Syntax (AF)

$$
\begin{array}{rr}
e = x \mid \lambda x.e \mid e\,e & \text{(Expressions)} \\
v = \lambda x.e & \text{(Values)} \\
a = A[v] & \text{(Answers)} \\
A = [\,] \mid (\lambda x.A)\,e & \text{(Answer Contexts)} \\
E = [\,] \mid E\,e \mid (\lambda x.E)\,e \mid (\lambda x.E[x])\,E & \text{(Evaluation Contexts)}
\end{array}
$$

Notions of Reduction (AF)

$$
\begin{array}{rcl}
(\lambda x.E[x])\,v & \boldsymbol{\beta}_{\mathbf{need}} & E[x]\{x := v\} \\
(\lambda x.A[v])\,e\,e' & \textbf{assoc-L} & (\lambda x.A[v\,e'])\,e \\
(\lambda x.E[x])\,((\lambda y.A[v])\,e) & \textbf{assoc-R} & (\lambda y.A[(\lambda x.E[x])\,v])\,e
\end{array}
$$

Syntax (new1)

$$
E = [\,] \mid E\,e \mid A[\lambda x.E]\,e \mid A[\lambda x.E[x]]\,E \qquad \text{(Evaluation Contexts)}
$$

Notions of Reduction (new1)

$$
\begin{array}{rcl}
A_1[\lambda x.E[x]]\,A_2[v] & \boldsymbol{\beta}_{\mathbf{need}} & A_1[A_2[E[x]\{x := v\}]] \\
(\lambda x.A[v])\,e\,e' & \textbf{assoc-L} & (\lambda x.A[v\,e'])\,e \\
v \neq \lambda y.E[y] & &
\end{array}
$$

Syntax (new2)

$$
\begin{array}{rr}
e = x \mid \lambda x.e \mid e\,e & \text{(Expressions)} \\
v = \lambda x.e & \text{(Values)} \\
a = A[v] & \text{(Answers)} \\
A = [\,] \mid A[\lambda x.A]\,e & \text{(Answer Contexts)} \\
\hat{A} = [\,] \mid A[\hat{A}]\,e & \text{(Partial Answer Contexts – outer)} \\
\check{A} = [\,] \mid A[\lambda x.\check{A}] & \text{(Partial Answer Contexts – inner)} \\
E = [\,] \mid E\,e \mid A[E] \mid \hat{A}[A[\lambda x.\check{A}[E[x]]]\,E] & \text{(Evaluation Contexts)} \\
\hat{A}[\check{A}] \in A &
\end{array}
$$

Notions of Reduction (new2)

$$
\begin{array}{rcl}
\hat{A}[A_1[\lambda x.\check{A}[E[x]]]\,A_2[v]] & \boldsymbol{\beta}_{\mathbf{need}} & \hat{A}[A_1[A_2[\check{A}[E[x]]\{x := v\}]]] \\
\hat{A}[\check{A}] \in A & &
\end{array}
$$