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EL4 Formal Typing Rules

$$\frac{i \in \{0,1,2, \dots\}}{\vdash i: \text{int}T}$$

$$\frac{}{\vdash \text{true}: \text{bool}T}$$

$$\frac{}{\vdash \text{false}: \text{bool}T}$$

$$\frac{TE(x) = t}{TE \vdash x: t}$$

$$\frac{op \in \{+, -, *, /\} \quad TE \vdash e1: \text{int}T \quad TE \vdash e2: \text{int}T}{TE \vdash (op \ e1 \ e2): \text{int}T}$$

$$\frac{op \in \{\&\&, ||\} \quad TE \vdash e1: \text{bool}T \quad TE \vdash e2: \text{bool}T}{TE \vdash (op \ e1 \ e2): \text{bool}T}$$

$$\frac{TE \vdash e1: \text{int}T \quad TE \vdash e2: \text{int}T}{TE \vdash (<= \ e1 \ e2): \text{bool}T}$$

$$\frac{TE \vdash c: \text{bool}T \quad TE \vdash t: ty \quad TE \vdash f: ty}{TE \vdash (\text{if } c \ t \ f): ty}$$

$$\frac{TE \vdash e1 \quad TE \vdash e2: t2}{TE \vdash (\text{seq } e1 \ e2): t2}$$

$$\frac{TE + (x \rightarrow tx) \vdash e: ty}{TE \vdash (\text{fun } x \ tx \ e): (\text{fun}T \ tx \ ty)}$$

$$\frac{TE \vdash f: (\text{fun}T \ tx \ ty) \quad TE \vdash b: tx}{TE \vdash (@ \ f \ b): ty}$$

$$\frac{TE \vdash e1: tx \quad TE + (x \rightarrow tx) \vdash e2: t2}{TE \vdash (\text{let } x \ tx \ e1 \ e2): t2}$$

$$\frac{tx: \text{fun}T \quad TE + (x \rightarrow tx) \vdash e1: tx \quad TE + (x \rightarrow tx) \vdash e2: t2}{TE \vdash (\text{letRec } x \ tx \ e1 \ e2): t2}$$