

# Lwnn Typing Rules

## 1. Rules

### 1.1 Subtyping

$$A <: A$$

$$\frac{C <: B \quad B <: A}{C <: A} \quad (\text{TRANSITIVITY})$$

$$\frac{\text{class } C \text{ extends } D \{ \dots \}}{C <: D \quad \Gamma[ \quad]} \quad (\text{INHERITANCE})$$

$$\Gamma \vdash x : \Gamma(x) \quad (\text{T-VAR})$$

$$(\text{T-ACCESS})$$

$$\frac{\Gamma \vdash e : C \quad \text{method}(m, C) = \vec{D}_i \rightarrow \tau_r \quad \Gamma \vdash \vec{e}_i : \vec{\tau}_i \quad \vec{\tau}_i <: \vec{D}_i}{\Gamma \vdash e.m(\vec{e}_i) : \tau_r} \quad (\text{T-METHOD-INVOCATION})$$

$$\Gamma \vdash i : \text{int}$$

$$\Gamma \vdash \text{str} : \text{string}$$

$$\Gamma \vdash \text{true} : \text{bool}$$

$$\Gamma \vdash \text{false} : \text{bool}$$

$$\Gamma \vdash \text{null} : \text{null}$$

$$\frac{\Gamma \vdash}{\Gamma \vdash \text{fields}_i : t_i}$$

$$\frac{\Gamma \vdash t_i : \text{class } T \text{ extends } S}{b}$$

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