

# Plan for Today

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**Finishing PA4**

**Type error examples**

**Lines and positions for AST nodes**

**Semantic Analysis**

**Types in programming languages**

**Representing Types**

**Type checking for PA4 ...**

- integer and boolean expressions
- while and if statements
- Meggy method calls

## Implementing type checking for PA4 (Slide 1)

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**Visitor over AST will check for type errors at each AST node**

*Syntax*

*AST node*

Meggy.setPixel(E1, E2, E3); [LINENUM,POSNUM] Invalid argument type for method MeggySetPixel	MeggySetPixel(E1,E2,E3)
--	-------------------------

Meggy.delay(E);	MeggyDelay(E)
Meggy.getPixel(E1, E2)	MeggyGetPixel(E1,E2)
Meggy.checkButton(E);	MeggyCheckButton(E1)

if (E) S1 else S2; [LINENUM,POSNUM] Invalid condition type for if statement	IfStatement(E, S1, S2)
--	------------------------

while (E) S [LINENUM,POSNUM] Invalid condition type for while statement	WhileStatement(E, S)
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## Implementing type checking for PA4 (Slide 2)

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*Syntax*

*AST node*

**! Exp**

**NotExp( Exp )**

[LINENUM,POSNUM] Invalid operand type for operator !

**(byte) Exp**

**ByteCast( Exp )**

[LINENUM,POSNUM] Can only cast a byte or int into a byte type, EXPTYPE

**Exp1 == Exp2**

**EqualExp(Exp1, Exp2)**

[LINENUM,POSNUM] Operands to == operator must be of same type

**Exp1 + Exp2**

**PlusExp(Exp1, Exp2)**

**Exp1 - Exp2**

**MinusExp(Exp1, Exp2)**

[LINENUM,POSNUM] Operands to + operator must be of same type

[LINENUM,POSNUM] Operands to - operator must be INT or BYTE

**Exp1 && Exp2**

**AndExp(Exp1, Exp2)**

[LINENUM,POSNUM] Invalid left operand type for operator &&

[LINENUM,POSNUM] Invalid right operand type for operator &&