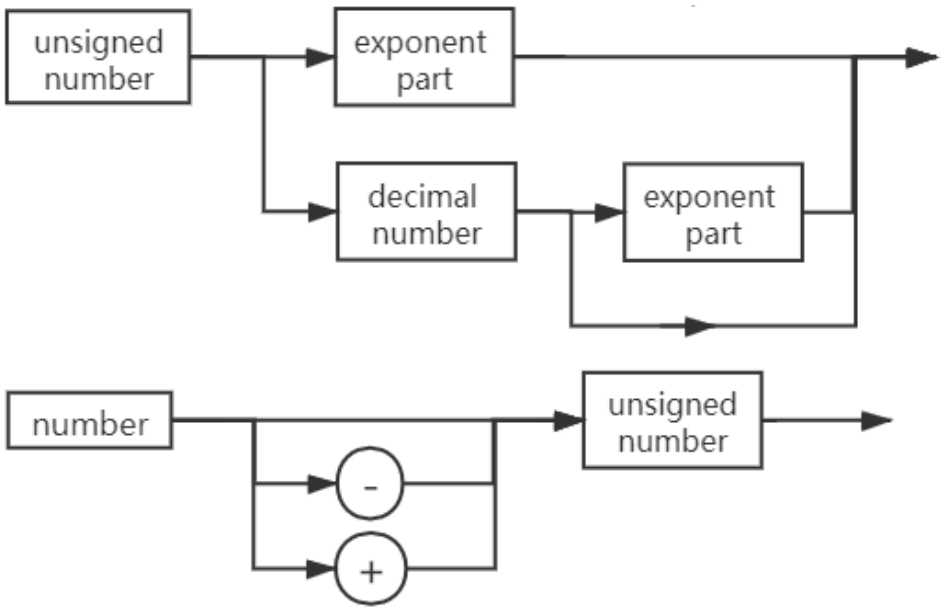
simple-statement ::= goto

structured-statement ::= begin label: empty; assignment; procedure; goto end

2、将以下 BNF 表示的 Algol60 部分产生式画成语法图

<unsigned integer> : : = <digit>
| <unsigned integer> <digit>
<integer> : : = +<unsigned integer>
|-<unsigned integer>
| <unsigned integer>
<decimal fraction> : : = . <unsigned integer>
<exponent part> : : = 10<integer> //10为下标。
<decimal number> : : = <unsigned integer>
| <decimal fraction>
| <unsigned integer> <decimal fraction>
<unsigned number> : : = <decimal number>
| <exponent part>
| <decimal number> <exponent part>
<number> : : = +<unsigned number>
|-<unsigned number>
| <unsigned number>





3、将下面的 EBNF 转换为 BNF：

S -> A { b A }

A -> a [b] A

解：< S > ::= < A > {‘b’ < A > }

< A > ::= ‘a’[‘b’] < A >

4、考虑下列文法：

< S > -> < A > a < B > b

< A > -> < A > b | b

< B > -> a < B > | a

下面的哪些句子属于这些文法所产生的语言？

baab

bbbab

bbaaaaa

bbaab

解：A -> { b }

B -> { a }

S -> { b } a { a } b

∴ baab、bbaab 是该文法所产生的语言