|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CFG’S | FIRST SET | | | | | | FOLLOW SET | | SELECTION SET | | |
| <TH>->this.|super.|E | { this. , super. , E} | | | | | | {ID} | | {this ,  super ,  ID} | | |
| <DEC>-> <ACSS-MOD><FINAL>DT ID <INIT><LIST> | {PUBLIC ,PRIVATE,FINAL,DT} | | | | | |  | | {PUBLIC, PRIVATE,FINAL,DT} | | |
| <LIST>-> ;| , ID <INIT> <LIST> | {; , ,} | | | | | |  | | {; , ,} | | |
| <INIT>->=<OE> | {=} | | | | | |  | | {=} | | |
| <INIT>->E | {E} | | | | | | {; , ,} | | {; , ,} | | |
| <WHILE>-> WHILE(<OE>)<BODY> | {WHILE} | | | | | |  | | {WHILE} | | |
| <BODY>->;|<SST>|{MST} | {; ,  , dt,inc-dec,while,if,return,for  dt,inc-dec,while,if,return,for {,do } | | | | | |  | |  | | |
| <MST>-><SST><MST>|  E | {this,super,id,do,dt,inc-dec,while,if,return,for  ,E} | | | | | | { } } | | { dt,inc-dec,while,if,return,for,}} | | |
| <IF-ELSE>-> IF (<OE>)<BODY><ELSE> | {IF} | | | | | |  | | {IF} | | |
| <IF-ELSE>-> IF (<OE>)<BODY><if\_else2> | {if} | | | | | |  | |  | | |
| <if\_else2>->else <if\_else3> | {else} | | | | | |  | |  | | |
| <if\_else3>-> if(<oe>)<body><if\_else2>|  <body> | {if}  {; ,  , dt,inc-dec,while,if,return,for  dt,inc-dec,while,if,return,for { } | | | | | |  | |  | | |
| <ELSE>->ELSE<BODY> | ELSE | | | | | |  | | {ELSE} | | |
| <DO-WHILE>->DO {<MST>}WHILE(<OE>); | {DO} | | | | | |  | | {DO} | | |
| <FOR>->FOR( <C1><C2>;<C3>)<BODY> | {FOR} | | | | | |  | | {FOR} | | |
| <C1>-><DEC> | {DT} | | | | | |  | | {DT } | | |
| <C1>-><ASGN-ST> ; | {THIS,SUPER,ID} | | | | | |  | | {THIS,SUPER,ID} | | |
| <C2>-><OE> | {this. , super. , ID , str-const , int-const , char-const, double-const , ( , ! , INC-DEC} | | | | | |  | | {this. , super. , ID , str-const , int-const , char-const, double-const , ( , ! , INC-DEC} | | |
| <C2>->E | {E} | | | | | | { ; } | | { ; } | | |
| <C3>-><INC-DEC-ST> | {INC-DEC} | | | | | |  | | {INC-DEC} | | |
| <C3>->E | {E} | | | | | | { ) } | | { ) } | | |
| <C3>-><ASGN-ST> | {THIS,SUPER,ID} | | | | | |  | | {THIS,SUPER,ID} | | |
| <INC-DEC-ST>  ->| <inc-dec><TH>ID<REF>; | {INC-DEC} | | | | | |  | | {INC-DEC} | | |
|  |  | | | | | |  | |  | | |
| <ASGN-ST>-><TH>ID<REF>  <ASGN\_OP><OE> | { this. , super. ,ID} | | | | | |  | | {this. ,super. , ID} | | |
| <asgn\_op> = || <CO> |  | | | | | |  | |  | | |
|  |  | | | | | |  | |  | | |
|  |  | | | | | |  | |  | | |
| <ASGN-OP>->COMP\_ASGN | {COMP\_ASGN} | | | | | |  | | {COMP\_ASGN} | | |
| <ASGN-OP>->= | {=} | | | | | |  | | {=} | | |
| <FINAL>->FINAL | {FINAL} | | | | | |  | | {FINAL} | | |
| <FINAL>->E | {E} | | | | | | {DT} | | {DT} | | |
| <ABS-FINAL>->ABSTRACT | {ABSTRACT} | | | | | |  | | {ABSTRACT} | | |
| <ABS-FINAL>->FINAL | {FINAL} | | | | | |  | | {FINAL} | | |
| <ABS-FINAL>->E | {E} | | | | | | {DT,CLASS} | | {DT,CLASS} | | |
| <ACSS-MOD>->PUBLIC | { PUBLIC} | | | | | |  | | {PUBLIC} | | |
| <ACSS-MOD>->PRIVATE | {PRIVATE} | | | | | |  | | {PRIVATE} | | |
| <ACSS-MOD>->E | {E} | | | | | | {,ABSTRACT,  CLASS,DT,  FINAL} | | {ABSTRACT,  CLASS,DT,  FINAL} | | |
| <MULTI-ARR>-><ACSS-MOD><FINAL>DT ID[]<arr>  <val>; | {PUBLIC,PRIVATE,FINAL,DT} | | | | | |  | | {PRIVATE,PUBLIC,  FINAL,DT} | | |
| <arr>->[]<arr> | { [ } | | | | | |  | | { [ } | | |
| <arr>->E | {E} | | | | | | {=,,,)} | | {=,,)} | | |
| <val>->=<arr-dec> | {=} | | | | | |  | | {=} | | |
| <arr-dec>->new DT [<OE>]  <arr-dec’> | {NEW} | | | | | |  | | {NEW} | | |
| <arr-dec>-> {<arr1>}<arr2> | { { } | | | | | |  | | { { } | | |
| <arr-dec’>->[<OE>]<arr-dec’> | { [ } | | | | | |  | | { [ } | | |
| <arr-dec’>->E | {E} | | | | | | {;} | | {;} | | |
| <arr1>-><ARGS> | { this. , super. , ID , str-const , int-const , char-const, double-const , ( , ! , INC-DEC} | | | | | |  | | { this. , super. , ID , str-const , int-const , char-const, double-const , ( , ! , INC-DEC } | | |
| <arr1>->{<ARGS>}<arr2> | { { } | | | | | |  | | { { } | | |
| <arr1>E |  | | | | | | { } } | | { } } | | |
| <arr2>->,<arr3> | { , } | | | | | |  | | { , } | | |
| <arr2>->E | {E} | | | | | | { ; , }} | | { ; , }} | | |
| <arr3>->{<ARGS>}<arr2> | { { } | | | | | |  | | { { } | | |
| <ARGS>-><OE><ARGS1> | {this. , super. , ID , str-const , int-const , char-const, double-const , ( , ! , INC-DEC } | | | | | |  | | {this. , super. , ID , str-const , int-const , char-const, double-const , ( , ! , inc-dec } | | |
| <ARGS>->E | {E} | | | | | | { ) , } } | | { ) , } } | | |
| <ARGS1>-> , <OE> <ARGS1> | {, } | | | | | |  | | { , } | | |
| <ARGS1>->E | {E} | | | | | | { ), } } | | { ), } } | | |
| <PL>-> DT <PL1> |  ID <PL1> |  E | {DT  ,ID,  E} | | | | | | { )} | | {DT,  ID,  )} | | |
| <PL1>->ID <PL2> | {ID} | | | | | |  | | {ID} | | |
| <PL2>-><PL3>  |[]<arr><PL3> | {, ,DT,ID,)  [} | | | | | |  | |  | | |
| <PL3>->,<PL>|  E | ,  E | | | | | | DT,ID,) | |  | | |
|  |  | | | | | |  | |  | | |
| <OBJ-DEC>->ID ID =NEW ID (<ARGS>) | { ID} | | | | | |  | | {ID} | | |
| <RETURN>->RETURN <RETURN1> | {RETURN} | | | | | |  | | {RETURN} | | |
| <RETURN1>-><OE>; | {this. , super. , ID , str-const , int-const , char-const, double-const , ( , ! , ++,--} | | | | | |  | | {this. , super. , ID , str-const , int-const , char-const, double-const , ( , ! , ++,--} | | |
| <OE>→ <AE> <OE’> | {this. , super. , ID , str-const , int-const , char-const, double-const , ( , ! , ++,--} | | | | | | { , , ] , ) , ; } | | {this. , super. , ID , str-const , int-const , char-const, double-const , ( , ! , ++,--} | | |
| <OE’>→ || <AE> <OE’> | { || } | | | | | |  | | {|| } | | |
| <OE’>→ E | {E} | | | | | | { , , ] , ) , ; } | | { , , ] , ) , ; } | | |
| <AE> → <RE> <AE’> | {this. , super. , ID , str-const , int-const , char-const, double-const , ( , ! , ++,--} | | | | | | {|| ,,,],),;} | | {this. , super. , ID , str-const , int-const , char-const, double-const , ( , ! , ++,--} | | |
| <AE’>→ && <RE> <AE’> | {&&} | | | | | |  | | {&&} | | |
| <AE’>→ E | {E} | | | | | | {  ||,,,],),;} | | {  ||,,,],),;} | | |
| <RE> → <E> <RE’> | {this. , super. , ID , str-const , int-const , char-const, double-const , ( , ! , ++,--} | | | | | | {&&,||} | | {this. , super. , ID , str-const , int-const , char-const, double-const , ( , ! , ++,--} | | |
| <RE’>→ RO <E> <RE’> | {RO} | | | | | |  | | {RO } | | |
| <RE’>→ E | {E} | | | | | | {&& ,|| , , ,] , ) , ;} | | {&& ,|| , , ,] , ) , ;} | | |
| <E>→ <T> <E’> | {this. , super. , ID , str-const , int-const , char-const, double-const , ( , ! , ++,--} | | | | | | {RO,&&} | | {this. , super. , ID , str-const , int-const , char-const, double-const , ( , ! , ++,--} | | |
| <E’>→ PM <T> <E’> | {PM} | | | | | | {RO,&&} | | {PM} | | |
| <E’>→ E | {E} | | | | | | {RO,&&,|| , , , ],),;} | | {RO,&&,|| , , , ],),;} | | |
| <T> → <F> <T’> | {this. , super. , ID , str-const , int-const , char-const, double-const , ( , ! , ++,--} | | | | | | {pm, RO} | | {this. , super. , ID , str-const , int-const , char-const, double-const , ( , ! , ++,--} | | |
| <T’> → MDM <F> <T’> | {MDM} | | | | | |  | | {MDM} | | |
| <T’> → E | {E} | | | | | | {pm, RO,||,&&, , , ] ,),;} | |  | | |
| <F> → <TH> ID <REF>|  <CONST>  ( <OE> ) |  ! <F> |  <INC\_DEC> <TH> ID <REF> | | | {this. , super. , ID ,  str-const , int-const , char-const, double-const ,  ( ,  ! ,  ++,--} | | {mdm,pm, RO,||,&&, , , ] ,),;} | | | {this. , super. , ID , str-const , int-const , char-const, double-const , ( , ! , ++,--} | |
|  | |  | |  | |  | | | | |
| <REF>-> .ID<REF>|  [ID|CONST]<REF>  | (ARGS)<X>|  E | | | {.  [  ,  (,  E} | | {=,;,come\_asgn,MDM,PM,RO,||,&&,,,],),;} | | | {.,[,(,  =,;,come\_asgn,MDM,PM} | |
| <X>->.ID<REF>|[ID|CONST]<REF>|E | | | { .,[,} | | {=,;,come\_asgn,MDM,PM,RO,||,&&,,,],),;} | | | {.,[} | |
| <OPT>-><REF><opt2> | | {=,CO,(,mdm,pm,RO,||,&&,,,]);} | | {;,mdm,pm,RO,||,&&,,,],)} | | {.,[,(,=,;,CO,  (,  MDM,PM,  MDM,PM,RO} | | | | |
| <Opt2>->(<ARGS>)  |E | | {(}  {E} | | {;,mdm,pm,RO,||,&&,,,],)} | |  | | | | |
| <REF>-> .ID<REF>|  [ID|CONST]<REF>  | (ARGS)<X>|  E | | | {.  [  (  E} | | {=,CO,(,mdm,pm,RO,||,&&,,,]);} | | |  | |
| <X>->.ID<REF>|[ID|CONST]<REF> | | | { .,[,} | | {=,;,come\_asgn,MDM,PM,RO,||,&&,,,],),;} | | | {.,[} | |
| <S>-> <DEFS> PUBLIC CLASS ID <INHT> { PUBLIC STATIC VOID MAIN ( ) { <MST> } <C\_BODY> } <DEFS> | {ABSTRACT, FINAL, CLASS, PUBLIC} | | | | | | {$} | | {ABSTRACT, FINAL, CLASS, PUBLIC} | | |
| <DEFS>→ <CLASS\_DEFS> <DEFS> | {ABSTRACT, FINAL, CLASS} | | | | | |  | | {ABSTRACT, FINAL, CLASS} | | |
| <DEFS>->E | {E} | | | | | | {$, public} | | {$, public} | | |
| <CLASS\_DEFS>→ <ABS\_FINAL> CLASS ID < INHT > {<C\_BODY>} | {ABSTRACT, FINAL, CLASS} | | | | | |  | | {ABSTRACT, FINAL, CLASS} | | |
| <INHT> → EXTENDS ID | {EXTENDS} | | | | | |  | | {EXTENDS } | | |
| <INHT> → E | {E} | | | | | | { { } | | { { } | | |
| <FUNC-DEF>-><ACSS-MOD>  <ABS-FINAL>DT ID(<PL>){<MST>} | {PUBLIC,PRIVATE,ABSTRACT  , FINAL,DT} | | | | | |  | | {PUBLIC,PRIVATE,ABSTRACT  , FINAL,DT} | | |
|  |  | | | | | |  | |  | | |
| <C\_BODY>-><ACCSS-MOD> <C\_BODY1> | { PUBLIC ,  PRIVATE ,  FINAL ,  ABSTRACT ,  DT ,  ID} | | | | | |  | | { PUBLIC ,  PRIVATE ,  FINAL ,  ABSTRACT ,  DT ,  ID } | | |
| <C\_BODY>-> FINAL <C\_BODY2> | {FINAL} | | | | | |  | | {FINAL} | | |
| <C\_BODY>-> ABSTRACT DT ID (<PL>) {<MST>} | {ABSTRACT} | | | | | |  | | {ABSTRACT} | | |
| <C\_BODY>-> DT <C\_BODY3> | {DT} | | | | | |  | | {DT} | | |
| <C\_BODY>-> ID <C\_BODY8> | {ID} | | | | | |  | | {ID} | | |
| <C\_BODY>-> E | {E} | | | | | | { } } | | { } } | | |
| <C\_BODY1>  ->FINAL<C\_BODY2> | { FINAL ,} | | | | | |  | | { FINAL } | | |
| <C\_BODY1>  -> DT <C\_BODY3> | {DT} | | | | | |  | | {DT} | | |
| <C\_BODY1>  -> ID <C\_BODY4> | {ID} | | | | | |  | | {ID} | | |
| <C\_BODY1>  -> ABSTRACT DT ID (<PL>){<MST>} | {ABSTRACT} | | | | | |  | | {ABSTRACT} | | |
| <C\_BODY2>->DT <C\_BODY3> | { DT } | | | | | |  | | { DT } | | |
| <C\_BODY3>-> ID <C\_BODY7> | { ID } | | | | | |  | | { ID } | | |
| <C\_BODY4>-> (<ARGS>) {<MST>} | { ( } | | | | | |  | | { ( } | | |
| <C\_BODY7>  ->(<PL>){MST}<C\_BODY> | { ( } | | | | | |  | | { ( } | | |
| <C\_BODY7>  -><INIT> <LIST> <C\_BODY> | {=,;, ,} | | | | | |  | | {= , ; , ,} | | |
| <C\_BODY7>  ->[ ]<arr><val>; <C\_BODY> | { [ } | | | | | |  | | { [ } | | |
| <C\_BODY8>-> ID=NEW ID(<ARGS>) <C\_BODY> | { ID } | | | | | |  | | { ID } | | |
| <C\_BODY8>->(<ARGS>) {<MST>} <C\_BODY> | { ( } | | | | | |  | | { ( } | | |
|  |  | | | | | |  | |  | | |
|  |  | | | | | |  | |  | | |
|  |  | | | | | |  | |  | | |
|  |  | | | | | |  | |  | | |
|  |  | | | | | |  | |  | | |
|  |  | | | | | |  | |  | | |
|  |  | | | | | |  | |  | | |
|  |  | | | | | |  | |  | | |
|  |  | | | | | |  | |  | | |
|  |  | | | | | |  | |  | | |
|  |  | | | | | |  | |  | | |
|  |  | | | | | |  | |  | | |
|  |  | | | | | |  | |  | | |
|  |  | | | | | |  | |  | | |
|  |  | | | | | |  | |  | | |
|  |  | | | | | |  | |  | | |
|  |  | | | | | |  | |  | | |
|  |  | | | | | |  | |  | | |