Programming paradigms 1

Evaluation: define

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Outline

define

$\text{Eval}[\texttt{define}, \mathcal{P}_{\mathrm{G}}] =$ 'special form define'

Outline

(define x 0)

$\mathsf{Eval}[(\texttt{define x 0}), \mathcal{P}_{\mathrm{G}}] = \ldots$

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$$\text{Eval}[(\texttt{define x 0}), \mathcal{P}_{\mathrm{G}}] = \ldots$$

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$\quad \checkmark\, \texttt{x}$ is a symbol.

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Outline

(define x (+ 1 1))

$\mathsf{Eval}[(\texttt{define x (+ 1 1)}), \mathcal{P}_{\mathrm{G}}] = \ldots$

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$\quad \text{Apply}[\text{'pr. proc. of sum.'}, \texttt{1}, \texttt{1}] = \texttt{2}$

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Outline

(define 0 x)

$\mathsf{Eval}[(\texttt{define}\ \texttt{0}\ \texttt{x}), \mathcal{P}_{\mathrm{G}}] = \ldots$

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$\text{Apply}_{\mathcal{P}_{\mathrm{G}}}[\text{'special form define'}, 0, \texttt{x}] = \ldots$

$\quad$ **Error:** define: '0' is not a symbol.

Outline

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✓ $\texttt{x}$ is a symbol.

$\text{Eval}[\texttt{x}, \mathcal{P}_{\mathrm{G}}] = \ldots$

Error: Symbol '$\texttt{x}$' does not have binding.

Outline

(define y x)

$\mathsf{Eval}[(\texttt{define y x}), \mathcal{P}_{\mathrm{G}}] = \ldots$

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$\quad$ **Error:** define: Incorrect number of arguments

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(define x 0 z)

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✓ `x` is a symbol.

$\text{Eval}[(\texttt{define y 0}), \mathcal{P}_{\mathrm{G}}] = \ldots$

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$\qquad \text{Eval}[\texttt{define}, \mathcal{P}_{\mathrm{G}}] = \text{'special form define'}$

$\quad \text{Apply}_{\mathcal{P}_{\mathrm{G}}}[\text{'special form define'}, \texttt{y}, 0] = \ldots$

$\qquad \checkmark\, \texttt{y}$ is a symbol.

(define x (define y 0))

$\text{Eval}[(\texttt{define x (define y 0)}), \mathcal{P}_{\mathrm{G}}] = \ldots$

$\quad \text{Eval}[\texttt{define}, \mathcal{P}_{\mathrm{G}}] = \text{'special form define'}$

$\text{Apply}_{\mathcal{P}_{\mathrm{G}}}[\text{'special form define'}, \texttt{x}, (\texttt{define y 0})] = \ldots$

$\quad \checkmark\, \texttt{x}$ is a symbol.

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$\qquad \checkmark\, \texttt{y}$ is a symbol.

$\qquad \text{Eval}[0, \mathcal{P}_{\mathrm{G}}] = 0$

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