+ 0 0 0

Conjugate

+ y is the conjugate of y . For example, +3j4 is 3j_4 .

Plus

+ is defined as in elementary arithmetic, and is extended to complex numbers as usual.

Verb

- 0 0 0

Negate

-y is the negative of y . That is, it is defined as 0 - y . Thus, -2 0 _2 is _2 0 2 .

Minus

- is defined as in elementary arithmetic, and is extended to complex numbers as usual.

Verb

* 0 0 0

Signum

*y is _1 if y is negative, 0 if it is zero, 1 if it is positive; more generally, *y is the intersection of the unit circle with the line from the origin through the argument y in the complex plane.

Times

* denotes multiplication, defined as in elementary mathematics and extended to complex numbers as usual.

Verb

% 0 0 0

Reciprocal

% y is the reciprocal of y , that is, 1%y .

Divided by

x % y is division of x by y as defined in elementary math, except that 0%0 is 0 .

Verb

= _ 0 0

Self-Classify

=y classifies the items of the nub of y (that is, ~.y) according to equality with the items of y , producing a boolean table of shape #~.y by #y .

Equal

x=y is 1 if x is equal to y , and is otherwise 0 .

Verb

> 0 0 0

Open

Open is the inverse of box, that is, ><y is y . When applied to an open array (that has no boxed elements), open has no effect. Opened atoms are brought to a common shape.

Larger Than

x>y is 1 if x is tolerantly larger than y . Tolerance t is provided by >!.t .

Verb

< _ 0 0

Box

<y is an atomic encoding of y . The result has rank 0, and is decoded by > .

Less Than

x<y is 1 if x is tolerantly less than y . <!.t uses tolerance t .

Verb

+. 0 0 0

Real / Imaginary

+.y yields a two-element list of the real and imaginary parts of its argument. For example, +.3j5 is 3 5, and +. 3 is 3 0 .

GCD (Or)

x+.y is the greatest common divisor of x and y . If the arguments are boolean (0 or 1), the functions +. and *. are equivalent to logical or and and. The function -. similarly restricted is not.

Verb

~: _ 0 0

Nub Sieve

~:y is the boolean list b such that b#y is the nub of y .

Not Equal

x~:y is 1 if x is tolerantly unequal to y .

Verb

| 0 0 0

Magnitude

|y == %:y*+y .

Residue

The familiar use of residue is in determining the remainder on dividing a non-negative integer by a positive.

Verb

_ 1 _

Tally

#y is the number of items in y .

Copy

If the arguments have an equal number of items, then x#y copies +/x items from y, with i{x repetitions of item i{y . Otherwise, if one is an atom it is repeated to make the item count of the arguments equal.

Verb

i. 1 _ _

Integers

The shape of i.y is |y , and its atoms are the first */|y non-negative integers. A negative element in y causes reversal of the atoms along the corresponding axis.

Index Of

If rix is the rank of an item of x, then the shape of the result of x i. y is (-rix)}. $y . Each atom of the result is either #x or the index of the first occurrence among the items of x of the corresponding rix-cell of y .

Verb

? 0 0 0

Roll

? y yields a uniform random selection from the population i.y if y is a positive integer, or from the interval of numbers greater than 0 and less than 1 if y is 0.

Deal

x ? y is a list of x items randomly chosen without repetition from i.y .

Verb

|. _ 1 _

Reverse

|. y reverses the order of the items of y .

Rotate

x|.y rotates successive axes of y by successive elements of x .

Verb

{. _ 1 _

Head

{.y selects the leading item of y , or an item of fills if y has no items; that is, {.y == 0{1{.y .

Take

If x is an atom, x{.y takes from y an interval of |x items; beginning at the front if x is positive, ending at the tail if it is negative.

Verb

m/ u/ _ _ _

Insert

u/y applies the dyad u between the items of y . m/y inserts successive verbs from the gerund m between items of y, extending m cyclically as required. Thus, +`*/i.6 is 0+1*2+3*4+5 .

Table

If x and y are numeric lists, then x */ y is their multiplication table.

Adverb

m\ u\ _ 0 _

Prefix

u\y has #y items resulting from applying u to each of the prefixes k{.y , for k from 1 to #y . m\y applies successive verbs from the gerund m to the prefixes of y , extending m cyclically as required.

Infix

If x>:0 , the items of x u\ y result from applying u to each infix of length x . If x<0 , u is applied to non-overlapping infixes of length |x , including any final shard. x m\ y applies successive verbs from the gerund m to the infixes of y , extending m cyclically as required.

Adverb

u~ _ ru lu

Reflexive

u~ y == y u y . For example, ^~ 3 is 27, and +/ ~ i. n is an addition table.

Passive

~ commutes or crosses connections to arguments: x u~ y == y u x .

Adverb