

Types: Used to describe data & the operations applicable to that data
Type error

Programs with type errors: ill-typed

Program without any type errors: well-typed

- Var dec puts a variable in scope with a type
 $[\text{Var dec: int} \times \text{true}]$ - should be rejected
 - Need to remember the variable's type
 - Need to ensure the expression is of the type
 - num should be an int
 - true and false should be bools
- var is whatever the type of the variable is
- while's expression is boolean
 - assign:
 - var should be in scope
 - var's type should match expression's type
- $\text{exp1} \times \text{exp2} \Rightarrow \text{int}, \text{exp1: int}, \text{exp2: int}$
- $\text{exp1} - \text{exp2} \Rightarrow \text{int}, \text{exp1: int}, \text{exp2: int}$
- $\text{exp1} \ \&\& \ \text{exp2} \Rightarrow \text{bool}, \text{exp1: bool}, \text{exp2: bool}$
- $\text{exp1} \ || \ \text{exp2} \Rightarrow \text{bool}, \text{exp1: bool}, \text{exp2: bool}$
- $\text{exp1} \ \< \ \text{exp2} \Rightarrow \text{bool}, \text{exp1: int}, \text{exp2: int}$
- Program: all statements are well-typed

instance of

Not all the test will reach loops

not everything will be reachable