CMSC 330, Fall 2017 Quiz 4

Instructions

- Do not start this quiz until you are told to do so.
- You have 15 minutes for this quiz.
- This is a closed book quiz. No notes or other aids are allowed.
- For partial credit, show all your work and clearly indicate your answers.

1. (4 points) Using the rules given below, show: \((1 + 2) + 3 \Rightarrow 6\)

\[
\begin{align*}
& n \Rightarrow n \\
& e_1 \Rightarrow n_1 \\
& e_2 \Rightarrow n_2 \\
& n_3 \text{ is } n_1 + n_2 \\
& e_1 + e_2 \Rightarrow n_3
\end{align*}
\]

2. (8 points) Using the rules given below, show: \(\text{let } x = 1 \text{ in let } x = 2 \text{ in } x + x \Rightarrow 4\)

\[
\begin{align*}
& A; n \Rightarrow n \\
& A; e_1 \Rightarrow v_1 \\
& A; x : v_1; e_2 \Rightarrow v_2 \\
& A; \text{let } x = e_1 \text{ in } e_2 \Rightarrow v_2 \\
\end{align*}
\]
3. *(8 points)* Translate the following rules into English and describe the operation *myst* represents.

Mystery(1): \[ A; e_1 \Rightarrow v_1 \quad A; e_2 \Rightarrow v_2 \quad v_1 = v_2 \quad \implies A; \text{myst } e_1 \text{ } e_2 \Rightarrow \text{true} \]

Mystery(2): \[ A; e_1 \Rightarrow v_1 \quad A; e_2 \Rightarrow v_2 \quad v_1 \neq v_2 \quad \implies A; \text{myst } e_1 \text{ } e_2 \Rightarrow \text{false} \]