

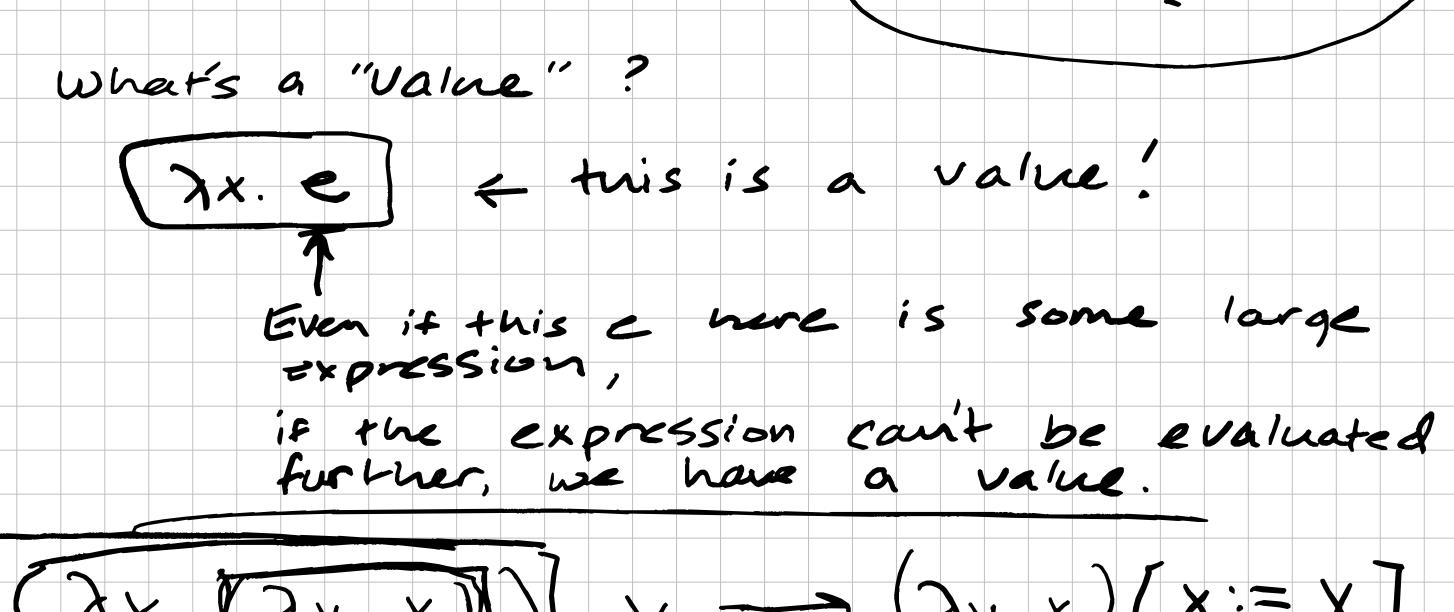
CSE 114A Lecture 3

- Anno
 - Puccia

- ✓ - Recap last time
lambda calc Syntax & substitution rule

 - scope of variables; free & bound variables
 - capture-avoiding substitution
 - renaming
 - Live coding in Elsa!
 - back to booleans / conditionals
 - numbers
 - pairs
 - recursion

The diagram illustrates the process of B-substitution in semantics. It shows a transformation from an expression $\underline{\Sigma} \cdot e_1$ to e_2 to a new expression $e_1[x := e_2]$. The transformation is labeled "steps to" and "B-substitution". A callout box "body" points to the part $\underline{\Sigma} \cdot e_1$. Another callout box explains the result as "replace all occurrences of x in e_1 with e_2 ".



A simple line drawing of a face on grid paper. The face has a large, irregular oval shape. It features two small, dark, teardrop-like marks near the top center, possibly representing eyes. A thick, horizontal line extends across the middle of the face, suggesting a wide, open mouth or a long nose.

What want
got car

underneath λx

$\lambda x. x$)) x
 \bar{x} we should replace x to

Name _____
that won't accidentally

Variable.

$$(\lambda x. e_1) e_2 \rightarrow e_1[x := e_2]$$

↑

" e_1 , but with all free occurrences of x replaced with e_2 ,

except when doing so would capture variables in e_2 ."

Fix and bound variables

$\lambda x. x$ x is bo

$\lambda x.$

No free variables.

No free variables.

y is bounded

is free.