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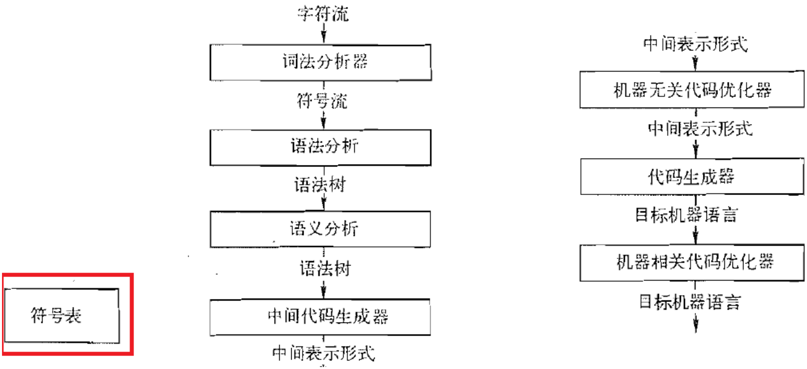
20221205



符号表

字符流

词法分析器

符号流

语法分析

语法树

语义分析

语法树

中间代码生成器

中间表示形式

机器无关代码优化器

中间表示形式

代码生成器

目标机器语言

机器相关代码优化器

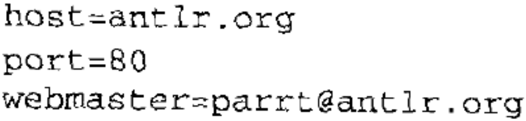
目标机器语言

Definition ((Symbol Table))

Definition ((Symbol Table))

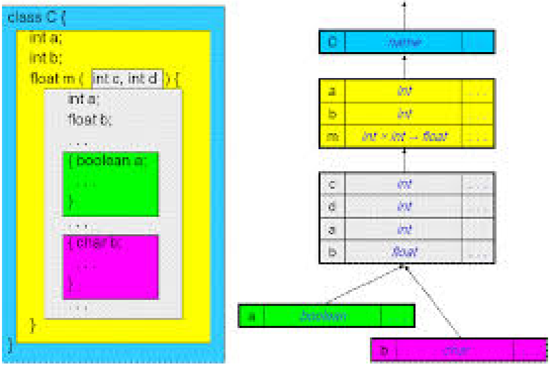
Name	**Type**	**Size**	**Dimension**	**Line of Declaration**	**Line of Usage**	**Address**	⋯
count	int	4	0	⋯	⋯	⋯	⋯
str	char	5	1	⋯	⋯	⋯	⋯

“” (DSL) ()



```
host=antlr.org
port=80
webmaster=parrt@antlr.org
```

“” (GPL)



```
class C {
    int a;
    int b;
    float m ( int c, int d ) {
        int a;
        float b;
        . . .
        { boolean a;
          . . .
        }
        . . .
        { char b;
          . . .
        }
        . . .
    }
}
```

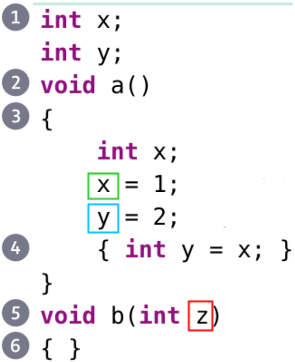
C	*name*	

a	*int*	. . .
b	*int*	. . .
m	*int × int → float*	. . .

c	*int*	. . .
d	*int*	. . .
a	*int*	
b	*float*	. . .

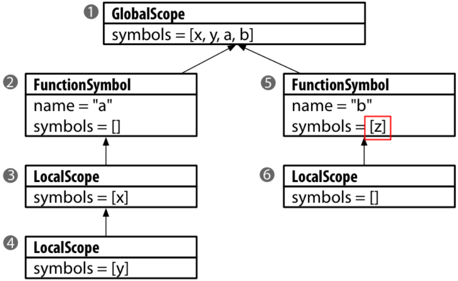
a	*boolean*	

b	*char*	. . .



```
① int x;
  int y;
② void a()
③ {
      int x;
      x = 1;
      y = 2;
④     { int y = x; }
  }
⑤ void b(int z)
⑥ { }
```

```
① int x;
  int y;
② void a()
③ {
      int x;
      x = 1;
      y = 2;
④     { int y = x; }
  }
⑤ void b(int z)
⑥ { }
```



❶ GlobalScope
symbols = [x, y, a, b]

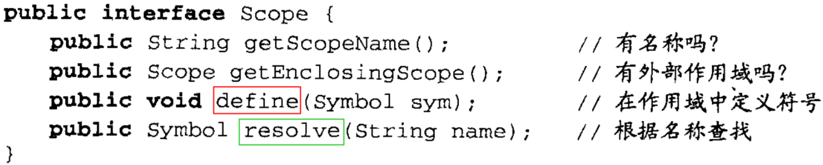
❷ FunctionSymbol
name = "a"
symbols = []

❸ LocalScope
symbols = [x]

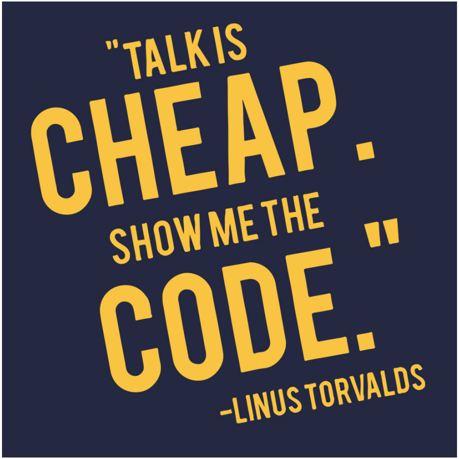
❹ LocalScope
symbols = [y]

❺ FunctionSymbol
name = "b"
symbols = [z]

❻ LocalScope
symbols = []

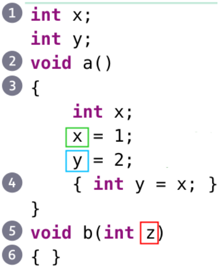


```
public interface Scope {
    public String getScopeName();              // 有名称吗?
    public Scope getEnclosingScope();          // 有外部作用域吗?
    public void define(Symbol sym);            // 在作用域中定义符号
    public Symbol resolve(String name);        // 根据名称查找
}
```

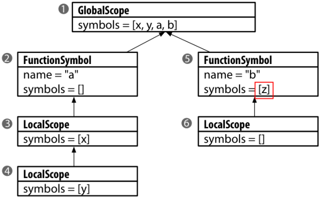


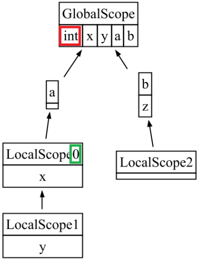
"TALK IS CHEAP. SHOW ME THE CODE."

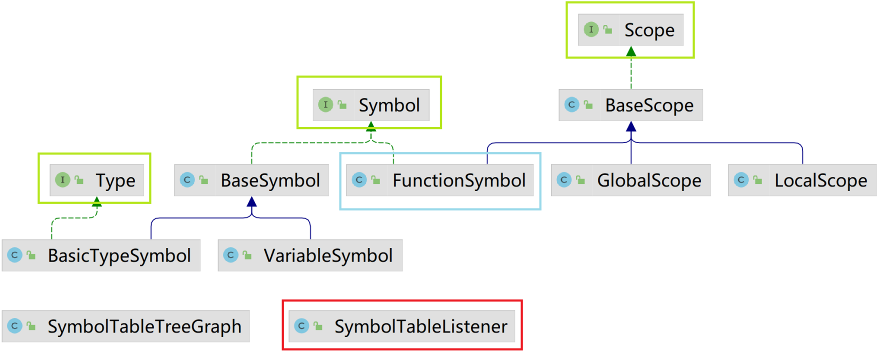
-LINUS TORVALDS

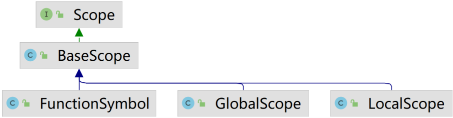


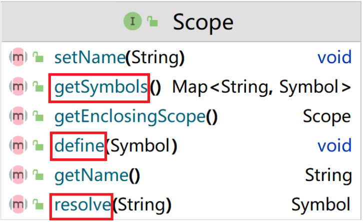
```
❶ int x;
  int y;
❷ void a()
❸ {
      int x;
      x = 1;
      y = 2;
❹     { int y = x; }
  }
❺ void b(int z)
❻ { }
```






I Scope
I Symbol
C BaseScope
I Type
C BaseSymbol
C FunctionSymbol
C GlobalScope
C LocalScope
C BasicTypeSymbol
C VariableSymbol
C SymbolTableTreeGraph
C SymbolTableListener



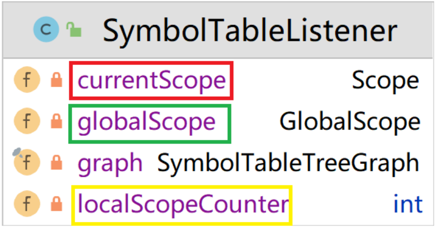


Scope

setName(String)	void
getSymbols()	Map<String, Symbol>
getEnclosingScope()	Scope
define(Symbol)	void
getName()	String
resolve(String)	Symbol

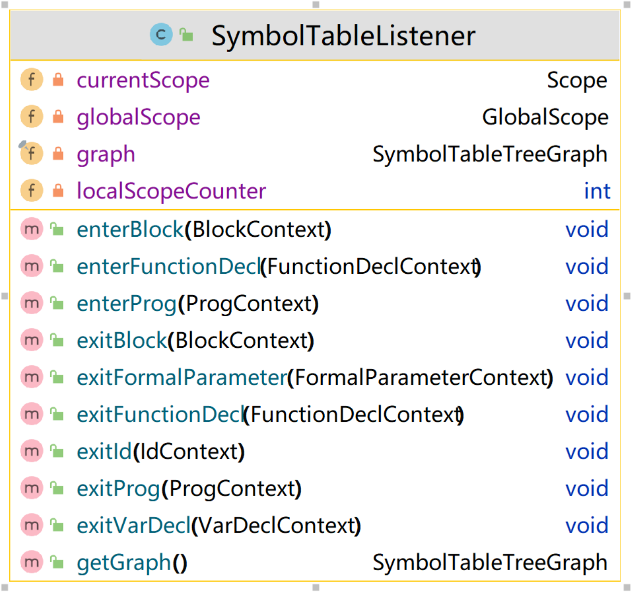
SymbolTableListener

SymbolTableListener



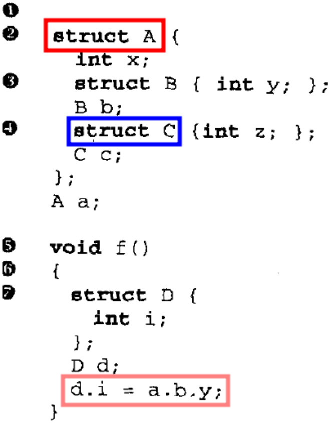
SymbolTableListener

currentScope	Scope
globalScope	GlobalScope
graph	SymbolTableTreeGraph
localScopeCounter	int



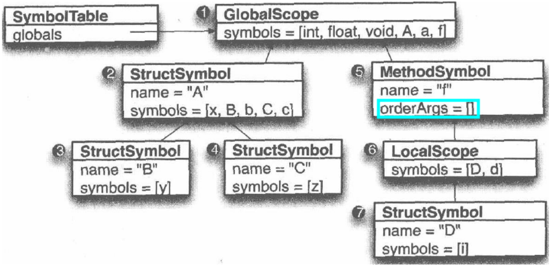
c SymbolTableListener	
f currentScope	Scope
f globalScope	GlobalScope
f graph	SymbolTableTreeGraph
f localScopeCounter	int
m enterBlock(BlockContext)	void
m enterFunctionDecl(FunctionDeclContext)	void
m enterProg(ProgContext)	void
m exitBlock(BlockContext)	void
m exitFormalParameter(FormalParameterContext)	void
m exitFunctionDecl(FunctionDeclContext)	void
m exitId(IdContext)	void
m exitProg(ProgContext)	void
m exitVarDecl(VarDeclContext)	void
m getGraph()	SymbolTableTreeGraph

struct:



```
❶
❷ struct A {
      int x;
❸     struct B { int y; };
      B b;
❹     struct C {int z; };
      C c;
  };
  A a;

❺ void f()
❻ {
❼    struct D {
        int i;
     };
     D d;
     d.i = a.b.y;
  }
```

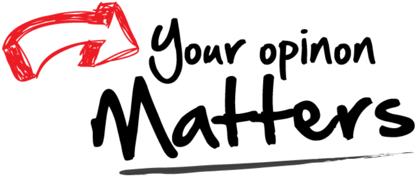


$d.i$ $a.b.y$

symtab @ antlr by parrt

symtab @ cs652 by parrt

Thank You!



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