

**NAME**

List::Util - A selection of general-utility list subroutines

**SYNOPSIS**

```
use List::Util qw(first max maxstr min minstr reduce shuffle sum);
```

**DESCRIPTION**

List::Util contains a selection of subroutines that people have expressed would be nice to have in the perl core, but the usage would not really be high enough to warrant the use of a keyword, and the size so small such that being individual extensions would be wasteful.

By default List::Util does not export any subroutines. The subroutines defined are

**first BLOCK LIST**

Similar to `grep` in that it evaluates BLOCK setting `$_` to each element of LIST in turn. `first` returns the first element where the result from BLOCK is a true value. If BLOCK never returns true or LIST was empty then `undef` is returned.

```
$foo = first { defined($_) } @list      # first defined value in
@list
$foo = first { $_ > $value } @list     # first value in @list
which
                                     # is greater than $value
```

This function could be implemented using `reduce` like this

```
$foo = reduce { defined($a) ? $a : wanted($b) ? $b : undef }
undef, @list
```

for example `wanted()` could be `defined()` which would return the first defined value in `@list`

**max LIST**

Returns the entry in the list with the highest numerical value. If the list is empty then `undef` is returned.

```
$foo = max 1..10                      # 10
$foo = max 3,9,12                     # 12
$foo = max @bar, @baz                 # whatever
```

This function could be implemented using `reduce` like this

```
$foo = reduce { $a > $b ? $a : $b } 1..10
```

**maxstr LIST**

Similar to `max`, but treats all the entries in the list as strings and returns the highest string as defined by the `gt` operator. If the list is empty then `undef` is returned.

```
$foo = maxstr 'A'..'Z'                # 'Z'
$foo = maxstr "hello","world"        # "world"
$foo = maxstr @bar, @baz              # whatever
```

This function could be implemented using `reduce` like this

```
$foo = reduce { $a gt $b ? $a : $b } 'A'..'Z'
```

**min LIST**

Similar to `max` but returns the entry in the list with the lowest numerical value. If the list is empty then `undef` is returned.

```
$foo = min 1..10           # 1
$foo = min 3,9,12         # 3
$foo = min @bar, @baz     # whatever
```

This function could be implemented using `reduce` like this

```
$foo = reduce { $a < $b ? $a : $b } 1..10
```

#### minstr LIST

Similar to `min`, but treats all the entries in the list as strings and returns the lowest string as defined by the `lt` operator. If the list is empty then `undef` is returned.

```
$foo = minstr 'A'..'Z'     # 'A'
$foo = minstr "hello","world" # "hello"
$foo = minstr @bar, @baz   # whatever
```

This function could be implemented using `reduce` like this

```
$foo = reduce { $a lt $b ? $a : $b } 'A'..'Z'
```

#### reduce BLOCK LIST

Reduces `LIST` by calling `BLOCK`, in a scalar context, multiple times, setting `$a` and `$b` each time. The first call will be with `$a` and `$b` set to the first two elements of the list, subsequent calls will be done by setting `$a` to the result of the previous call and `$b` to the next element in the list.

Returns the result of the last call to `BLOCK`. If `LIST` is empty then `undef` is returned. If `LIST` only contains one element then that element is returned and `BLOCK` is not executed.

```
$foo = reduce { $a < $b ? $a : $b } 1..10           # min
$foo = reduce { $a lt $b ? $a : $b } 'aa'..'zz'    # minstr
$foo = reduce { $a + $b } 1 .. 10                  # sum
$foo = reduce { $a . $b } @bar                      # concat
```

If your algorithm requires that `reduce` produce an identity value, then make sure that you always pass that identity value as the first argument to prevent `undef` being returned

```
$foo = reduce { $a + $b } 0, @values;               # sum with 0
identity value
```

#### shuffle LIST

Returns the elements of `LIST` in a random order

```
@cards = shuffle 0..51      # 0..51 in a random order
```

#### sum LIST

Returns the sum of all the elements in `LIST`. If `LIST` is empty then `undef` is returned.

```
$foo = sum 1..10           # 55
$foo = sum 3,9,12         # 24
$foo = sum @bar, @baz     # whatever
```

This function could be implemented using `reduce` like this

```
$foo = reduce { $a + $b } 1..10
```

If your algorithm requires that `sum` produce an identity of 0, then make sure that you always pass 0 as the first argument to prevent `undef` being returned

```
$foo = sum 0, @values;
```

## KNOWN BUGS

With perl versions prior to 5.005 there are some cases where reduce will return an incorrect result. This will show up as test 7 of reduce.t failing.

## SUGGESTED ADDITIONS

The following are additions that have been requested, but I have been reluctant to add due to them being very simple to implement in perl

```
# One argument is true

sub any { $_ && return 1 for @_; 0 }

# All arguments are true

sub all { $_ || return 0 for @_; 1 }

# All arguments are false

sub none { $_ && return 0 for @_; 1 }

# One argument is false

sub notall { $_ || return 1 for @_; 0 }

# How many elements are true

sub true { scalar grep { $_ } @_ }

# How many elements are false

sub false { scalar grep { !$_ } @_ }
```

## SEE ALSO

*Scalar::Util, List::MoreUtils*

## COPYRIGHT

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