

characters (such as carriage returns and linefeeds) occurring therein; in the display such characters are replaced by spaces. For example, try `< 8 32 $ a.`

## Floor < . 0 0 0 Lesser Of (Min )

<p><code>&lt;.y</code> gives the floor of <code>y</code>, that is, the largest integer less than or equal to <code>y</code>. Thus:</p> <pre>&lt;. 4.6 4 _4 _4.6 4 4 _4 _5</pre> <p>The implied comparison with integers is tolerant, as discussed under Equal (=), and is controlled by <code>&lt;.!.t.</code> See below for complex arguments.</p>	<p><code>x&lt;.y</code> is the lesser of <code>x</code> and <code>y</code>. For example:</p> <pre>3 &lt;. 4 _4 3 _4</pre> <pre>&lt;./7 8 5 9 2 2 &lt;./\7 8 5 9 2 7 7 5 5 2</pre>
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For a complex argument, the definition of `<.` is modelled by:

```
floor=: j./@(ip+(c2>c1),c1+:c2)
'`c1 c2 fp ip'=: (1:>+/@fp)`(>:/@fp)`(+.-ip)`(<.@+.)
```

As developed by McDonnell [10], this function has the following properties:

- Convexity: If  $(\langle .z1) = (\langle .z2)$  and  $z3$  lies on the line between  $z1$  to  $z2$ , then  $(\langle z3) = (\langle z1)$ .
- Translatability: If  $z4$  is a Gaussian integer, then  $(z4 + \langle .z5) = (\langle .z4 + z5)$ .
- Compatibility:  $(\langle .x j.0) = ((\langle .x)j.0)$  and  $(\langle .0 j.x) = (0 j.(\langle .x))$

The function `<.` can be viewed as a tiling by rectangles of unit area, all arguments within a rectangle sharing the same floor. One rectangle has vertices at `1j0` and `0j1`, with the other side passing through the origin. Rectangles along successive diagonals are displaced by one-half the length.

The phrase `j./@ip` “floors” the individual parts of a complex argument. Moreover, the floor `<.y` is equivalent to `->.-y`. In other words, it is the dual of ceiling with respect to (that is, under) arithmetic negation: `<. ↔ >.&.-` and `>. ↔ <.&.-`. Thus:

```
(>.&.- ; <.) 4.6 4 _4 _4.6
+-----+-----+
|4 4 _4 _5|4 4 _4 _5|
+-----+-----+
```

Continued

Floor                      < . 0 0 0      Lesser Of (Min )

Continued
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The expression  $\text{floor}(x+0.5)$  gives the integer nearest to the real argument  $x$ , and  $\text{floor}(z+0.5j)$  gives the Gaussian integer nearest to  $z$ . The number of digits needed to represent an integer is given by one plus the floor of its base ten logarithm:

```

a = 9 10 11 99 100 101
a ,. ( ,. 1:+<.) 10^. a=: 9 10 11 99 100 101
9 0.954243 1
10          1 2
11 1.04139 2
99 1.99564 2
100        2 3
101 2.00432 3

```