

$$(\text{fun } x \rightarrow \underline{(\text{fun } y \rightarrow (x, y, y))}) : \alpha \rightarrow \beta$$

$$\Rightarrow x : \alpha$$

$$(\text{fun } y \rightarrow \underline{(x, y, y)}) : \gamma \rightarrow \delta = \beta$$

$$\Rightarrow y : \gamma$$

$$(x, y, y) : \alpha * \gamma * \gamma = \delta$$

$$\Rightarrow (\text{fun } x \rightarrow (\text{fun } y \rightarrow (x, y, y))) : \alpha \rightarrow \gamma \rightarrow \alpha * \gamma * \gamma$$

$$\text{fun } f \rightarrow \underline{\text{fun } g \rightarrow f(g\ 42)} : \alpha \rightarrow \beta$$

$$\Rightarrow f : \beta$$

$$\text{fun } g \rightarrow \underline{f(g\ 42)} : \gamma \rightarrow \delta = \beta$$

$$\Rightarrow \underline{g : \gamma}$$

$$: \delta$$

$$g(42) : \varepsilon$$

$$f : (\varepsilon \rightarrow \delta) = \alpha$$

$$\Rightarrow \alpha \rightarrow \beta = \alpha \rightarrow (\gamma \rightarrow \delta) =$$

$$g : (\text{int} \rightarrow \varepsilon) = \gamma$$

$$= (\varepsilon \rightarrow \delta) \rightarrow (\text{int} \rightarrow \varepsilon) \rightarrow \delta$$

if $3 < 5$ then $\text{fun } x \rightarrow x$ else $\text{fun } y \rightarrow y, y$
 bool : $\alpha = \beta \rightarrow \beta$: $\alpha = \varepsilon \rightarrow \varepsilon \times \varepsilon$

$$\Rightarrow \beta = \varepsilon \Rightarrow \varepsilon = \varepsilon \times \varepsilon$$

~~X~~

let rec f x = if $x = 0$ then 1 else $x * f(x-1)$
 bool : α : α
 $x: \text{int}$: int : int

$f: \text{int} \rightarrow \text{int}$

x * $f(x-1)$: int
 int : int

let rec map f l =
 match l with
 | $[]$ → $[]$
 | $x :: xs$ → $f\ x :: \text{map } f\ xs$
 α : β

$\text{map}: \alpha \rightarrow \beta \rightarrow \gamma$

usi vzorci so β , $\text{lec } f: \beta \rightarrow \gamma$.

$f: \alpha$

$l: \beta$

$[]$: $\beta = \varnothing \text{ list}$

$[]$: $\gamma \text{ list}$

$x :: xs : \beta = \varnothing \text{ list}$

$\Rightarrow \gamma = \varnothing$

$(::): \varnothing * \varnothing \text{ list} \rightarrow \varnothing \text{ list}$

$x: \varnothing$

$xs: \varnothing \text{ list}$

$$\underline{[]} = \gamma = \psi$$

$$\underline{[]} = \psi \text{ list}$$

$$(f x) :: (\text{map } f \text{ } xs) : \gamma = \varepsilon \text{ list}$$

$$(::) : \varepsilon * \varepsilon \text{ list} \rightarrow \varepsilon \text{ list}$$

$$(f x) : \varepsilon, (\text{map } f \text{ } xs) : \varepsilon \text{ list}$$

$\Downarrow$

$$f : \psi \rightarrow \varepsilon$$

$$f : \alpha$$

$$xs : \beta = \psi \text{ list}$$

$$\gamma = \varepsilon \text{ list}$$

$$\text{map } \alpha \rightarrow \beta \rightarrow \gamma = (\psi \rightarrow \varepsilon) = \psi \text{ list} = \varepsilon \text{ list}$$

