3.1, 3.2, 3.3

```
% 1)
local B in
   if B then
      skip S2
   else
      skip S3
   end
end
```

S_0, S_1

$\langle S_0, \sigma \rangle \rightarrow \langle S_1, E \rangle$ $E = \{B \rightarrow b_1\}$

Suspende por b in bound

σ b_1

```
%2)
local B in
   B = false
   if B then
      skip S3
   else
      skip S4
   end
end
```

S_0, S_1, S_2

$\langle S_0, \sigma \rangle \rightarrow \langle S_1, E \rangle$ / $\langle S_2, E \rangle$ $E = \{B \rightarrow b_1\}$

$\rightarrow \langle S_2, E \rangle$ $E = \{B \rightarrow b_1\}$ σ $b_1 = 4$

$\rightarrow \langle S_4, E \rangle \rightarrow \emptyset$

```
% 3)
local X Z A B P in
   proc {P X Y}
      Y = X+Z S11
   end
   Z=7
   X=4
   {P X A}
   {P A B}
end
```

S_0, S_1, S_{11}

$\langle S_0, \sigma \rangle \rightarrow \langle S_1, E \rangle$ / $\langle S_2, E \rangle$ / $\langle S_3, E \rangle$ / $\langle S_4, E \rangle$ / $\langle S_5, E \rangle$

$E = \{X \rightarrow x_1, Z \rightarrow z_1, A \rightarrow e_1, B \rightarrow b_2, P \rightarrow p_1\}$

σ

$p_1 = proc\{\$ \; x \; y\} \langle S_{11} \rangle end$, $\{z \rightarrow z_1\}$

CE

$\rightarrow \langle S_{11}, E_{P_1} \rangle$ / $\langle S_5, E \rangle$ $E_{P_1} = \{X \rightarrow x_1, Z \rightarrow z_1, Y \rightarrow b_1\}$

$z_1 = 7$

$x_1 = 4$

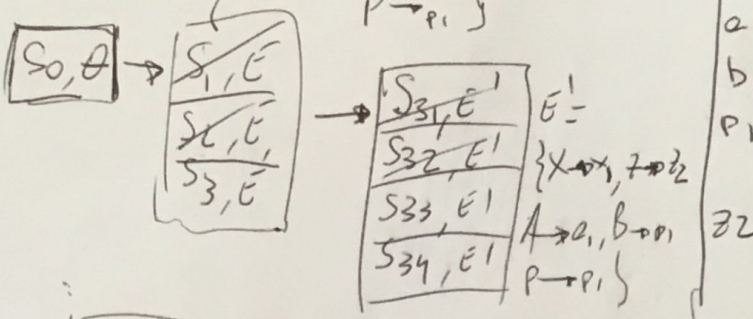
$e_1 = 11$

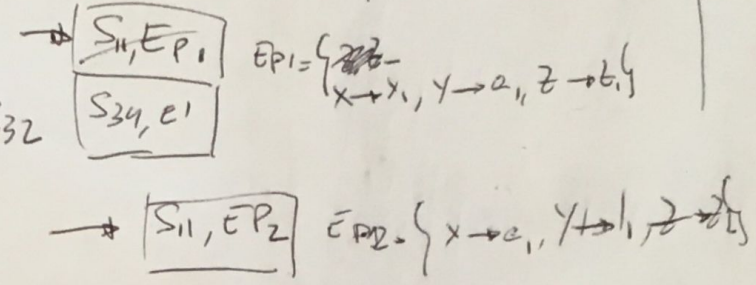
$\rightarrow \langle S_{11}, E_{P_2} \rangle$ $E_{P_2} = \{X \rightarrow e_1, Z \rightarrow z_1, Y \rightarrow b_1\}$

$b_1 = 18$

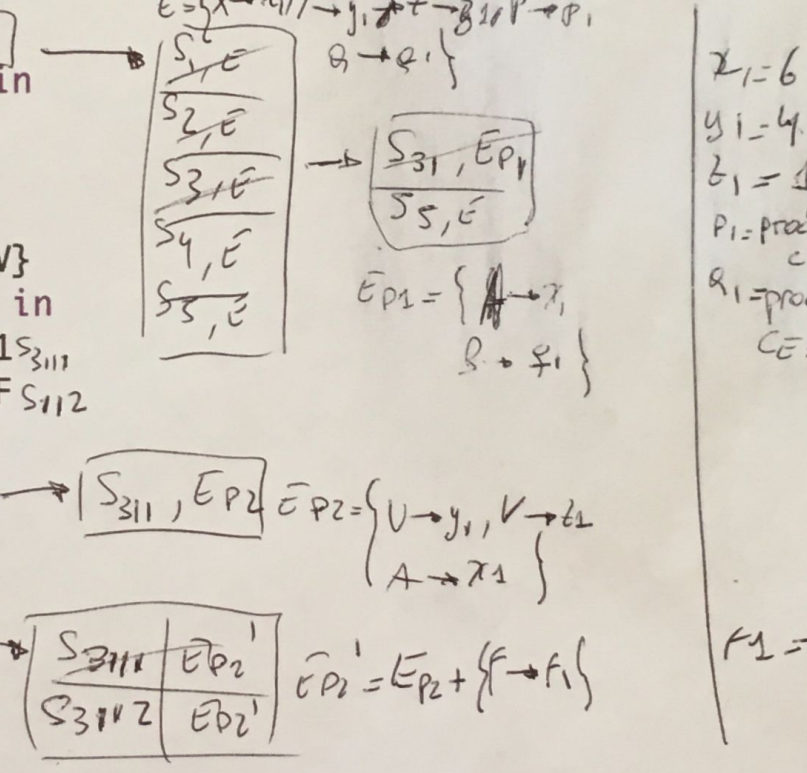
3.4, 3.5

```
% 4)
local X Z A B P in
   proc {P X Y}
      Y = X+Z
   end
   Z=10
   local Z in
      Z=2 X=4
      {P X A}
      {P A B}
   end
end
```



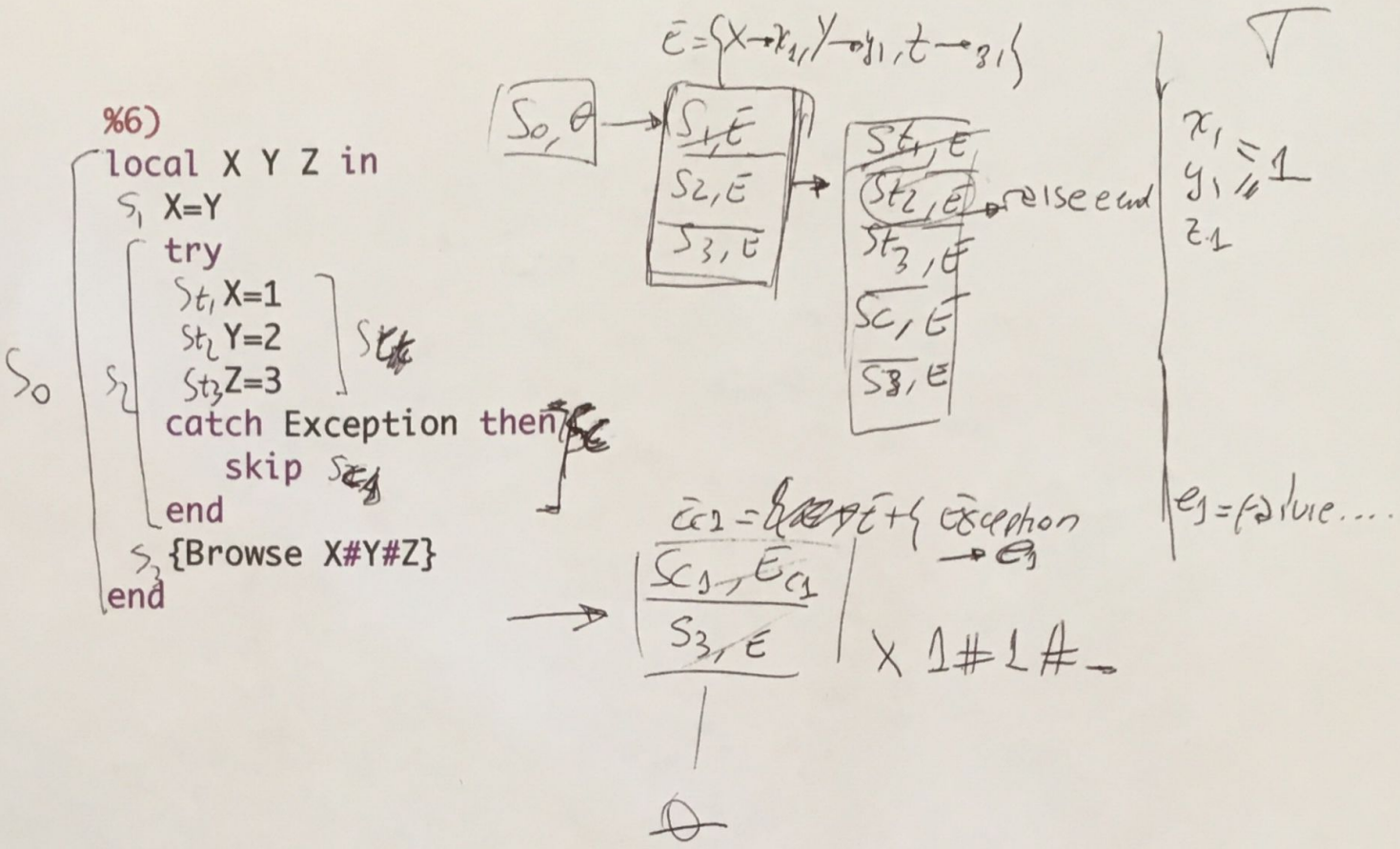



```
% 5)
local X Y Z P Q in
   S1 X=6
   S2 Y=4
   proc {P A B}
      proc {B U V}
         local F in
            F=A+1 S311
            V=U+F S312
         end
      end
   end
   S4 {P X Q}
   S5 {Q Y Z}
end
```



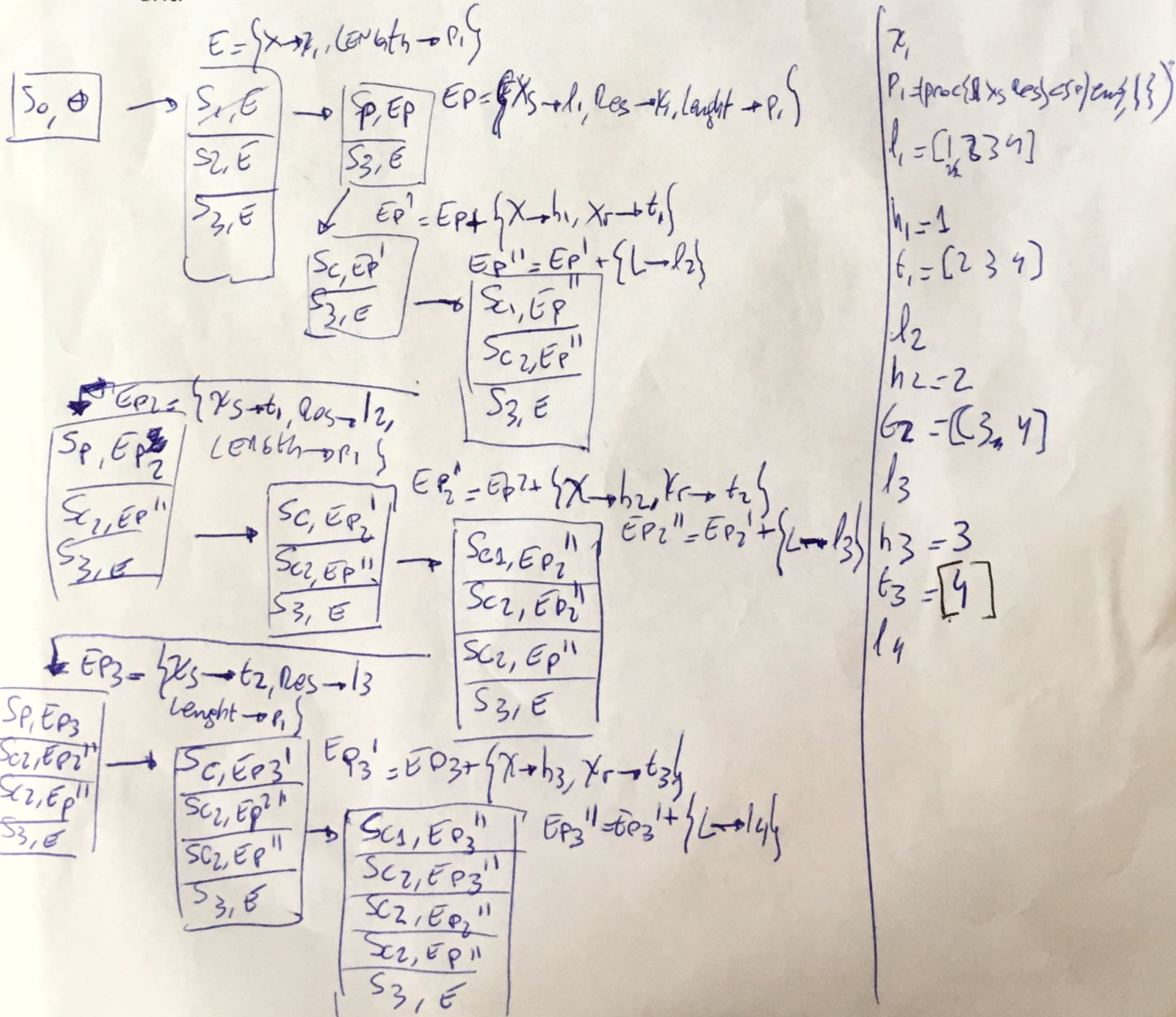
3.6

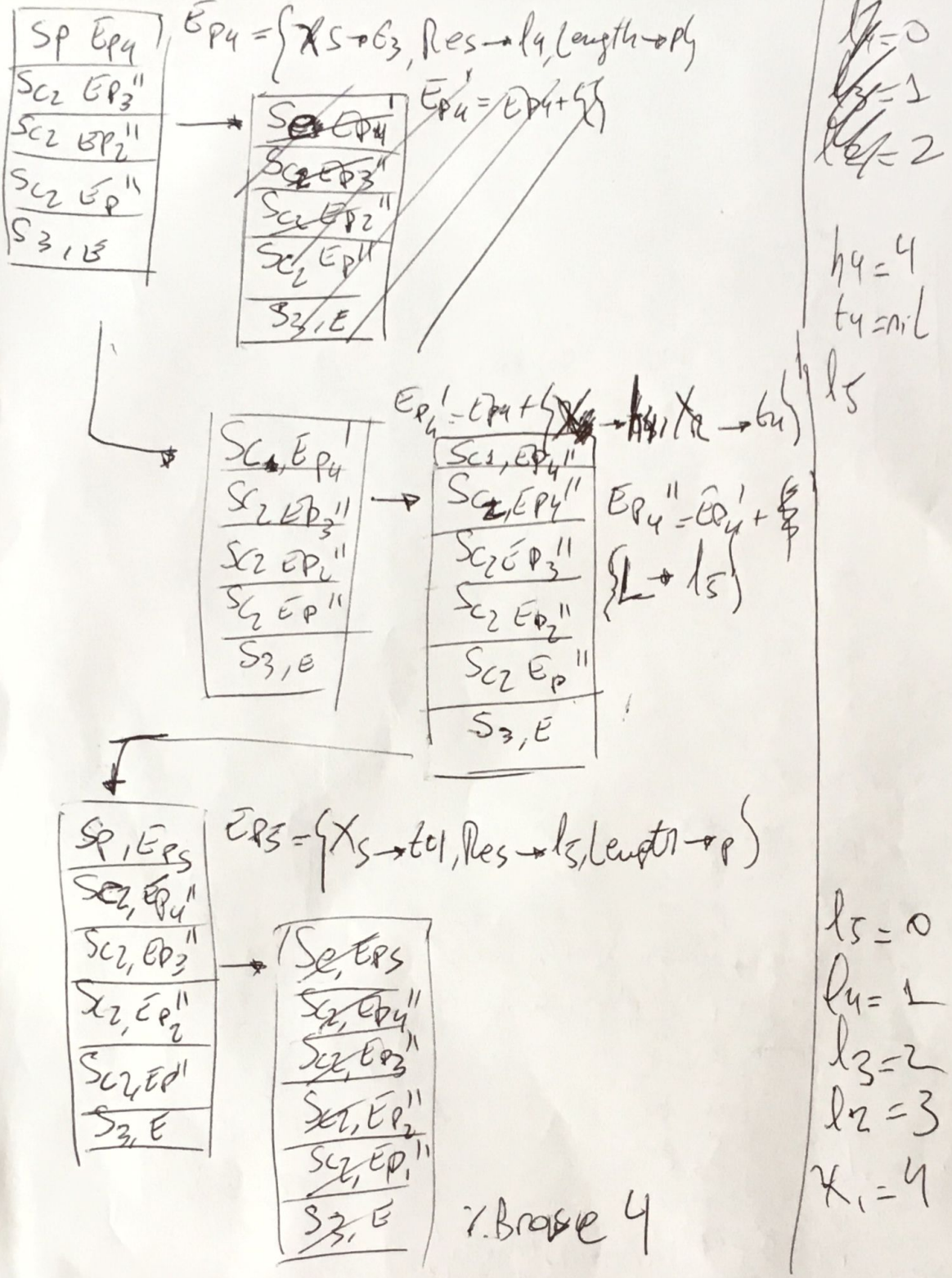
```
%6)
local X Y Z in
   X=Y
   try
      X=1
      Y=2
      Z=3
   catch Exception then
      skip
   end
   {Browse X#Y#Z}
end
```



5.1 (Recursive)

```
local Length X in
   Length=proc {$ Xs Res}
      case Xs of X|Xr then
         local L in
            {Length Xr L}
            Res = 1+L
         end
      else
         Res = 0
      end
   end
   {Length [1 2 3 4] X}
   {Browse X}
end
```





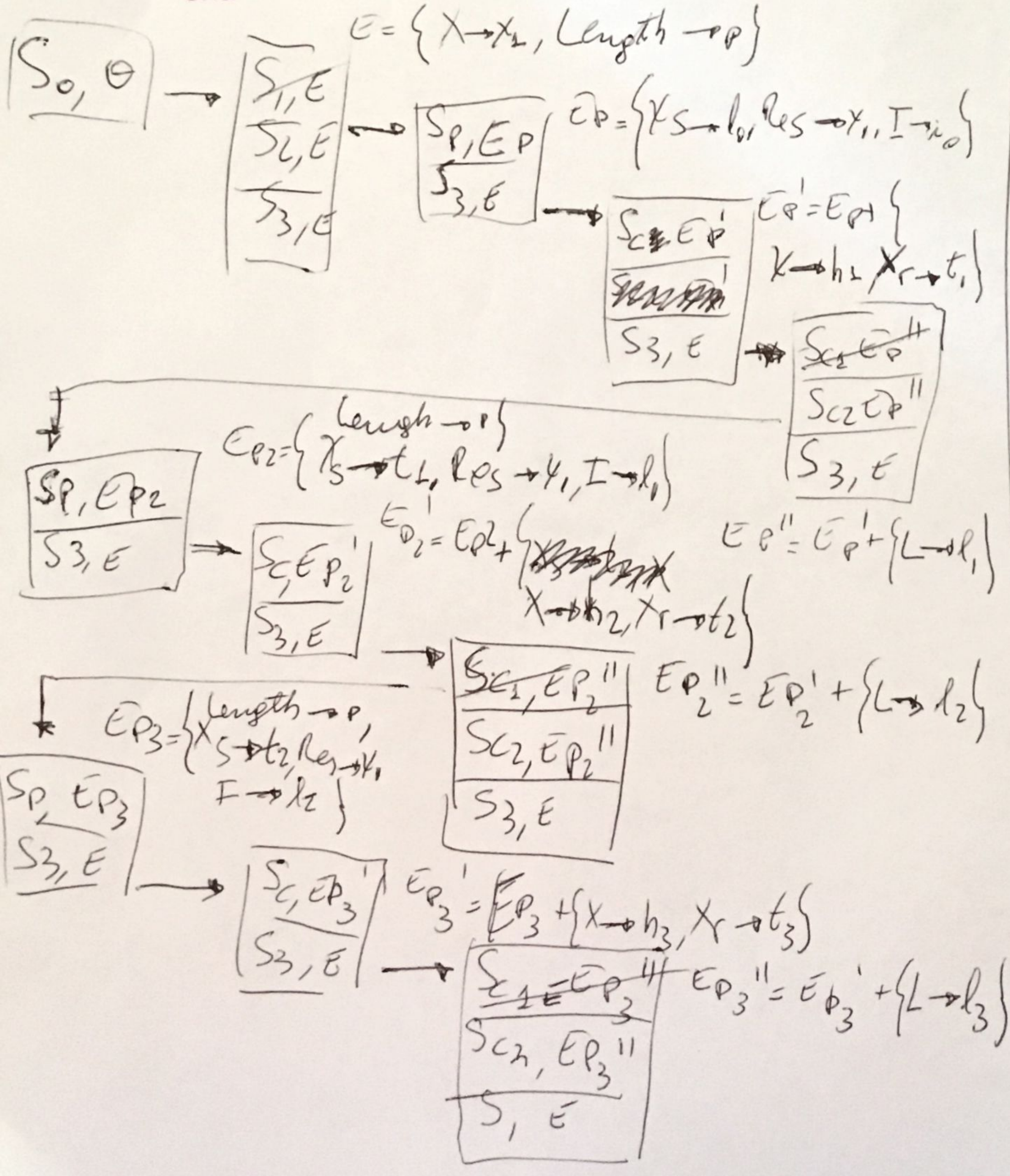
Y. Brasse 4

Se acumula la ultima llamada en el Stack hasta que llega el final.

5.2 (tail)

```
S0  local Length X in
S1    Length=proc {$ Xs Res I}
Sp      case Xs of X|Xr then
Sc        local L in
            L = 1+I                Sc1
            {Length Xr Res L}      Sc2
          end
        else
Se        Res = I
        end
      end

S2    {Length [1 2 3 4] X 0}
S3    {Browse X}
    end
```



x_1

$p = proc\{\$ Xs\ Res\ I\} \langle S_p \rangle end$, $\{\}$

$l_0 = [1\ 2\ 3\ 4]$

$i_0 = 0$

$h_1 = 1$

$t_1 = [2\ 3\ 4]$

$l_1 = 1$

$h_2 = 2$

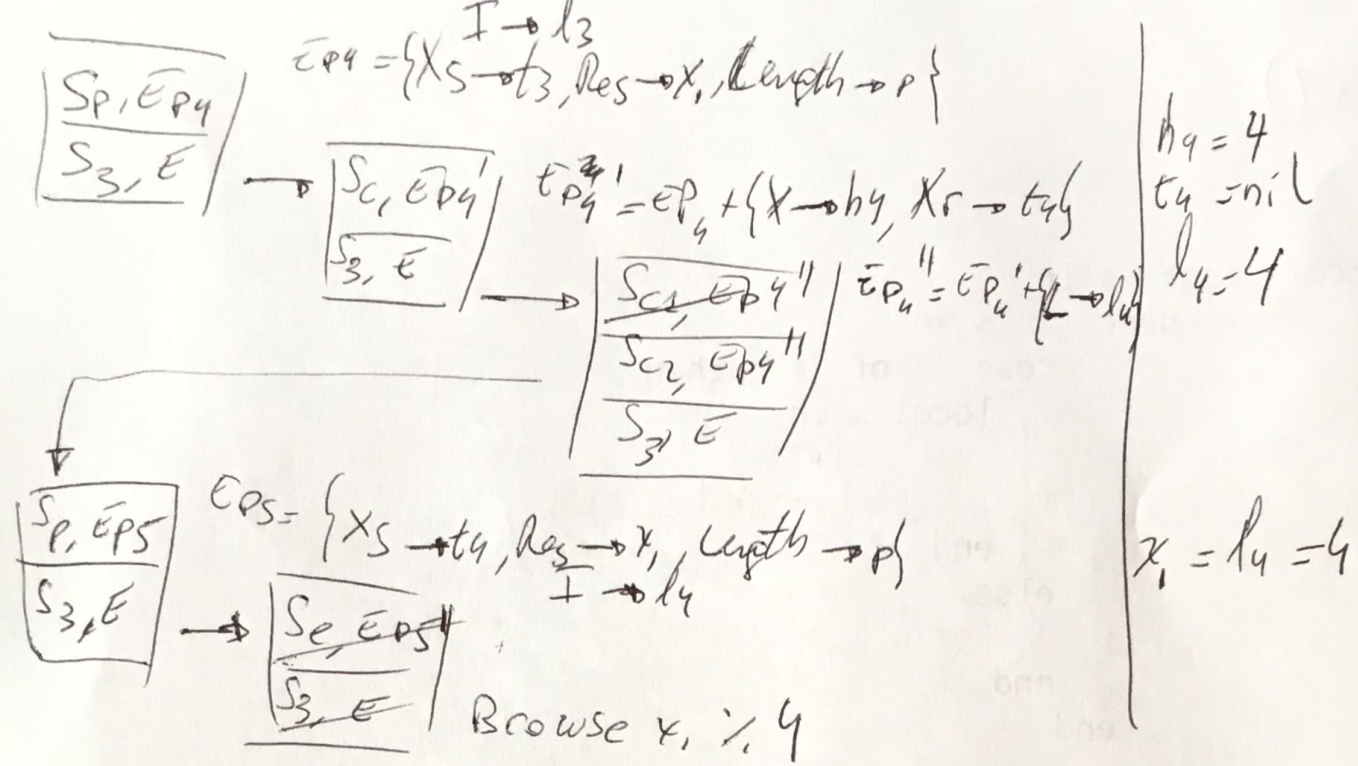
$t_2 = [3\ 4]$

$l_2 = 2$

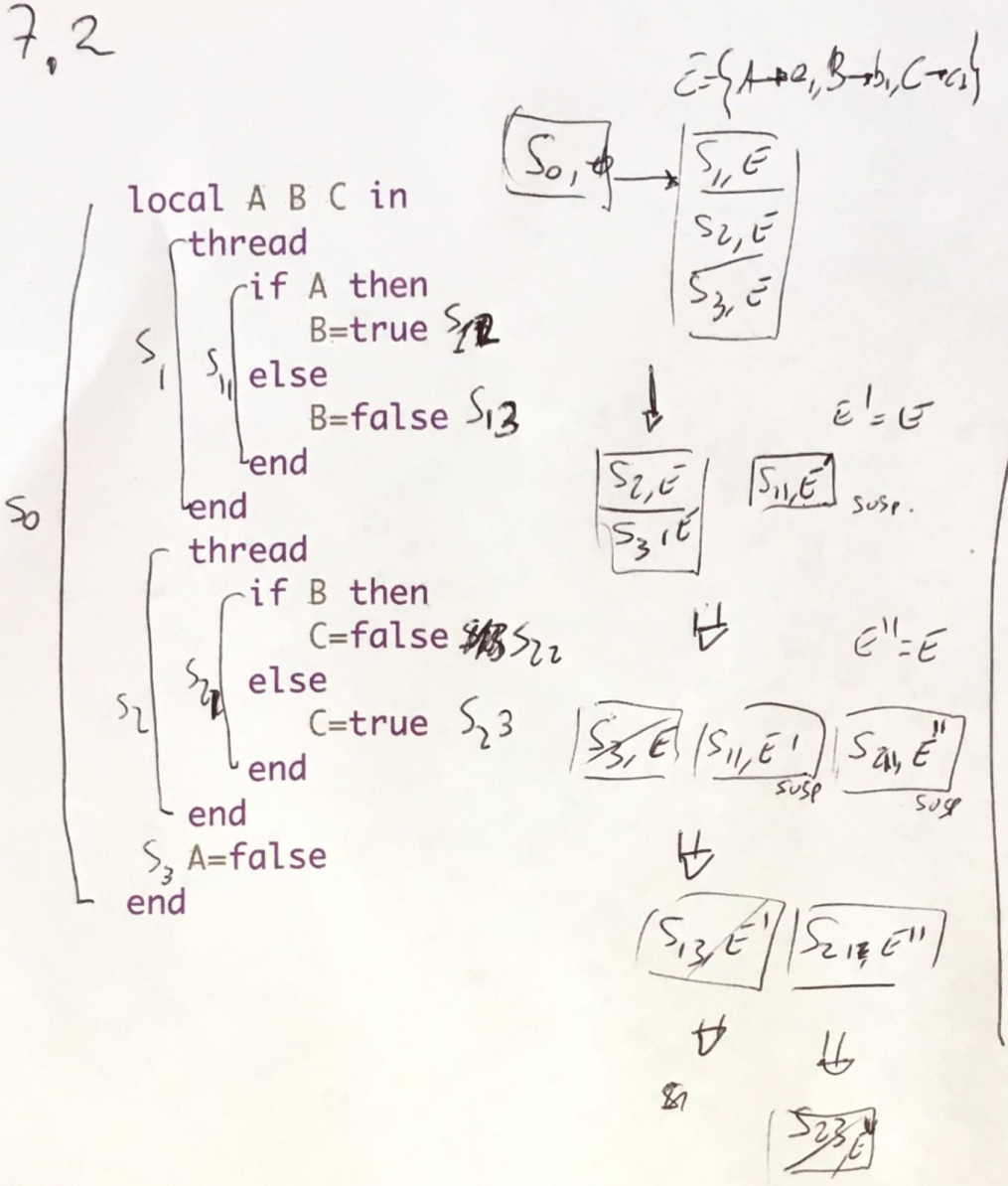
$h_3 = 3$

$t_3 = [4]$

$l_3 = 3$


I → l3
ēp4 = {Xs → t3, Res → x1, Length → p}
Sp, ēp4
S3, E
Sc, ēp4'
S3, E
t'p4 = ēp4 + {X → h4, Xs → t4}
Sc1, ēp4''
Sc2, ēp4''
S3, E
ē''p4 = ē'p4 + {l → l4}
h4 = 4
t4 = nil
l4 = 4
ēp5 = {Xs → t4, Res → x1, Length → p}
I → l4
Sp, ēp5
S3, E
Se, ēp5
S3, E
x1 = l4 = 4
Browse x1 ; 4

7.2


local A B C in
thread
if A then
B=true
else
B=false
end
end
thread
if B then
C=false
else
C=true
end
end
A=false
end
S0
S1
S11
S12
S13
S2
S21
S22
S23
S3
E = {A→a1, B→b1, C→c1}
e1 = false
b1 = false
c1 = true
S0, ϕ
S1, E
S2, E
S3, E
E' = E
S2, E
S3, E
S11, E
susp.
E'' = E
S3, E
S11, E'
susp
S21, E''
susp
S13, E'
S22, E''
S23, E

8.1

```
local Ints L A B C in
   Ints = proc {$ N L}
             local P in
                P = proc {$ Res}
                       local A in
                          Res = N|A
                          {Ints N+1 A}
                       end
                    end
                {ByNeed P L}
             end
          end
   {Ints 1 L}
   A = L.2.2.1
   B = L.1
   C = A+B
   {Browse C}
end
```

S_0, S_1, S_2, S_3, S_4, S_5, S_6, S_P, S_{P_1}, S_L

trig(P_2, l_1) (*1)
trig(P_3, a_2) (*2)
trig(P_4, a_3) (*3)
trig(P_5, a_4)

P_1 = proc {$N L} ... end, {}
$l_1 = 1|a_2$
$a_1 = 3$
$B_1 = 1$
$C_1 = 4$
$n_0 = 1$
P_2 = proc {$ Res} ... end, {N → n_0}
$a_2 = 2|a_3$
$n_1 = 2$
P_3 = proc {$ Res} ... end, {N → n_1}
$a_3 = 3|a_4$
$n_2 = 3$
P_4 = proc {$ Res} ... end, {N → n_2}

S_0, θ

$E = \{Ints \to p_1, L \to l_1, A \to a_1, B \to b_1, C \to c_1\}$
$E_P = \{N \to n_0, L \to l_1\}$

S_1, E | S_2, E | S_3, E | S_4, E | S_5, E | S_6, E → S_P, E_P | S_3, E | S_4, E | S_5, E | S_6, E

$E_P' = E_P + \{P \to P_2\}$

S_{P_1}, E_P | S_{P_2}, E_P' | S_3, E | S_4, E | S_5, E | S_6, E

(*1) S_L, E_L → S_{L_1}, E_L | S_{L_2}, E_L' → S_P, E_{P_2}

$E_L = \{Res \to l_2, N \to n_0\}$
$E_L' = E_L + \{A \to a_2\}$
$E_{P_2} = \{N \to n_1, L \to a_2\}$

(*2) S_L, E_{L_2} → $S_{P_1}, E_{P_2}^{a_1}$ | S_{P_2}, E_{P_2}'

$E_{L_2} = \{Res \to a_2, N \to n_1\}$
$E_{P_2}' = \{P \to P_3\} + E_{P_2}$

$E_{L_2}' = \{A \to a_3\} + E_{L_2}$

S_L, E_{L_2}' | S_{L_2}, E_{L_2}' → S_P, E_{P_3}

$E_{P_3} = \{N \to n_2, L \to a_3\}$
$E_{P_3}' = E_{P_3} + \{P \to P_4\}$

S_{P_1}, E_{P_3}' | S_{P_2}, E_{P_3}'

Browse 4

(*3)

S_R, E_{L_3} $E_{L_3} = \{Res \to a_3, N \to n_2\}$

→ S_{L1}, E_{L_3}' $E_{L_3}' = E_{L_3} + \{A \to a_4\}$

S_{L2}, E_{L_3}' → S_P, E_{P_4} $E_{P_4} = \{N \to n_3, L \to a_4\}$

→ S_{P1}, E_{P_4}' $E_{P_4}' = \{P \to p_5\}$

S_{P2}, E_{P_4}'

$a_4 = \_$

$n_3 = 4$

$p_5 = $ (proc {$ Res} <s> end, $\{N \to n_3\}$)