

# Evaluation strategies

consider the following term:  $(\lambda x.x)((\lambda x.x)(\lambda z.(\lambda x.x)z))$

more readably:  $id (id (\lambda z.id z))$

# Evaluation strategies

consider the following term:  $(\lambda x.x)((\lambda x.x)(\lambda z.(\lambda x.x)z))$

more readably:  $id (id (\lambda z.id z))$

three redexes:

$id (id (\lambda z.id z))$

$id$  $(id (\lambda z.id z))$

$id (id (\lambda z.\underline{ $id z$ }))$



full beta-reduction (one possibility):

$$\begin{aligned} & id (id (\lambda z. \underline{id\ z})) \\ \rightarrow & id (id (\lambda z. z)) \\ \rightarrow & \underline{id (\lambda z. z)} \\ \rightarrow & \lambda z. z \end{aligned}$$

full beta-reduction (one possibility):

$$\begin{aligned} & id (id (\lambda z.\underline{id z})) \\ \rightarrow & id (id (\lambda z.z)) \\ \rightarrow & \underline{id (\lambda z.z)} \\ \rightarrow & \lambda z.z \end{aligned}$$

normal order:

$$\begin{aligned} & \underline{id (id (\lambda z.id z))} \\ \rightarrow & \underline{id (\lambda z.id z)} \\ \rightarrow & \lambda z.\underline{id z} \\ \rightarrow & \lambda z.z \end{aligned}$$

full beta-reduction (one possibility):

$$\begin{aligned} & id (id (\lambda z. \underline{id z})) \\ \rightarrow & id (id (\lambda z. z)) \\ \rightarrow & \underline{id (\lambda z. z)} \\ \rightarrow & \lambda z. z \end{aligned}$$

normal order:

$$\begin{aligned} & \underline{id (id (\lambda z. id z))} \\ \rightarrow & \underline{id (\lambda z. id z)} \\ \rightarrow & \lambda z. \underline{id z} \\ \rightarrow & \lambda z. z \end{aligned}$$

call by name:

$$\begin{aligned} & \underline{id (id (\lambda z. id z))} \\ \rightarrow & \underline{id (\lambda z. id z)} \\ \rightarrow & \lambda z. id z \end{aligned}$$

full beta-reduction (one possibility):

$$\begin{aligned} & id (id (\lambda z. \underline{id z})) \\ \rightarrow & id (id (\lambda z. z)) \\ \rightarrow & \underline{id (\lambda z. z)} \\ \rightarrow & \lambda z. z \end{aligned}$$

normal order:

$$\begin{aligned} & \underline{id (id (\lambda z. id z))} \\ \rightarrow & \underline{id (\lambda z. id z)} \\ \rightarrow & \lambda z. \underline{id z} \\ \rightarrow & \lambda z. z \end{aligned}$$

call by name:

$$\begin{aligned} & \underline{id (id (\lambda z. id z))} \\ \rightarrow & \underline{id (\lambda z. id z)} \\ \rightarrow & \lambda z. id z \end{aligned}$$

call by value:

$$\begin{aligned} & \underline{id (id (\lambda z. id z))} \\ \rightarrow & \underline{id (\lambda z. id z)} \\ \rightarrow & \lambda z. id z \end{aligned}$$