

根据课堂讲义 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示例。

答：

```
program myprogram(a1, a2);  
  var a1, a2;  
  var b1, b2;  
  function mufunction(p1, p2);  
  begin  
    label1:  
      c1 = a1 + b1;  
      begin  
        label2:  
          c2 = a2 + b2;  
      end;  
  end;  
end;
```

$$\langle \text{unsigned integer} \rangle :: = \langle \text{digit} \rangle$$

```
<integer> :: = +<unsigned integer>
```

| <unsigned integer>

$$\langle \text{exponent part} \rangle :: = 10 \langle \text{integer} \rangle$$

<decimal number> :: = <unsigned integer>

| <unsigned integer> <decimal fraction>

| <exponent part>

$$\langle \text{number} \rangle :: = + \langle \text{unsigned number} \rangle$$

| <unsigned number>

The diagram illustrates the parsing of a floating-point number into its numerical components. The input tokens are: `<exponent part>`, `<integer>`, `<unsigned integer>`, `<decimal number>`, `<decimal fraction>`, `<unsigned number>`, and `<number>`.

The parsing process involves several intermediate components:

- Exponent Part:** The `<exponent part>` token is processed by a circle containing the value 10. The output of this circle is fed into a `digit` box, which then feeds into a `digit` box that outputs to the right.
- Integer Part:** The `<integer>` token is processed by a circle containing a plus (+) and minus (-) sign. The output of this circle is fed into a `digit` box, which then feeds into a `digit` box that outputs to the right.
- Decimal Number:** The `<decimal number>` token is processed by a circle containing a decimal point (.). The output of this circle is fed into a `digit` box, which then feeds into a `digit` box that outputs to the right.
- Decimal Fraction:** The `<decimal fraction>` token is processed by a circle containing a decimal point (.). The output of this circle is fed into a `digit` box, which then feeds into a `digit` box that outputs to the right.
- Unsigned Number:** The `<unsigned number>` token is processed by a circle containing a plus (+) and minus (-) sign. The output of this circle is fed into a `digit` box, which then feeds into a `digit` box that outputs to the right.

The final output of the parser is the `<number>` token, which is the result of the parsing process.

2.6 将下面的 EBNF 转换为 BNF:

$$S \rightarrow A \{ bA \}$$
$$A \rightarrow a [b] A$$

答:

$$\langle S \rangle ::= \langle A \rangle | \langle S \rangle b \langle A \rangle$$
$$\langle A \rangle ::= a \langle A \rangle | ab \langle A \rangle$$

2.7 考虑下列文法:

$$\langle S \rangle \rightarrow \langle A \rangle a \langle B \rangle b$$
$$\langle A \rangle \rightarrow \langle A \rangle b | b$$
$$\langle B \rangle \rightarrow a \langle B \rangle | a$$

下面的哪些句子属于这些文法所产生的语言?

baab

bbbab

bbaaaaa

bbaab

答:

baab 和 bbaab