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EMPTY(t) $\frac{t \in \text{TYPESET}}{\text{ENV} \models \text{EMPTY}(t) \Rightarrow \text{SET}(t, \{\})}$

SINGLETON(t, v) $\frac{t \in \text{TYPESET} \quad \text{ENV} \models v \Rightarrow v' \quad \text{TYPEOF}(v') = t}{\text{ENV} \models \text{SINGLETON}(t, v) \Rightarrow \text{SET}(t, \{v'\})}$

OF(t, ARGL) $\frac{\text{TYPEOF}(\text{ARGL}) = \text{ARGLS} \quad (\forall v_i \in \text{ARGLS}: (\text{ENV} \models v_i \Rightarrow v'_i) \wedge (\text{TYPEOF}(v'_i) = t) \wedge \text{ADDTOT}(v'_i, \mathcal{L}) \neq \emptyset)}{\text{ENV} \models \text{OF}(t, \text{ARGL}) \Rightarrow \text{SET}(t, \mathcal{L})}$

ISEMPTY(SET) $\frac{\text{ENV} \models \text{SET} \Rightarrow \text{SET}(t, \mathcal{L})}{\text{ENV} \models \text{ISEMPTY}(\text{SET}) \Rightarrow \text{BOOL}(\mathcal{L} = \emptyset)}$

EXISTSIN(V, SET) $\frac{\text{ENV} \models v \Rightarrow v' \quad \text{ENV} \models \text{SET} \Rightarrow \text{SET}(t, \mathcal{L}) \quad \text{TYPEOF}(v') = t}{\text{ENV} \models \text{EXISTSIN}(V, \text{SET}) \Rightarrow \text{BOOL}(v' \in \mathcal{L})}$

CONTAINS(SET, SET1) $\frac{\text{ENV} \models \text{SET} \Rightarrow \text{SET}(t, \mathcal{L}) \quad \text{ENV} \models \text{SET1} \Rightarrow \text{SET}(t_1, \mathcal{L}_1) \quad t = t_1}{\text{ENV} \models \text{CONTAINS}(\text{SET}, \text{SET1}) \Rightarrow \text{BOOL}(\mathcal{L}_1 \subseteq \mathcal{L})}$

ADD(V, SET) $\frac{\text{ENV} \models v \Rightarrow v' \quad \text{ENV} \models \text{SET} \Rightarrow \text{SET}(t, \mathcal{L}) \quad \text{TYPEOF}(v') = t}{\text{ENV} \models \text{ADD}(V, \text{SET}) \Rightarrow \text{SET}(t, \mathcal{L} \cup \{v'\})}$

REMOVE(V, SET) $\frac{\text{ENV} \models v \Rightarrow v' \quad \text{ENV} \models \text{SET} \Rightarrow \text{SET}(t, \mathcal{L}) \quad \text{TYPEOF}(v') = t}{\text{ENV} \models \text{REMOVE}(V, \text{SET}) \Rightarrow \text{SET}(t, \mathcal{L} \setminus \{v'\})}$

UNION(SET1, SET2) $\frac{\text{ENV} \models \text{SET1} \Rightarrow \text{SET}(t_1, \mathcal{L}_1) \quad \text{ENV} \models \text{SET2} \Rightarrow \text{SET}(t_2, \mathcal{L}_2) \quad t_1 = t_2}{\text{ENV} \models \text{UNION}(\text{SET1}, \text{SET2}) \Rightarrow \text{SET}(t, \mathcal{L}_1 \cup \mathcal{L}_2)}$

INTERSECTION(SET1, SET2) $\frac{\text{ENV} \models \text{SET1} \Rightarrow \text{SET}(t_1, \mathcal{L}_1) \quad \text{ENV} \models \text{SET2} \Rightarrow \text{SET}(t_2, \mathcal{L}_2) \quad t_1 = t_2}{\text{ENV} \models \text{INTERSECTION}(\text{SET1}, \text{SET2}) \Rightarrow \text{SET}(t, \mathcal{L}_1 \cap \mathcal{L}_2)}$

DIFFERENCE(SET1, SET2) $\frac{\text{ENV} \models \text{SET1} \Rightarrow \text{SET}(t_1, \mathcal{L}_1) \quad \text{ENV} \models \text{SET2} \Rightarrow \text{SET}(t_2, \mathcal{L}_2) \quad t_1 = t_2}{\text{ENV} \models \text{DIFFERENCE}(\text{SET1}, \text{SET2}) \Rightarrow \text{SET}(t, \mathcal{L}_1 \setminus \{\mathcal{L}_1 \cap \mathcal{L}_2\})}$

MAX(SET) $\frac{\text{ENV} \models \text{SET} \Rightarrow \text{SET}(t, \mathcal{L}) \quad t = \text{INT}(\exists v \in \mathcal{L}: (\forall v' \in \mathcal{L} \setminus \{v\}: v' \leq v))}{\text{ENV} \models \text{MAX}(\text{SET}) \Rightarrow \text{INT}(v)}$

MIN(SET) $\frac{\text{ENV} \models \text{SET} \Rightarrow \text{SET}(t, \mathcal{L}) \quad t = \text{INT}(\exists v \in \mathcal{L}: (\forall v' \in \mathcal{L} \setminus \{v\}: v' \geq v))}{\text{ENV} \models \text{MIN} \Rightarrow \text{INT}(v)}$

FOR_ALL (PRD, SET)

$$\begin{aligned} \text{ENV} \triangleright \text{SET} &\Rightarrow \text{SET}(t, \ell) & \text{ENV} \triangleright \text{PRD} &\Rightarrow \text{closure}(\text{ARG}, \text{FBody}, \text{FEnv}) \\ (\forall v \in \ell: \text{ENV} \triangleright \text{APPLY}(\text{PRD}, v) &\Rightarrow \text{Bool}(b) \wedge \text{ADDT0}(\text{Bool}(b), \ell')) & (\forall v' \in \ell': v' = \text{Bool}(\text{TRUE})) &\Rightarrow b' \\ \text{ENV} \triangleright \text{FOR_ALL}(\text{PRD}, \text{SET}) &\Rightarrow \text{Bool}(b) \end{aligned}$$

EXISTS (PRD, SET)

$$\begin{aligned} \text{ENV} \triangleright \text{SET} &\Rightarrow \text{SET}(t, \ell) & \text{ENV} \triangleright \text{PRD} &\Rightarrow \text{closure}(\text{ARG}, \text{FBody}, \text{FEnv}) \\ (\forall v \in \ell: \text{ENV} \triangleright \text{APPLY}(\text{PRD}, v) &\Rightarrow \text{Bool}(b) \wedge \text{ADDT0}(\text{Bool}(b), \ell')) & (\exists v' \in \ell': v' = \text{Bool}(\text{TRUE})) &\Rightarrow b' \\ \text{ENV} \triangleright \text{EXISTS}(\text{PRD}, \text{SET}) &\Rightarrow \text{Bool}(b') \end{aligned}$$

FILTER (PRD, SET)

$$\begin{aligned} \text{ENV} \triangleright \text{SET} &\Rightarrow \text{SET}(t, \ell) & \text{ENV} \triangleright \text{PRD} &\Rightarrow \text{closure}(\text{ARG}, \text{FBody}, \text{FEnv}) \\ (\forall v \in \ell: \text{ENV} \triangleright \text{APPLY}(\text{PRD}, v) &\Rightarrow \text{Bool}(b) \wedge \text{ADDT0}(v, \ell')) & & \\ \text{ENV} \triangleright \text{FILTER}(\text{PRD}, \text{SET}) &\Rightarrow \text{SET}(t, \ell') \end{aligned}$$

MAP (FUNC, SET)

$$\begin{aligned} \text{ENV} \triangleright \text{SET} &\Rightarrow \text{SET}(t, \ell) & \text{ENV} \triangleright \text{FUNC} &\Rightarrow \text{closure}(\text{ARG}, \text{FBody}, \text{FEnv}) \\ (\forall v \in \ell: \text{ENV} \triangleright \text{APPLY}(\text{FUNC}, v) &\Rightarrow v' \wedge \text{ADDT0}(v', \ell')) & & \\ \text{ENV} \triangleright \text{MAP}(\text{PRD}, \text{SET}) &\Rightarrow \text{SET}(t, \ell') \end{aligned}$$