# Semantics of Functions - Execution of Statements

- $\Sigma(\{Tx = t; s\}, e, m, G)) =$
  $\quad$ Let $(v, m') = \Theta(t, e, m, G)$ in
  $\Sigma(s, e \oplus (x = r), m' \oplus (r = v), G)$ where $r$ fresh $e, m$
- $\Sigma(\{\text{final}\, Tx = t; s\}, e, m, G)) =$
  $\quad$ Let $(v, m') = \Theta(t, e, m, G)$ in
  $\Sigma(s, e \oplus (x = v), m', G)$
- $\Sigma(x = t; , e, m, G) =$
  $\quad$ Let $(v, m') = \Theta(t, e, m, G)$ in
  $(\text{normal}, m' \oplus (e(x) = v))$
- $\Sigma(\{s_1\ s_2\}, e, m, G) =$
  $\quad$ case $\Sigma(s_1, e, m, G) =$ of
  $(\text{normal}, m') \longrightarrow \Sigma(s_2, e, m', G)$
  $(\text{return}, v, m') \longrightarrow (\text{return}, v, m')$

# $\cdots$ - Execution of Statements - Cont.

- $\Sigma(\text{if } (b)\ s_1 \text{ else } s_2, e, m, G) =$
  $\quad$ case $\Theta(b, e, m, G)$ of
  $(\text{true}, m') \longrightarrow \Sigma(s_1, e, m', G)$
  $(\text{false}, m') \longrightarrow \Sigma(s_2, e, m', G)$
- (The definition of loop is unchanged)
  $\Sigma(\text{while } (b)\ s, e, m, G) = \lim_{\text{n}} \Sigma(p_n, e, m, G)$ where $\cdots$
- $\Sigma(\text{return } t;, e, m, G) =$
  $\quad$ Let $(v, m') = \Theta(t, e, m, G)$ in
  $(\text{return}, v, m')$
- $\Sigma(f(t_1, \cdots, t_n);, e, m, G) =$
  $\quad$ case $\Sigma(p, e'', m'', G)$ of
  $(\text{normal}, m''') \longrightarrow (\text{normal}, m'''))$
  $(\text{return}, m''') \longrightarrow (\text{normal}, m''')$