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Last login: Fri Mar 24 13:39:38 on ttys005
carbon:SamplePrograms$ utop
                Welcome to utop version 1.14 (using OCaml version 4.01.0)!

Type #utop_help for help about using utop.

─( 18:00:00 )─< command 0 >──────────────────────────────────────{ counter: 0 }─
utop # #use "streams.ml";;
type 'a stream = Cons of 'a * (unit -> 'a stream)
val ones : int stream = Cons (1, <fun>)
val head : 'a stream -> 'a = <fun>
val tail : 'a stream -> 'a stream = <fun>
val from : int -> int stream = <fun>
val nats : int stream = Cons (1, <fun>)
val take : int -> 'a stream -> 'a list = <fun>
val filter : ('a -> bool) -> 'a stream -> 'a stream = <fun>
val even : int -> bool = <fun>
val squares_from : int -> int stream = <fun>
val t1 : int list = [1; 4; 9; 16; 25; 36; 49; 64; 81; 100]
val squares : int stream = Cons (1, <fun>)
val zip : ('a -> 'b -> 'c) -> 'a stream -> 'b stream -> 'c stream = <fun>
val nats2 : int stream = Cons (1, <fun>)
val factorials : int stream = Cons (1, <fun>)
val non : ('a -> bool) -> 'a -> bool = <fun>
val multiple_of : int -> int -> bool = <fun>
val sift : int -> int stream -> int stream = <fun>
val sieve : int stream -> int stream = <fun>
val primes : int stream = Cons (2, <fun>)
─( 13:42:53 )─< command 1 >──────────────────────────────────────{ counter: 0 }─
utop # ones ;;
- : int stream = Cons (1, <fun>)
─( 13:42:57 )─< command 2 >──────────────────────────────────────{ counter: 0 }─
utop # head ones ;;
- : int = 1
─( 13:43:03 )─< command 3 >──────────────────────────────────────{ counter: 0 }─
utop # head (tail ones) ;;
- : int = 1
─( 13:43:40 )─< command 4 >──────────────────────────────────────{ counter: 0 }─
utop # tails ones ;;
Error: Unbound value tails
Did you mean tail?
─( 13:43:47 )─< command 5 >──────────────────────────────────────{ counter: 0 }─
utop # tails ones ;;
Error: Unbound value tails
Did you mean tail?
─( 13:43:52 )─< command 6 >──────────────────────────────────────{ counter: 0 }─
utop # tail ones ;;
- : int stream = Cons (1, <fun>)
─( 13:43:55 )─< command 7 >──────────────────────────────────────{ counter: 0 }─
utop # from 10 ;;
- : int stream = Cons (10, <fun>)
─( 13:43:57 )─< command 8 >──────────────────────────────────────{ counter: 0 }─
utop # head (from 10) ;;
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- : int = 10
─( 13:45:35 )─< command 9 >──────────────────────────────────────{ counter: 0 }─
utop # head (tail (from 14)) ;;
step 15
- : int = 15
─( 13:45:45 )─< command 10 >─────────────────────────────────────{ counter: 0 }─
utop # head (tail (tail (tail nats))) ;;
step 2
step 3
step 4
- : int = 4
─( 13:45:52 )─< command 11 >─────────────────────────────────────{ counter: 0 }─
utop # take 10 nats ;;
step 2
step 3
step 4
step 5
step 6
step 7
step 8
step 9
step 10
step 11
- : int list = [1; 2; 3; 4; 5; 6; 7; 8; 9; 10]
─( 13:47:22 )─< command 12 >─────────────────────────────────────{ counter: 0 }─
utop # #use "streams.ml";;
type 'a stream = Cons of 'a * (unit -> 'a stream)
val ones : int stream = Cons (1, <fun>)
val head : 'a stream -> 'a = <fun>
val tail : 'a stream -> 'a stream = <fun>
val from : int -> int stream = <fun>
val nats : int stream = Cons (1, <fun>)
val take : int -> 'a stream -> 'a list = <fun>
File "streams.ml", line 57, characters 40-55:
Error: This expression has type 'b stream
       but an expression was expected of type unit -> 'a stream
─( 13:48:10 )─< command 13 >─────────────────────────────────────{ counter: 0 }─
utop # #use "streams.ml";;
type 'a stream = Cons of 'a * (unit -> 'a stream)
val ones : int stream = Cons (1, <fun>)
val head : 'a stream -> 'a = <fun>
val tail : 'a stream -> 'a stream = <fun>
val from : int -> int stream = <fun>
val nats : int stream = Cons (1, <fun>)
val take : int -> 'a stream -> 'a list = <fun>
File "streams.ml", line 57, characters 40-55:
Error: This expression has type 'b stream
       but an expression was expected of type unit -> 'a stream
─( 13:55:55 )─< command 14 >─────────────────────────────────────{ counter: 0 }─
utop # #use "streams.ml";;
File "streams.ml", line 58, characters 26-30:
Error: Syntax error: ')' expected
File "streams.ml", line 57, characters 36-37:
Error: This '(' might be unmatched
─( 13:56:23 )─< command 15 >─────────────────────────────────────{ counter: 0 }─
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utop # #use "streams.ml";;
type 'a stream = Cons of 'a * (unit -> 'a stream)
val ones : int stream = Cons (1, <fun>)
val head : 'a stream -> 'a = <fun>
val tail : 'a stream -> 'a stream = <fun>
val from : int -> int stream = <fun>
val nats : int stream = Cons (1, <fun>)
val take : int -> 'a stream -> 'a list = <fun>
val filter : ('a -> bool) -> 'a stream -> 'a stream = <fun>
val even : int -> bool = <fun>
val squares_from : int -> int stream = <fun>
val t1 : int list = [1; 4; 9; 16; 25; 36; 49; 64; 81; 100]
val squares : int stream = Cons (1, <fun>)
val zip : ('a -> 'b -> 'c) -> 'a stream -> 'b stream -> 'c stream = <fun>
val nats2 : int stream = Cons (1, <fun>)
val factorials : int stream = Cons (1, <fun>)
val non : ('a -> bool) -> 'a -> bool = <fun>
val multiple_of : int -> int -> bool = <fun>
val sift : int -> int stream -> int stream = <fun>
val sieve : int stream -> int stream = <fun>
val primes : int stream = Cons (2, <fun>)
─( 13:58:13 )─< command 16 >──────────────────────────────────────{ counter: 0 }─
utop # even ;;
- : int -> bool = <fun>
─( 13:58:25 )─< command 17 >──────────────────────────────────────{ counter: 0 }─
utop # even 4 ;;
- : bool = true
─( 13:58:49 )─< command 18 >──────────────────────────────────────{ counter: 0 }─
utop # take 10 (filter even nats)) ;;
Error: Syntax error
─( 13:58:52 )─< command 19 >──────────────────────────────────────{ counter: 0 }─
utop # take 10 (filter even nats) ;;
step 2
step 3
step 4
step 5
step 6
step 7
step 8
step 9
step 10
step 11
step 12
step 13
step 14
step 15
step 16
step 17
step 18
step 19
step 20
step 21
step 22
- : int list = [2; 4; 6; 8; 10; 12; 14; 16; 18; 20]
─( 13:59:02 )─< command 20 >──────────────────────────────────────{ counter: 0 }─
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utop # squares ;;
- : int stream = Cons (1, <fun>)
─( 13:59:07 )─< command 21 >──────────────────────────────────────{ counter: 0 }─
utop # take 10 squares ;;
- : int list = [1; 4; 9; 16; 25; 36; 49; 64; 81; 100]
─( 14:00:10 )─< command 22 >──────────────────────────────────────{ counter: 0 }─
utop # zip (fun add x y -> x + y) nats nats ;;
- : (int -> int) stream = Cons (<fun>, <fun>)
─( 14:00:15 )─< command 23 >──────────────────────────────────────{ counter: 0 }─
utop # take 10 (zip (fun add x y -> x + y) nats nats) ;;
step 2
step 2
step 3
step 3
step 4
step 4
step 5
step 5
step 6
step 6
step 7
step 7
step 8
step 8
step 9
step 9
step 10
step 10
step 11
step 11
- : (int -> int) list =
[<fun>; <fun>; <fun>; <fun>; <fun>; <fun>; <fun>; <fun>; <fun>; <fun>]
─( 14:03:21 )─< command 24 >──────────────────────────────────────{ counter: 0 }─
utop # take 10 (zip (fun add x y -> x + y) nats nats) ;;
step 2
step 2
step 3
step 3
step 4
step 4
step 5
step 5
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step 6
step 7
step 7
step 8
step 8
step 9
step 9
step 10
step 10
step 11
step 11
- : (int -> int) list =
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[<fun>; <fun>; <fun>; <fun>; <fun>; <fun>; <fun>; <fun>; <fun>; <fun>]
–( 14:03:29 )–< command 25 >––––––––––––––––––––––––––––––––––––––––––––––––––{ counter: 0 }–
utop # take 10 nats2 ;;
- : int list = [1; 2; 3; 4; 5; 6; 7; 8; 9; 10]
–( 14:04:05 )–< command 26 >––––––––––––––––––––––––––––––––––––––––––––––––––{ counter: 0 }–
utop # zip ;;
- : ('a -> 'b -> 'c) -> 'a stream -> 'b stream -> 'c stream = <fun>
–( 14:04:11 )–< command 27 >––––––––––––––––––––––––––––––––––––––––––––––––––{ counter: 0 }–
utop # take 10 (zip (fun add x y -> x + y) nats nats) ;;
step 2
step 2
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step 3
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step 4
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step 11
step 11
- : (int -> int) list =
[<fun>; <fun>; <fun>; <fun>; <fun>; <fun>; <fun>; <fun>; <fun>; <fun>]
–( 14:04:32 )–< command 28 >––––––––––––––––––––––––––––––––––––––––––––––––––{ counter: 0 }–
utop # head (take 10 (zip (fun add x y -> x + y) nats nats)) ()  ;;
Error: This expression has type (int -> int) list
       but an expression was expected of type ('a -> 'b) stream
–( 14:05:03 )–< command 29 >––––––––––––––––––––––––––––––––––––––––––––––––––{ counter: 0 }–
utop # head (take 10 (zip (fun add x y -> x + y) nats nats)) ;;
Error: This expression has type (int -> int) list
       but an expression was expected of type 'a stream
–( 14:05:13 )–< command 30 >––––––––––––––––––––––––––––––––––––––––––––––––––{ counter: 0 }–
utop # take 10 (zip (fun x y -> x + y) nats nats) ;;
step 2
step 2
step 3
step 3
step 4
step 4
step 5
step 5
step 6
step 6
step 7
step 7
step 8
step 8
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step 9
step 9
step 10
step 10
step 11
step 11
- : int list = [2; 4; 6; 8; 10; 12; 14; 16; 18; 20]
─( 14:05:17 )─< command 31 >──────────────────────────────────────{ counter: 0 }─
utop # take 10 (zip (fun x y -> x + y) nats nats) ;;
step 2
step 2
step 3
step 3
step 4
step 4
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step 5
step 6
step 6
step 7
step 7
step 8
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step 9
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step 10
step 10
step 11
step 11
- : int list = [2; 4; 6; 8; 10; 12; 14; 16; 18; 20]
─( 14:05:45 )─< command 32 >──────────────────────────────────────{ counter: 0 }─
utop # take 10 factorials ;;
step 2
step 2
step 3
step 2
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step 4
step 2
step 3
step 4
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step 6
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step 7
step 2
step 3
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step 4
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step 2
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step 9
step 2
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step 7
step 8
step 9
step 10
- : int list = [1; 1; 2; 6; 24; 120; 720; 5040; 40320; 362880]
─( 14:06:10 )─< command 33 >──────────────────────────────────────{ counter: 0 }─
utop # take 100 primes ;;
step 3
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- : int list =
[2; 3; 5; 7; 11; 13; 17; 19; 23; 29; 31; 37; 41; 43; 47; 53; 59; 61; 67; 71;
 73; 79; 83; 89; 97; 101; 103; 107; 109; 113; 127; 131; 137; 139; 149; 151;
 157; 163; 167; 173; 179; 181; 191; 193; 197; 199; 211; 223; 227; 229; 233;
 239; 241; 251; 257; 263; 269; 271; 277; 281; 283; 293; 307; 311; 313; 317;
 331; 337; 347; 349; 353; 359; 367; 373; 379; 383; 389; 397; 401; 409; 419;
 421; 431; 433; 439; 443; 449; 457; 461; 463; 467; 479; 487; 491; 499; 503;
 509; 521; 523; 541]
─( 14:08:10 )─< command 34 >──────────────────────────────────────{ counter: 0 }─
utop # take 10 nats ;;
step 2
step 3
step 4
step 5
step 6
step 7
step 8
step 9
step 10
step 11
- : int list = [1; 2; 3; 4; 5; 6; 7; 8; 9; 10]
─( 14:11:26 )─< command 35 >──────────────────────────────────────{ counter: 0 }─
utop # take 10 nats ;;
step 2
step 3
step 4
step 5
step 6
step 7
step 8
step 9
step 10
step 11
- : int list = [1; 2; 3; 4; 5; 6; 7; 8; 9; 10]
─( 14:12:00 )─< command 36 >──────────────────────────────────────{ counter: 0 }─
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```
utop # take 10 nats ;;
step 2
step 3
step 4
step 5
step 6
step 7
step 8
step 9
step 10
step 11
- : int list = [1; 2; 3; 4; 5; 6; 7; 8; 9; 10]
─( 14:12:10 )─< command 37 >──────────────────────────────────────{ counter: 0 }─
utop # take 10 nats ;;
step 2
step 3
step 4
step 5
step 6
step 7
step 8
step 9
step 10
step 11
- : int list = [1; 2; 3; 4; 5; 6; 7; 8; 9; 10]
─( 14:12:11 )─< command 38 >──────────────────────────────────────{ counter: 0 }─
utop # take 10 nats ;;
step 2
step 3
step 4
step 5
step 6
step 7
step 8
step 9
step 10
step 11
- : int list = [1; 2; 3; 4; 5; 6; 7; 8; 9; 10]
─( 14:12:12 )─< command 39 >──────────────────────────────────────{ counter: 0 }─
utop # take 10 nats ;;
step 2
step 3
step 4
step 5
step 6
step 7
step 8
step 9
step 10
step 11
- : int list = [1; 2; 3; 4; 5; 6; 7; 8; 9; 10]
─( 14:12:13 )─< command 40 >──────────────────────────────────────{ counter: 0 }─
utop # take 10 nats ;;
step 2
step 3
```