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**Iz**

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**CONTENTS:**

<b>1</b>	<b>Submodules</b>	<b>1</b>
1.1	filtration module . . . . .	1
1.2	functional module . . . . .	2
1.3	iterating module . . . . .	4
1.4	left module . . . . .	7
1.5	logical module . . . . .	7
1.6	replication module . . . . .	8
1.7	reversal module . . . . .	9
1.8	right module . . . . .	9
1.9	sorting module . . . . .	10
1.10	transposition module . . . . .	10
1.11	typology module . . . . .	10
<b>2</b>	<b>Indices and tables</b>	<b>13</b>
	<b>Python Module Index</b>	<b>15</b>
	<b>Index</b>	<b>17</b>



## SUBMODULES

## 1.1 filtration module

`lz.filtration.grabber` (*predicate*: *Callable*[[*Domain*], *bool*] = *None*) → *Callable*[[*Iterable*[*Domain*]], *Iterable*[*Domain*]]

Returns function that selects elements from the beginning of iterable while given predicate is satisfied.

If predicate is not specified than true-like objects are selected.

```
>>> grab_while_true_like = grabber()
>>> list(grab_while_true_like(range(10)))
[]
```

```
>>> from operator import gt
>>> from functools import partial
>>> grab_while_less_than_five = grabber(partial(gt, 5))
>>> list(grab_while_less_than_five(range(10)))
[0, 1, 2, 3, 4]
```

`lz.filtration.kicker` (*predicate*: *Callable*[[*Domain*], *bool*] = *None*) → *Callable*[[*Iterable*[*Domain*]], *Iterable*[*Domain*]]

Returns function that skips elements from the beginning of iterable while given predicate is satisfied.

If predicate is not specified than true-like objects are skipped.

```
>>> kick_while_true_like = kicker()
>>> list(kick_while_true_like(range(10)))
[0, 1, 2, 3, 4, 5, 6, 7, 8, 9]
```

```
>>> from operator import gt
>>> from functools import partial
>>> kick_while_less_than_five = kicker(partial(gt, 5))
>>> list(kick_while_less_than_five(range(10)))
[5, 6, 7, 8, 9]
```

`lz.filtration.scavenger` (*predicate*: *Callable*[[*Domain*], *bool*] = *None*) → *Callable*[[*Iterable*[*Domain*]], *Iterable*[*Domain*]]

Returns function that selects elements from iterable which dissatisfy given predicate.

If predicate is not specified than false-like objects are selected.

```
>>> to_false_like = scavenger()
>>> list(to_false_like(range(10)))
[0]
```

```
>>> def is_even(number: int) -> bool:
...     return number % 2 == 0
>>> to_odd = scavenger(is_even)
>>> list(to_odd(range(10)))
[1, 3, 5, 7, 9]
```

`lz.filtration.separator` (*predicate: Callable[[Domain], bool] = None*) → *Callable[[Iterable[Domain]], Tuple[Iterable[Domain], Iterable[Domain]]]*  
 Returns function that returns pair of iterables first of which consists of elements that dissatisfy given predicate and second one consists of elements that satisfy given predicate.

```
>>> split_by_truth = separator()
>>> tuple(map(list, split_by_truth(range(10))))
([0], [1, 2, 3, 4, 5, 6, 7, 8, 9])
```

```
>>> def is_even(number: int) -> bool:
...     return number % 2 == 0
>>> split_by_evenness = separator(is_even)
>>> tuple(map(list, split_by_evenness(range(10))))
([1, 3, 5, 7, 9], [0, 2, 4, 6, 8])
```

`lz.filtration.sifter` (*predicate: Callable[[Domain], bool] = None*) → *Callable[[Iterable[Domain]], Iterable[Domain]]*  
 Returns function that selects elements from iterable which satisfy given predicate.  
 If predicate is not specified than true-like objects are selected.

```
>>> to_true_like = sifter()
>>> list(to_true_like(range(10)))
[1, 2, 3, 4, 5, 6, 7, 8, 9]
```

```
>>> def is_even(number: int) -> bool:
...     return number % 2 == 0
>>> to_even = sifter(is_even)
>>> list(to_even(range(10)))
[0, 2, 4, 6, 8]
```

## 1.2 functional module

`lz.functional.apply` (*function: Callable[[...], Range], args: Iterable[Domain], kwargs: Dict[str, Any]*) = *mappingproxy({})* → *Range*  
 Calls given function with given positional and keyword arguments.

`lz.functional.cleave` (*\*functions: Callable[[...], Range]*) → *Callable[[...], Iterable[Range]]*  
 Returns function that separately applies given functions to the same arguments.

```
>>> to_min_and_max = cleave(min, max)
>>> list(to_min_and_max(range(10)))
[0, 9]
>>> list(to_min_and_max(range(0), default=None))
[None, None]
```

`lz.functional.combine` (*\*maps: Callable[[Domain], Range]*) → *Callable[[Iterable[Domain]], Iterable[Range]]*  
 Returns function that applies each map to corresponding argument.

```
>>> encoder_decoder = combine(str.encode, bytes.decode)
>>> list(encoder_decoder(['hello', b'world']))
[b'hello', 'world']
```

`lz.functional.compose` (*last\_function*: Callable[[Any], Range], \**front\_functions*: Callable[[...], Any]) → Callable[[...], Range]

Returns functions composition.

```
>>> sum_of_first_n_natural_numbers = compose(sum, range)
>>> sum_of_first_n_natural_numbers(10)
45
```

`lz.functional.curry` (*function*: Callable[[...], Range], \*, *signature*: Optional[paradigm.models.Base] = None) → lz.functional.Curry

Returns curried version of given function.

```
>>> curried_pow = curry(pow)
>>> two_to_power = curried_pow(2)
>>> two_to_power(10)
1024
```

`lz.functional.flatmap` (*function*: Callable[[Domain], Iterable[Range]], \**iterables*: Iterable[Domain]) → Iterable[Range]

Applies given function to the arguments aggregated from given iterables and concatenates results into plain iterable.

```
>>> list(flatmap(range, range(5)))
[0, 0, 1, 0, 1, 2, 0, 1, 2, 3]
```

`lz.functional.flip` (*function*: Callable[[...], Range]) → Callable[[...], Range]

Returns function with positional arguments flipped.

```
>>> flipped_power = flip(pow)
>>> flipped_power(2, 4)
16
```

`lz.functional.identity` (*argument*: Domain) → Domain

Returns object itself.

```
>>> identity(0)
0
```

`lz.functional.pack` (*function*: Callable[[...], Range]) → Callable[[Iterable[Domain]], Range]

Returns function that works with single iterable parameter by unpacking elements to given function.

```
>>> packed_int = pack(int)
>>> packed_int(['10'])
10
>>> packed_int(['10'], {'base': 2})
2
```

`lz.functional.to_constant` (*object*: Domain) → Callable[[...], Domain]

Returns function that always returns given object.

```
>>> always_zero = to_constant(0)
>>> always_zero()
0
```

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```
>>> always_zero(1)
0
>>> always_zero(how_about=2)
0
```

## 1.3 iterating module

`lz.iterating.capacity` (*iterable: Iterable[Any]*) → int  
Returns number of elements in iterable.

```
>>> capacity(range(0))
0
>>> capacity(range(10))
10
```

`lz.iterating.chop` (*iterable: Iterable[Domain], \*, size: int*) → Iterable[Sequence[Domain]]  
Splits iterable into chunks of given size.

`lz.iterating.chopper` (*size: int*) → Callable[[Iterable[Domain]], Iterable[Sequence[Domain]]]  
Returns function that splits iterable into chunks of given size.

```
>>> in_three = chopper(3)
>>> list(map(tuple, in_three(range(10))))
[(0, 1, 2), (3, 4, 5), (6, 7, 8), (9,)]
```

`lz.iterating.cut` (*iterable: Iterable[Domain], \*, slice\_: slice*) → Iterable[Domain]  
Selects elements from iterable based on given slice.

Slice fields supposed to be unset or non-negative since it is hard to evaluate negative indices/step for arbitrary iterable which may be potentially infinite or change previous elements if iterating made backwards.

`lz.iterating.cutter` (*slice\_: slice*) → Callable[[Iterable[Domain]], Iterable[Domain]]  
Returns function that selects elements from iterable based on given slice.

```
>>> to_first_triplet = cutter(slice(3))
>>> list(to_first_triplet(range(10)))
[0, 1, 2]
```

```
>>> to_second_triplet = cutter(slice(3, 6))
>>> list(to_second_triplet(range(10)))
[3, 4, 5]
```

```
>>> cut_out_every_third = cutter(slice(0, None, 3))
>>> list(cut_out_every_third(range(10)))
[0, 3, 6, 9]
```

`lz.iterating.expand` (*object\_: Domain*) → Iterable[Domain]  
Wraps object into iterable.

```
>>> list(expand(0))
[0]
```

`lz.iterating.first` (*iterable: Iterable[Domain]*) → Domain  
Returns first element of iterable.



```
>>> first(range(10))
0
```

`lz.iterating.flatmapper` (*map\_*: *Callable[[Domain], Iterable[Range]]*) → *Callable[[Iterable[Domain]], Iterable[Range]]*  
Returns function that applies map to the each element of iterable and flattens results.

```
>>> relay = flatmapper(range)
>>> list(relay(range(5)))
[0, 0, 1, 0, 1, 2, 0, 1, 2, 3]
```

`lz.iterating.flatten` (*iterable*: *Iterable[Iterable[Domain]]*) → *Iterable[Domain]*  
Returns plain iterable from iterable of iterables.

```
>>> list(flatten([range(5), range(10, 20)]))
[0, 1, 2, 3, 4, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19]
```

`lz.iterating.group_by` (*iterable*: *Iterable[Domain]*, *\**, *key*: *Callable[[Domain], Hashable]*, *mapping\_cls*: *Type[MutableMapping]*) → *Iterable[Tuple[Hashable, Iterable[Domain]]]*  
Groups iterable elements based on given key.

`lz.iterating.grouper` (*key*: *Callable[[Domain], Hashable]*, *\**, *mapping\_cls*: *Type[MutableMapping]* = *<class 'collections.OrderedDict'>*) → *Callable[[Iterable[Domain]], Iterable[Tuple[Hashable, Iterable[Domain]]]]*  
Returns function that groups iterable elements based on given key.

```
>>> group_by_absolute_value = grouper(abs)
>>> list(group_by_absolute_value(range(-5, 5)))
[(5, [-5]), (4, [-4, 4]), (3, [-3, 3]), (2, [-2, 2]), (1, [-1, 1]), (0, [0])]
```

```
>>> def modulo_two(number: int) -> int:
...     return number % 2
>>> group_by_evenness = grouper(modulo_two)
>>> list(group_by_evenness(range(10)))
[(0, [0, 2, 4, 6, 8]), (1, [1, 3, 5, 7, 9])]
```

`lz.iterating.header` (*size*: *int*) → *Callable[[Iterable[Domain]], Iterable[Domain]]*  
Returns function that selects elements from the beginning of iterable. Resulted iterable will have size not greater than given one.

```
>>> to_first_pair = header(2)
>>> list(to_first_pair(range(10)))
[0, 1]
```

`lz.iterating.in_four` (*iterable*: *Iterable[Domain]*, *\**, *size*: *int* = 4) → *Iterable[Sequence[Domain]]*  
Splits iterable into chunks of size 4.

`lz.iterating.in_three` (*iterable*: *Iterable[Domain]*, *\**, *size*: *int* = 3) → *Iterable[Sequence[Domain]]*  
Splits iterable into chunks of size 3.

`lz.iterating.in_two` (*iterable*: *Iterable[Domain]*, *\**, *size*: *int* = 2) → *Iterable[Sequence[Domain]]*  
Splits iterable into chunks of size 2.

`lz.iterating.interleave` (*iterable*: *Iterable[Iterable[Domain]]*) → *Iterable[Domain]*  
Interleaves elements from given iterable of iterables.

```
>>> list(interleave([range(5), range(10, 20)]))
[0, 10, 1, 11, 2, 12, 3, 13, 4, 14, 15, 16, 17, 18, 19]
```

`lz.iterating.last` (*iterable: Iterable[Domain]*) → *Domain*  
Returns last element of iterable.

```
>>> last(range(10))
9
```

`lz.iterating.mapper` (*map\_: Callable[[Domain], Range]*) → *Callable[[Iterable[Domain]], Iterable[Range]]*  
Returns function that applies given map to the each element of iterable.

```
>>> to_str = mapper(str)
>>> list(to_str(range(10)))
['0', '1', '2', '3', '4', '5', '6', '7', '8', '9']
```

`lz.iterating.pairwise` (*iterable: Iterable[Domain], \*, size: int = 2*) → *Iterable[Tuple[Domain, ...]]*  
Slides over iterable with window of size 2.

`lz.iterating.quadruplewise` (*iterable: Iterable[Domain], \*, size: int = 4*) → *Iterable[Tuple[Domain, ...]]*  
Slides over iterable with window of size 4.

`lz.iterating.slide` (*iterable: Iterable[Domain], \*, size: int*) → *Iterable[Tuple[Domain, ...]]*  
Slides over iterable with window of given size.

`lz.iterating.slider` (*size: int*) → *Callable[[Iterable[Domain]], Iterable[Tuple[Domain, ...]]]*  
Returns function that slides over iterable with window of given size.

```
>>> pairwise = slider(2)
>>> list(pairwise(range(10)))
[(0, 1), (1, 2), (2, 3), (3, 4), (4, 5), (5, 6), (6, 7), (7, 8), (8, 9)]
```

`lz.iterating.trail` (*iterable: Iterable[Domain], \*, size: int*) → *Iterable[Domain]*  
Selects elements from the end of iterable. Resulted iterable will have size not greater than given one.

`lz.iterating.trailer` (*size: int*) → *Callable[[Iterable[Domain]], Iterable[Domain]]*  
Returns function that selects elements from the end of iterable. Resulted iterable will have size not greater than given one.

```
>>> to_last_pair = trailer(2)
>>> list(to_last_pair(range(10)))
[8, 9]
```

`lz.iterating.triplewise` (*iterable: Iterable[Domain], \*, size: int = 3*) → *Iterable[Tuple[Domain, ...]]*  
Slides over iterable with window of size 3.

## 1.4 left module

`lz.left.accumulator` (*function: Callable[[Range, Domain], Range], initial: Range*) → *Callable[[Iterable[Domain]], Iterable[Range]]*

Returns function that yields cumulative results of given binary function starting from given initial object in direction from left to right.

```
>>> import math
>>> to_pi_approximations = accumulator(round, math.pi)
>>> list(to_pi_approximations(range(5, 0, -1)))
[3.141592653589793, 3.14159, 3.1416, 3.142, 3.14, 3.1]
```

`lz.left.applier` (*function: Callable[[...], Range], \*args: Domain, \*\*kwargs: Domain*) → *Callable[[...], Range]*

Returns function that behaves like given function with given arguments partially applied. Given positional arguments will be added to the left end.

```
>>> count_from_zero_to = applier(range, 0)
>>> list(count_from_zero_to(10))
[0, 1, 2, 3, 4, 5, 6, 7, 8, 9]
```

`lz.left.attach` (*iterable: Iterable[Domain], object\_: Domain*) → *Iterable[Domain]*

Prepends given object to the iterable.

`lz.left.attacher` (*object\_: Domain*) → *Callable[[Iterable[Domain]], Iterable[Domain]]*

Returns function that prepends given object to iterable.

```
>>> attach_hundred = attacher(100)
>>> list(attach_hundred(range(10)))
[100, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9]
```

`lz.left.folder` (*function: Callable[[Range, Domain], Range], initial: Range*) → *Callable[[Iterable[Domain]], Range]*

Returns function that cumulatively applies given binary function starting from given initial object in direction from left to right.

```
>>> to_sum_evaluation_order = folder('{} + {}'.format, 0)
>>> to_sum_evaluation_order(range(1, 10))
'((((((((0 + 1) + 2) + 3) + 4) + 5) + 6) + 7) + 8) + 9)'
```

## 1.5 logical module

`lz.logical.conjoin` (*\*predicates: Callable[[Domain], bool]*) → *Callable[[Domain], bool]*

Returns conjunction of given predicates.

```
>>> is_valid_constant_identifier = conjoin(str.isupper, str.isidentifier)
>>> is_valid_constant_identifier('SECOND_SECTION')
True
>>> is_valid_constant_identifier('2ND_SECTION')
False
```

`lz.logical.disjoin` (*\*predicates: Callable[[Domain], bool]*) → *Callable[[Domain], bool]*

Returns disjunction of given predicates.

```
>>> alphabetic_or_numeric = disjoint(str.isalpha, str.isnumeric)
>>> alphabetic_or_numeric('Hello')
True
>>> alphabetic_or_numeric('42')
True
>>> alphabetic_or_numeric('Hello42')
False
```

`lz.logical.exclusive_disjoin(*predicates: Callable[[Domain], bool]) → Callable[[Domain], bool]`  
Returns exclusive disjunction of given predicates.

```
>>> from keyword import iskeyword
>>> valid_object_name = exclusive_disjoin(str.isidentifier, iskeyword)
>>> valid_object_name('valid_object_name')
True
>>> valid_object_name('_')
True
>>> valid_object_name('1')
False
>>> valid_object_name('lambda')
False
```

`lz.logical.negate(predicate: Callable[[Domain], bool]) → Callable[[Domain], bool]`  
Returns negated version of given predicate.

```
>>> from lz.logical import negate
>>> false_like = negate(bool)
>>> false_like([])
True
>>> false_like([0])
False
```

## 1.6 replication module

`lz.replication.duplicate(object_: Domain, *, count: int = 2) → Iterable[Domain]`  
Duplicates given object.

`lz.replication.replicate(object_: Domain, *, count: int) → Iterable[Domain]`  
Returns given number of object replicas.

`lz.replication.replicator(count: int) → Callable[[Domain], Iterable[Domain]]`  
Returns function that replicates passed object.

```
>>> triplicate = replicator(3)
>>> list(map(tuple, triplicate(range(5))))
[(0, 1, 2, 3, 4), (0, 1, 2, 3, 4), (0, 1, 2, 3, 4)]
```

## 1.7 reversal module

`lz.reversal.reverse` (*object\_*: *Domain*, *\*\*\_*: *Any*) → *Range*

Returns reversed object.

```
>>> list(reverse(range(10)))
[9, 8, 7, 6, 5, 4, 3, 2, 1, 0]
>>> import io
>>> list(reverse(io.BytesIO(b'Hello\nWorld!'))))
[b'World!', b'Hello\n']
```

## 1.8 right module

`lz.right.accumulator` (*function*: *Callable*[[*Domain*, *Range*], *Range*], *initial*: *Range*) → *Callable*[[*Iterable*[*Domain*]], *Iterable*[*Iterable*[*Range*]]]

Returns function that yields cumulative results of given binary function starting from given initial object in direction from right to left.

```
>>> def to_next_fraction(partial_denominator: int,
...                      reciprocal: float) -> float:
...     return partial_denominator + 1 / reciprocal
>>> to_simple_continued_fractions = accumulator(to_next_fraction, 1)
>>> from itertools import repeat
>>> [round(fraction, 4)
...  for fraction in to_simple_continued_fractions(list(repeat(1, 10)))]
[1, 2.0, 1.5, 1.6667, 1.6, 1.625, 1.6154, 1.619, 1.6176, 1.6182, 1.618]
```

`lz.right.applier` (*function*: *Callable*[[...], *Range*], *\*args*: *Domain*, *\*\*kwargs*: *Domain*) → *Callable*[[...], *Range*]

Returns function that behaves like given function with given arguments partially applied. Given positional arguments will be added to the right end.

```
>>> square = applier(pow, 2)
>>> square(10)
100
```

`lz.right.attach` (*iterable*: *Iterable*[*Domain*], *object\_*: *Domain*) → *Iterable*[*Domain*]

Appends given object to the iterable.

`lz.right.attacher` (*object\_*: *Domain*) → *Callable*[[*Iterable*[*Domain*]], *Iterable*[*Domain*]]

Returns function that appends given object to iterable.

```
>>> attach_hundred = attacher(100)
>>> list(attach_hundred(range(10)))
[0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 100]
```

`lz.right.folder` (*function*: *Callable*[[*Domain*, *Range*], *Range*], *initial*: *Range*) → *Callable*[[*Iterable*[*Domain*]], *Range*]

Returns function that cumulatively applies given binary function starting from given initial object in direction from right to left.

```
>>> to_sum_evaluation_order = folder('{} + {}'.format, 0)
>>> to_sum_evaluation_order(range(1, 10))
'(1 + (2 + (3 + (4 + (5 + (6 + (7 + (8 + (9 + 0))))))))'
```

## 1.9 sorting module

`lz.sorting.register_implementation` (*algorithm: str, implementation: Optional[Callable[[...], Iterable[Domain]]] = None, \*, stable: bool = False, overwrite: bool = False*) → Union[Callable[[Callable[[...], Iterable[Domain]]], Callable[[...], Iterable[Domain]]], Callable[[...], Iterable[Domain]]]

Registers implementation of sorting algorithm.

```
>>> from typing import Any
>>> @register_implementation('CUSTOMSORTING')
... def custom_sorting(iterable: Iterable[Domain],
...                     *,
...                     key: Optional[Map[Domain, Any]] = None
...                     ) -> Iterable[Domain]:
...     ...
```

`lz.sorting.sorter` (\*, *algorithm: str = 'TIMSORT', key: Optional[Callable[[Domain], lz.hints.Sortable]] = None*) → Callable[[Iterable[Domain]], Iterable[Domain]]

Returns function that generates sorted iterable by given key with specified algorithm.

```
>>> sort = sorter()
>>> sort('Hello World!')
[' ', '!', 'H', 'W', 'd', 'e', 'l', 'l', 'l', 'o', 'o', 'r']
```

## 1.10 transposition module

`lz.transposition.transpose` (*object\_: Domain*) → Range

Transposes given object.

```
>>> list(map(tuple, transpose(zip(range(10), range(10, 20)))))
[(0, 1, 2, 3, 4, 5, 6, 7, 8, 9), (10, 11, 12, 13, 14, 15, 16, 17, 18, 19)]
```

## 1.11 typology module

`lz.typology.instance_of` (\**types: type*) → Callable[[Domain], bool]

Creates predicate that checks if object is instance of given types.

```
>>> is_any_string = instance_of(str, bytes, bytearray)
>>> is_any_string(b'')
True
>>> is_any_string('')
True
>>> is_any_string(1)
False
```

`lz.typology.subclass_of` (\**types: type*) → Callable[[Domain], bool]

Creates predicate that checks if type is subclass of given types.

```
>>> is_metaclass = subclass_of(type)
>>> is_metaclass(type)
```

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```
True
>>> is_metaclass(object)
False
```

---

**Note:** If member is not listed in documentation it should be considered as implementation detail that can change and should not be relied upon.

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## INDICES AND TABLES

- `genindex`
- `modindex`
- `search`



## PYTHON MODULE INDEX

### I

- lz.filtration, 1
- lz.functional, 2
- lz.iterating, 4
- lz.left, 7
- lz.logical, 7
- lz.replication, 8
- lz.reversal, 9
- lz.right, 9
- lz.sorting, 10
- lz.transposition, 10
- lz.typology, 10



## A

accumulator() (in module *lz.left*), 7  
 accumulator() (in module *lz.right*), 9  
 applier() (in module *lz.left*), 7  
 applier() (in module *lz.right*), 9  
 apply() (in module *lz.functional*), 2  
 attach() (in module *lz.left*), 7  
 attach() (in module *lz.right*), 9  
 attacher() (in module *lz.left*), 7  
 attacher() (in module *lz.right*), 9

## C

capacity() (in module *lz.iterating*), 4  
 chop() (in module *lz.iterating*), 4  
 chopper() (in module *lz.iterating*), 4  
 cleave() (in module *lz.functional*), 2  
 combine() (in module *lz.functional*), 2  
 compose() (in module *lz.functional*), 3  
 conjoin() (in module *lz.logical*), 7  
 curry() (in module *lz.functional*), 3  
 cut() (in module *lz.iterating*), 4  
 cutter() (in module *lz.iterating*), 4

## D

disjoin() (in module *lz.logical*), 7  
 duplicate() (in module *lz.replication*), 8

## E

exclusive\_disjoin() (in module *lz.logical*), 8  
 expand() (in module *lz.iterating*), 4

## F

first() (in module *lz.iterating*), 4  
 flatmap() (in module *lz.functional*), 3  
 flatmapper() (in module *lz.iterating*), 5  
 flatten() (in module *lz.iterating*), 5  
 flip() (in module *lz.functional*), 3  
 folder() (in module *lz.left*), 7  
 folder() (in module *lz.right*), 9

## G

grabber() (in module *lz.filtration*), 1

group\_by() (in module *lz.iterating*), 5  
 grouper() (in module *lz.iterating*), 5

## H

header() (in module *lz.iterating*), 5

## I

identity() (in module *lz.functional*), 3  
 in\_four() (in module *lz.iterating*), 5  
 in\_three() (in module *lz.iterating*), 5  
 in\_two() (in module *lz.iterating*), 5  
 instance\_of() (in module *lz.typology*), 10  
 interleave() (in module *lz.iterating*), 5

## K

kicker() (in module *lz.filtration*), 1

## L

last() (in module *lz.iterating*), 6  
 lz.filtration (module), 1  
 lz.functional (module), 2  
 lz.iterating (module), 4  
 lz.left (module), 7  
 lz.logical (module), 7  
 lz.replication (module), 8  
 lz.reversal (module), 9  
 lz.right (module), 9  
 lz.sorting (module), 10  
 lz.transposition (module), 10  
 lz.typology (module), 10

## M

mapper() (in module *lz.iterating*), 6

## N

negate() (in module *lz.logical*), 8

## P

pack() (in module *lz.functional*), 3  
 pairwise() (in module *lz.iterating*), 6

## Q

`quadruplewise()` (in module *lz.iterating*), 6

## R

`register_implementation()` (in module *lz.sorting*), 10

`replicate()` (in module *lz.replication*), 8

`replicator()` (in module *lz.replication*), 8

`reverse()` (in module *lz.reversal*), 9

## S

`scavenger()` (in module *lz.filtration*), 1

`separator()` (in module *lz.filtration*), 2

`sifter()` (in module *lz.filtration*), 2

`slide()` (in module *lz.iterating*), 6

`slider()` (in module *lz.iterating*), 6

`sorter()` (in module *lz.sorting*), 10

`subclass_of()` (in module *lz.typology*), 10

## T

`to_constant()` (in module *lz.functional*), 3

`trail()` (in module *lz.iterating*), 6

`trailer()` (in module *lz.iterating*), 6

`transpose()` (in module *lz.transposition*), 10

`triplewise()` (in module *lz.iterating*), 6