COMP 302 A5

Leila Erbay ID: 260672158
Partner: Richard Guo ID: 260729805

Q.1.1

$FV(e_1, e_2) = FV(e_1) \cup FV(e_2)$ (pair)

$FV(\text{let } (x,y) = e_1 \text{ in } e_2 \text{ end}) = FV(e_1) \cup (FV(e_2) / \{x, y\})$ (match)

Q1.3

$[e'/x](e_1, e_2) = ([e'/x]e_1, [e'/x]e_2)$ (pair)

$[e'/x](\text{let } (z,y) = e_1 \text{ in } e_2 \text{ end}) =$ (match)

$\text{let } (z,y) = [e'/x]e_1 \text{ in } [e'/x]e_2 \text{ end}$

provided that $x \neq z$, $x \neq y$, $z \& y \notin FV(e')$

$z \notin FV(e')$, $y \notin FV(e')$

Q1.5

$$\frac{\Gamma \vdash e_1 : T_1 \quad \Gamma \vdash e_2 : T_2}{\Gamma \vdash (e_1, e_2) : T_1 \times T_2}$$ (pair)

$$\frac{\Gamma \vdash e_1 : T_1 \times T_2 \quad \Gamma, x:T_1, y:T_2 \vdash e_2 : T}{\Gamma \vdash \text{let } (x,y) = e_1 \text{ in } e_2 \text{ end} : T}$$ (match)