

1 Practice

Provide the full lambda computation of the following sentences.

Solution to step-by-step computation

1. $\llbracket \text{Every judge criticized Melrose} \rrbracket$

(a) $\llbracket \text{criticized Melrose} \rrbracket$

$$\begin{aligned} &= \llbracket \text{criticize Melrose} \rrbracket \\ &= \llbracket \text{criticize} \rrbracket (\llbracket \text{Melrose} \rrbracket) \\ &= \llbracket \text{criticize} \rrbracket (m) \\ &= \lambda x [\lambda y [\text{CRITICIZE}(y, x)]](m) \\ &= \lambda y [\text{CRITICIZE}(y, m)] \end{aligned}$$

(b) $\llbracket \text{Every judge} \rrbracket$

$$\begin{aligned} &= \llbracket \text{every} \rrbracket (\llbracket \text{judge} \rrbracket) \\ &= \lambda f_{\langle e, t \rangle} [\lambda g_{\langle e, t \rangle} [\forall x [f(x) \rightarrow g(x)]]] (\llbracket \text{judge} \rrbracket) \\ &= \lambda g_{\langle e, t \rangle} [\forall x [\llbracket \text{judge} \rrbracket (x) \rightarrow g(x)]] \\ &= \lambda g_{\langle e, t \rangle} [\forall x [\lambda y [\text{JUDGE}(y)](x) \rightarrow g(x)]] \\ &= \lambda g_{\langle e, t \rangle} [\forall x [\text{JUDGE}(x) \rightarrow g(x)]] \end{aligned}$$

(c) $\llbracket \text{Every judge criticized Melrose} \rrbracket$

$$\begin{aligned} &= \llbracket \text{every judge criticize Melrose} \rrbracket \\ &= \llbracket \text{every judge} \rrbracket (\llbracket \text{criticize Melrose} \rrbracket) \\ &= \lambda g_{\langle e, t \rangle} [\forall x [\text{JUDGE}(x) \rightarrow g(x)]] (\llbracket \text{criticize Melrose} \rrbracket) \\ &= \forall x [\text{JUDGE}(x) \rightarrow \llbracket \text{criticize Melrose} \rrbracket (x)] \\ &= \forall x [\text{JUDGE}(x) \rightarrow \lambda y [\text{CRITICIZE}(y, m)](x)] \\ &= \text{T iff } \forall x [\text{JUDGE}(x) \rightarrow \text{CRITICIZE}(x, m)] \end{aligned}$$

2. Some girl stole the granola-bar

- (a) $\llbracket \text{the granola-bar} \rrbracket$
- $$\begin{aligned}
&= \llbracket \text{the} \rrbracket (\llbracket \text{granola-bar} \rrbracket) \\
&= \lambda f_{\langle e, t \rangle} [\iota y [f(y)]] (\llbracket \text{granola-bar} \rrbracket) \\
&= \iota y [\llbracket \text{granola-bar} \rrbracket (y)] \\
&= \iota y [\lambda x [\text{GRANOLABAR}(x)](y)] \\
&= \iota y [\text{GRANOLABAR}(y)] \\
&= g
\end{aligned}$$
- (b) $\llbracket \text{stole the granola-bar} \rrbracket$
- $$\begin{aligned}
&= \llbracket \text{steal the granola-bar} \rrbracket \\
&= \llbracket \text{steal} \rrbracket (\llbracket \text{the granola-bar} \rrbracket) \\
&= \llbracket \text{steal} \rrbracket (g) \\
&= \lambda x [\lambda y [\text{STEAL}(y, x)]](g) \\
&= \lambda y [\text{STEAL}(y, g)]
\end{aligned}$$
- (c) $\llbracket \text{Some girl} \rrbracket$
- $$\begin{aligned}
&= \llbracket \text{some} \rrbracket (\llbracket \text{girl} \rrbracket) \\
&= \lambda f_{\langle e, t \rangle} [\lambda g_{\langle e, t \rangle} [\exists x [f(x) \ \& \ g(x)]]] (\llbracket \text{girl} \rrbracket) \\
&= \lambda g_{\langle e, t \rangle} [\exists x [\llbracket \text{girl} \rrbracket (x) \ \& \ g(x)]] \\
&= \lambda g_{\langle e, t \rangle} [\exists x [\lambda y [\text{GIRL}(y)](x) \ \& \ g(x)]] \\
&= \lambda g_{\langle e, t \rangle} [\exists x [\text{GIRL}(x) \ \& \ g(x)]]
\end{aligned}$$
- (d) $\llbracket \text{Some girl stole the granola-bar} \rrbracket$
- $$\begin{aligned}
&= \llbracket \text{some girl steal the granola-bar} \rrbracket \\
&= \llbracket \text{some girl} \rrbracket (\llbracket \text{steal the granola-bar} \rrbracket) \\
&= \lambda g_{\langle e, t \rangle} [\exists x [\text{GIRL}(x) \ \& \ g(x)]] (\llbracket \text{steal the granola-bar} \rrbracket) \\
&= \exists x [\text{GIRL}(x) \ \& \ \llbracket \text{steal the granola-bar} \rrbracket (x)] \\
&= \exists x [\text{GIRL}(x) \ \& \ \lambda y [\text{STEAL}(y, g)](x)] \\
&= \text{T iff } \exists x [\text{GIRL}(x) \ \& \ \text{STEAL}(x, g)]
\end{aligned}$$