update : List a -> Int -> a -> List a
update xs i y =
 case (xs, i) of
 ([], \_) ->
 []
 (x::rest, 0) ->
 y :: rest
 (x::rest, \_) ->
 x :: update rest (i-1) y

• • •

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in =

"a" :: ("b" :: ("c" :: ("d" :: ("e" :: [])))

(::) "a" ((::) "b" ((::) "c" ((::) "d" ((::) "e" [])))



update in\_a 2 "X"



update in_a 2 "X"	xs = in_a i = 2 y = "X"
-------------------	-------------------------



update	in_a 2	2	"X"	xs = in_a	i = 2 y = "X"
		2		x = "a"	rest = in_b

.



update	in_a 2	2	"Y"	xs = in_a	i = 2 y = "X"
		2	Λ	x = "a"	rest = in_b

"a" 
$$\bullet$$
 update in\_b 1 "X"



update	in_a 2	2	"X"	xs = in_a	i = 2 y = "X"
		2		x = "a"	rest = in_b

"a" 
$$\bullet$$
 update in\_b 1 "X"  $xs = in_b i = 1 y = "X"$ 



update	in_a 2	2	"Y"	xs = in_a	i = 2 y = "X"
		2	Λ	x = "a"	rest = in_b

" ~ "		→ update in	in h	h 1	"Y"	xs = in_b	i = 1 y = "X"
u		upuuce		<u> </u>	Λ	x = "b"	rest = in_c

let  
 in = ["a", "b", "c", "d", "e"]  
 out = update in 2 "X"  
 in  
 ...  
in = in\_a in\_b in\_c in\_d in\_e  
 "a" • "b" • "c" • "d" • "e" []  
 update in\_a 2 "X" 
$$xs = in_a i = 2 y = "X"$$
  
 x = "a" rest = in\_b

"a" 
$$\leftarrow$$
 update in\_b 1 "X"  $xs = in_b i = 1 y = "X"$   
 $x = "b"$  rest = in\_c

"b" 
$$\bullet$$
 update in\_c 0 "X"

let  
in = ["a", "b", "c", "d", "e"]  
out = update in 2 "X"  
in  
...  
in = in\_a in\_b in\_c in\_d in\_e  
"a" 
$$\overset{\text{in}_b}{=}$$
 "c"  $\overset{\text{in}_a}{=}$  "a"  $\overset{\text{in}_b}{=}$  "c"  $\overset{\text{in}_a}{=}$  "e" []  
update in\_a 2 "X"  
"a"  $\overset{\text{in}_a}{=}$  update in\_b 1 "X"  
"a"  $\overset{\text{in}_a}{=}$  update in\_c 0 "X"  
"x = "no" rest = in\_d  
"X"  $\overset{\text{in}_a}{=}$  in\_d  
out = out\_a out\_b out\_c  
"a"  $\overset{\text{out}_b}{=}$  out\_c  
"a"  $\overset{\text{out}_b}{=}$  out\_c  
"A"  $\overset{\text{in}_a}{=}$  "X"  $\overset{\text{in}_a}{=}$  in\_d