

# Records

{ x = 4; y = 5 }

let x = { name = "Zach"; height = 74 } in x.name

x.address

FBR

$$e ::= \dots \mid \overbrace{\{ l = e; \dots; l = e \}}^{0 \text{ or more}} \mid e.l$$

Let x = {} In ...

$l ::= x$

{ x = 4 }

$e \Rightarrow v$   
 $\{x=4\} \Rightarrow \{x=4\}$

$v ::= \dots \mid \{ l = v; \dots; l = v \}$

{ x = 4; y = True And False; z = 4 + 2; ... }

Record Rule

$\{x=4; y=4\}.x \neq \}$

$$\frac{e_1 \Rightarrow v_1 \quad \dots \quad e_n \Rightarrow v_n}{\{ l_1 = e_1; \dots; l_n = e_n \} \Rightarrow \{ l_1 = v_1; \dots; l_n = v_n \}}$$

Projection Rule

$\{\} \Rightarrow \{\}$

$$\frac{e \Rightarrow \{ l_1 = v_1; \dots; l_n = v_n \} \quad 1 \leq i \leq n}{e.l_i \Rightarrow v_i}$$

$\{x=4\}.y \neq \}$

# Variants

FbV

constructor  
 ↓  
 • Foo(5).

Match x With  
 | Foo(y) → y

$e ::= \dots | \overbrace{C} e | \text{Match } e \text{ With } | p_1 \rightarrow e_1 | \dots | p_n \rightarrow e_n$

$C ::= [A-Z][A-Za-z0-9_']*$

$p ::= \overbrace{C} x$

$v ::= \dots | \overbrace{C} v$

Match 'Foo 4 With  
 | 'Bar (x) → x  
 | 'Foo (y) → y

$e \Rightarrow \overbrace{C}_i v$

Variant  $\frac{e \Rightarrow v}{\overbrace{C} e \Rightarrow \overbrace{C} v}$

Match  $\frac{e \Rightarrow \overbrace{C} v \quad C = C_i \quad e_i[v/x_i] \Rightarrow v_i}{\left( \begin{array}{l} \text{Match } e \text{ With} \\ | \overbrace{C}_1 x_1 \rightarrow e_1 \\ | \dots \\ | \overbrace{C}_n x_n \rightarrow e_n \end{array} \right) \Rightarrow v_i}$

# Records & Variants

$\{x=4; y=5\}$  ← two ints!

$$\mathbb{Z} \times \mathbb{Z}$$

Records: value AND value AND value ...

`Foo 5    `Bar 5

$$\mathbb{Z} + \mathbb{Z}$$

Variants: value OR value OR value ...

FbV: encode records!

$\{x=4; y=5\}$     c.l

(Function |b| →

  Match |b| With

| `X \_ → 4

| `Y \_ → 5

)

r(-l 0)

FbR: encode variants

$\{constr = \dots; value = \dots\}$ .