

<program> -> <dec> <main> <dec>

<main> -> main () { <mst> }

<dec> -> <class_dec> | <fn_dec> | ε

<class_dec> -> class ID <extends> { <class_body> }

<extends> -> :ID | null

<class_body> -> <class_chidren> <class_body> | null

<class_chidren> -> <dt_dec> | <func_dec> | <Constructor>

<func_dec> -> DT ID (<param_list>) <Body>

<param_list> -> <param> | <param> , <param_list> | ε

<param> -> DT ID

<Body> -> ; | { <MST> }

<Constructor> -> ID (<param_list>) <Body>

<dt_dec> -> DT ID = <Const_or_ID> ; // int x = 5; or int x = x;
 | DT ID ; // int x;
 | DT <multi_dec> ; // int x,b,c; or int a,b;
 | DT <multi_dec_init> ; // int x = 10,b=20; or int x = a, y = b; or int x=a,y=3;
 | <arr_type> ID [] = { <arr_const_or_id> }; // int arr[] = {}; or int arr[] = {1,2,a}; obj arr[]

<Const_or_ID> -> Const | ID

<multi_dec> -> ID , <multi_dec> | ID


<multi_dec_init> -> ID = Const, <multi_dec_init> | ID = ID, <multi_dec_init> | ID = <Const_or_ID>

<arr_type> -> DT | ID

<arr_const_or_id> -> ε | <Const_or_ID> | ID , | Const ,

<SST> -> <while_loop> | <for_loop> | <if_else> | <do_while> | <command> | <exp> | <try> |
<throw> | <return> | <continue> | <break> | <dt_dec> | <func_dec>


<MST> -> <SST><MST> | ε

<while_loop> ->  (<cond>)<loop_body>

<cond> -> <Const_or_ID> | <Const_or_ID> <ROP> <Const_or_ID> | <exp>

<ROP> -> RO1 | RO2

<loop_body> -> ; | <SST> | {<MST>}

<for_loop> ->  (<F1><F2>;<F3>)<loop_body>

<F1> -> <dt_dec> | <assign_st> | ;


<F2> -> <cond> | null


<F3> -> <inc_dec> | <assign_st> | null



<inc_dec> -> ID increase_decrease



<assign_st> -> ID = <assign_options> ;

<assign_options> -> <Const_or_ID> | <exp>

<if> ->  (<cond>) <loop_body> <else>

<else> ->  <loop_body> | null


<do_while> ->  <loop_body>  (<cond>);

<this> ->  ID ; |  <func_call> ;

<func_call> -> ID (<param_list>)



<exp> -> <OE>


<OE>-> <AE><OE'>
 <OE'> -> OR<AE><OE'> | null
 <AE>-> <RE2><AE'>
 <AE'> -> AND<RE2><AE'> | null
 <RE2>-> <RE1><RE2'>
 <RE2'> -> RO2<RE1><RE2'> | null
 <RE1> -> <E><RE1'>
 <RE1'> -> RO1<E><RE1'> | null
 <E> -> <T><E'>
 <E'> -> PM<T><E'> | null
 <T> -> <F><T'>
 <T'> -> MDM<F><T'> | null
 <F> -> ID | const | (<OE>) | -<F> | NOT <F>

<return> ->  <return_options> ;
 <return_options> -> ID | <const> | <exp> | null

<continue> ->  ;

<break> ->  ;

<try> →  { <MST> }  (ID) { <MST> }

<throw> ->  <throw_options>:
 <throw_options> -> ID | Const | new ID (<param_list>)