

AST Nodes

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1 AST Operations

The root AST node class has two operations:

- `typeCheck` - checks the types of its child nodes and returns true if and only if the type check passes
- `declaredBeforeUse` - checks that all contained variables within its child nodes are declared before their use

2 AST Node Types

Node	Fields
Program	List<ClassDecl> classes
ClassDecl	String classId, Option(String) extendsId, List<FieldDecl> fields, List<MethodDecl> methods
FieldDecl	List<Var> vars //Each Var has the same Type
MethodDecl	
—VoidMethod	String id, Option(Formals) formals, Block block
—FruitfulMethod	Type returnType, String id, Option(Formals) formals, Block block
Formals	List<Var> vars //Each Var can have a different Type
Type	
—IntType	
—BoolType	
—StringType	
—ClassType	String classId
—ArrayType	Type arrayType
VarDecl	Type type, List<AssignVar> vars
Stmt	
—Block	List<VarDecl> vars, List<Stmt> stmts
—LocStmt	Location loc, Expr e
—CallStmt	Call call
—ReturnStmt	Option(Expr) e
—IfStmt	Expr cond, Stmt then, Option(Stmt) else
—WhileStmt	Expr e, Stmt s
—BreakStmt	
—ContinueStmt	
Expr	
—LocExpr	Location loc
—CallExpr	Call call

—ThisExpr	
—ClassExpr	String classId
—ArrayExpr	Type type, Expr e
—LengthExpr	Expr e
—BinExpr	Expr e1, Binop op, Expr e2
—UnExpr	Unop op, Expr e
—IntExpr	int val
—StringExpr	string val
—BoolExpr	boolean val
—NullExpr	
Call	
—LibCall	String id, List<Expr> exprs
—VirtualCall	Option(Expr) e, String id, List<Expr> exprs
Location	
—IdLoc	String id
—DotLoc	Expr e, String id
—ArrayLoc	Expr e1, Expr e2
Binop	
—Plus	
—Minus	
—Mult	
—Div	
—Mod	
—And	
—Or	
—Less	
—LessEq	
—Greater	
—GreaterEq	
—Equal	
—NotEqual	
Unop	
—Negative	
—Not	
Var	Type type, String id
AssignVar	String id, Option(Expr) e