**终结符**： public 、static、void、main、String、args、System.out.println、System.in.read、if、else、int、while、identifier（标识符）、num（数字）、;、 , 、 ( 、) 、 { 、}、[、]、 =、 == 、!= 、 > 、 <、<=、>=、+ 、- 、 \*、 /、#(结束符)

**非终结符**：

S,B,A,C,X,Y,R,Z,Z’,U,U’,E,D,L,L’,T,T’,F,P

**开始符**：S

**规则**：

1.文法开始：

**S->public static void main(String[] args){A}** //S为开始符，A为复合语句。

2.复合语句:

**A->CA**

**C->X|B|R**  //X为变量定义，B为控制语句，R变量赋值。

**A->$**

3.变量定义：

X -> YZ;

Y -> int

Z -> UZ’

Z’-> ,Z|$

U -> identifierU’

U’-> =L|$

4.控制语句:

B -> if(E){A}else{A} //E条件判断，A为语句

B -> while(E){A} // E条件判断，A为语句

B -> System.out.println(P); //P为字符串

P -> identifier|num

B -> System.in.read(identifier); //identifier为标志符

5.变量赋值：

R -> identifier=L;

6.算术运算：

加减法：

L -> TL’

L’-> +L|-L|$

乘除法：

T -> FT’

T’-> \*T|/T|$

因子：

F->(L)

F->identifier|num

比较：

E -> FDF

D -> <|>|<=|>=|==|!=

**分析表**：(注：代码中已经去掉了System.out.println/System.in.read的实现)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | public | System.out.println | System.in.read | int | identifier | num | if | else | while |
| S | **S->public static void main(String[] args){A}** |  |  |  |  |  |  |  |  |
| A |  | A->CA | A->CA | A->CA | A->CA |  | A->CA | A->CA | A->CA |
| B |  | B->System.out.println(P); | B->System.in.read(identifier); |  |  |  | B-> if(E){A}else{A} |  | B -> while(E){A} |
| C |  | C->B | C->B | C->X | C->R |  | C->B | C->B | C->B |
| X |  |  |  | X->YZ; |  |  |  |  |  |
| Y |  |  |  | Y->int |  |  |  |  |  |
| R |  |  |  |  | R->identifier=L; |  |  |  |  |
| Z |  |  |  |  | Z->UZ’ |  |  |  |  |
| Z’ |  |  |  |  | Z’->$ |  |  |  |  |
| U |  |  |  |  | U->identifierU’ |  |  |  |  |
| U’ |  |  |  |  |  |  |  |  |  |
| E |  |  |  |  | E-> FDF | E-> FDF |  |  |  |
| D |  |  |  |  |  |  |  |  |  |
| L |  |  |  |  | L->TL’ | L->TL’ |  |  |  |
| L’ |  |  |  |  | L’->$ | L’->$ |  |  |  |
| T |  |  |  |  | T->FT’ | T->FT’ |  |  |  |
| T’ |  |  |  |  | T’->$ | T’->$ |  |  |  |
| F |  |  |  |  | F->identifier | F->num |  |  |  |
| P |  |  |  |  | P->identifier | P->num |  |  |  |
|  | ; | , | ( | ) | { | } | = | == | != |
| S |  |  |  |  |  |  |  |  |  |
| A |  |  |  |  |  | A->$ |  |  |  |
| B |  |  |  |  |  |  |  |  |  |
| C |  |  |  |  |  |  |  |  |  |
| X |  |  |  |  |  |  |  |  |  |
| Y |  |  |  |  |  |  |  |  |  |
| R |  |  |  |  |  |  |  |  |  |
| Z |  |  |  |  |  |  |  |  |  |
| Z’ | Z’->$ | Z’->,Z |  |  |  |  |  |  |  |
| U |  |  |  |  |  |  |  |  |  |
| U’ | U’->$ | U’->$ |  |  |  |  | U’->=L |  |  |
| E |  |  | E-> FDF |  |  |  |  |  |  |
| D |  |  |  |  |  |  |  | D->== | D->！= |
| L |  |  | L->TL’ |  |  |  |  |  |  |
| L’ | L’->$ |  |  | L’->$ |  |  |  |  |  |
| T |  |  | T->FT’ |  |  |  |  |  |  |
| T’ | T’->$ |  |  | T’->$ |  |  |  |  |  |
| F |  |  | F->(L) |  |  |  |  |  |  |
| P |  |  |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | > | < | >= | <= | + | - | \* | / | # |
| S |  |  |  |  |  |  |  |  |  |
| A |  |  |  |  |  |  |  |  | A->$ |
| B |  |  |  |  |  |  |  |  |  |
| C |  |  |  |  |  |  |  |  |  |
| X |  |  |  |  |  |  |  |  |  |
| Y |  |  |  |  |  |  |  |  |  |
| R |  |  |  |  |  |  |  |  |  |
| Z |  |  |  |  |  |  |  |  |  |
| Z’ |  |  |  |  |  |  |  |  | Z’->$ |
| U |  |  |  |  |  |  |  |  |  |
| U’ |  |  |  |  |  |  |  |  | U’->$ |
| E |  |  |  |  |  |  |  |  |  |
| D | D-> > | D->< | D-> >= | D-> <= |  |  |  |  |  |
| L |  |  |  |  |  |  |  |  |  |
| L’ |  |  |  |  | L’->+L | L’->-L |  |  | L’->$ |
| T |  |  |  |  |  |  |  |  |  |
| T’ |  |  |  |  | T’->$ | T’->$ | T’->\*T | T’->/T | T’->$ |
| F |  |  |  |  |  |  |  |  |  |
| P |  |  |  |  |  |  |  |  |  |