KTH ROYAL INSTITUTE
OF TECHNOLOGY

Degree Project in Technology

First cycle, 15 credits

This is the title in the language of the thesis

A subtitle in the language of the thesis

FAKE A. STUDENT
FAKE B. STUDENT

Stockholm, Sweden, 2024

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A subtitle in the language of the thesis

FAKE A. STUDENT

FAKE B. STUDENT

Bachelor's Programme in Information and Communication Technology
Date: January 22, 2024

Supervisors: A. Busy Supervisor, Another Busy Supervisor, Third Busy Supervisor
Examiner: Gerald Q. Maguire Jr.
School of Electrical Engineering and Computer Science
Host company: Företaget AB
Swedish title: Detta är den svenska översättningen av titeln
Swedish subtitle: Detta är den svenska översättningen av undertiteln

0.1 Inference Rules

$$\text{T-TASK}\ \frac{\begin{array}{c} x : C; \mathit{ocap} \vdash t : \tau \\ \Gamma; a \vdash b : Q \rhd \mathit{Box}[C] \end{array}}{\Gamma; a \vdash \mathit{task}(b)\{x \Rightarrow t\} : Q \rhd \mathit{Task}[C]}$$

$$\text{T-ASYNC}\ \frac{\begin{array}{c} \mathit{Perm}[Q] \in \Gamma \\ \Gamma \setminus \mathit{Perm}[Q]; a \vdash s : \sigma \\ \Gamma; a \vdash t : Q \rhd \mathit{Task}[C] \end{array}}{\Gamma; a \vdash \mathit{async}(t)\{s\} : \bot}$$

$$\text{T-FINISH}\ \frac{\Gamma; a \vdash t : \tau}{\Gamma; a \vdash \mathit{finish}\{t\} : \mathit{null}}$$

$$\text{E-TASK}\ \frac{L(b') = b(o,p)}{\begin{array}{l} H, \langle L, \quad \mathit{let}\ x = \mathit{task}(b')\{x \Rightarrow t\} \mathit{in}\ s, P\rangle^l \\ \to H, \langle L[x \to \mathit{task}(b(o,p),t)], s, \quad P\rangle^l \end{array}}$$

$$\text{E-ASYNC}\ \frac{\begin{array}{c} \nexists \langle \mathit{FINISH}\_\rangle \in FS \\ L(y) = \mathit{task}(b(o,p),t) \\ T = (f', \langle [x \to o], t, \emptyset\rangle^\epsilon) \end{array}}{\begin{array}{l} H, \{(f, \langle L, \mathit{async}(y)\{s\}, p \uplus P\rangle^l \circ FS \circ \langle \mathit{FINISH}\, f'\rangle \circ FS')\} \uplus TS \\ \twoheadrightarrow H, \{(f, \langle L, s, \quad P \quad \rangle^l \circ \quad \langle \mathit{FINISH}\, f'\rangle \circ FS')\} \uplus \{T\} \uplus TS \end{array}}$$

$$\text{E-FINISH1}\ \frac{\begin{array}{c} F_1 = \langle L, t, P\rangle^\epsilon \\ F_2 = \langle \mathit{FINISH}\, f'\rangle \\ F_3 = \langle L, \mathit{null}, P\rangle^l \\ f' \mathit{fresh} \end{array}}{\begin{array}{l} H, \{(f, \langle L, \mathit{finish}\{\ t\ \}, P\rangle^l \circ FS)\} \uplus TS \\ \twoheadrightarrow H, \{(f, F_1 \circ F_2 \circ F_3 \circ FS)\} \quad \uplus TS \end{array}}$$

$$\text{E-FINISH2}\ \frac{\nexists (f', FS) \in TS}{\begin{array}{l} H, \{(f, \langle \mathit{FINISH}\, f'\rangle \circ FS)\} \uplus TS \\ \twoheadrightarrow H, \{(f, FS)\} \quad \uplus TS \end{array}}$$