More on. . .
What's new in LuaTeX 0.43

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Overview

- What means TRT? — the aleph direction model in LuaTeX
- Global leaders — by LuaTeX
- Using \latelua within \leaders

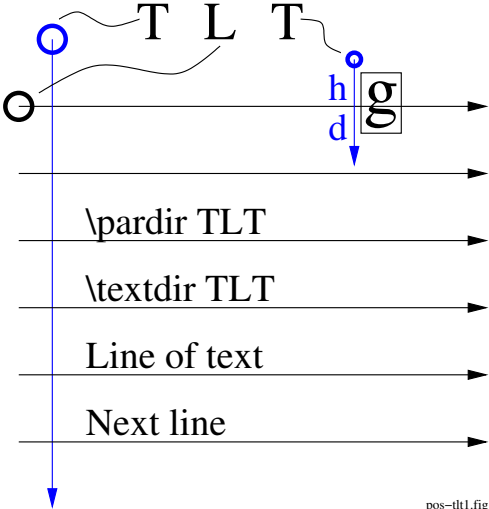# Multidirectional Positioning

LuaTeX knows many writing directions (inherited from Omega/aleph)

```
 #    Dir             Box dir          Glyph dir
----------------------------------------------------
 0    TLT = 010       dir_TL_ = 0      dir__LT =  0
 1    TLL = 011       dir_TL_ = 0      dir__LL =  1
 2    TLB = 012       dir_TL_ = 0      dir__LB =  2
 3    TLR = 013       dir_TL_ = 0      dir__LR =  3
 4    TRT = 030       dir_TR_ = 1      dir__RT =  4
 5    TRL = 031       dir_TR_ = 1      dir__RL =  5
 6    TRB = 032       dir_TR_ = 1      dir__RB =  6
 7    TRR = 033       dir_TR_ = 1      dir__RR =  7
 .    LTT, LTL, LTB, LTR, LBT, LBL, LBB, LBR,
 .    BLT, BLL, BLB, BLR, BRT, BRL, BRB, BRR,
 .    RTT, RTL, RTB, RTR, RBT, RBL,
30    RBB = 322       dir_RB_ = 7      dir__BB = 14
31    RBR = 323       dir_RB_ = 7      dir__BR = 15
```

Multidirectional Positioning

What TLT means. . .

T L T

h
d

g

\pardir TLT

\textdir TLT

Line of text

Next line

pos-tlt1.fig

Multidirectional Positioning

What means TRT, anyway?

TLT $\longrightarrow$

Multidirectional Positioning
What means TRT, anyway?

TLT $\longrightarrow$

$\longleftarrow$ **TRT**

Multidirectional Positioning

There are in principle also many glyph directions. . .

*LT   *RT   *LL   *RR

*LB   *RB   *LR   *RL
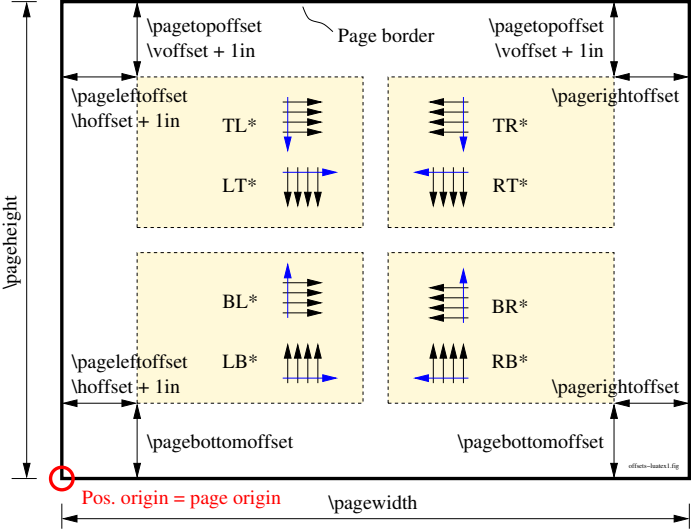
*TL   *BL   *BR   *TR   *TT   *TB   *BT   *BB
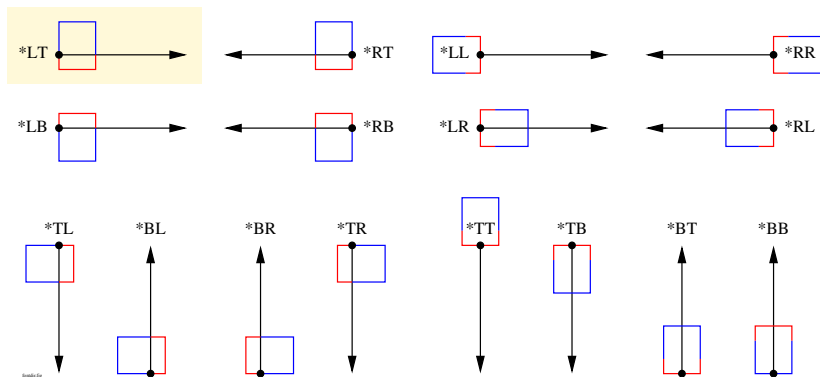
. . . but most available fonts are just *LT.

LuaTeX uses standard *LT fonts also e. g. for TRT typesetting.
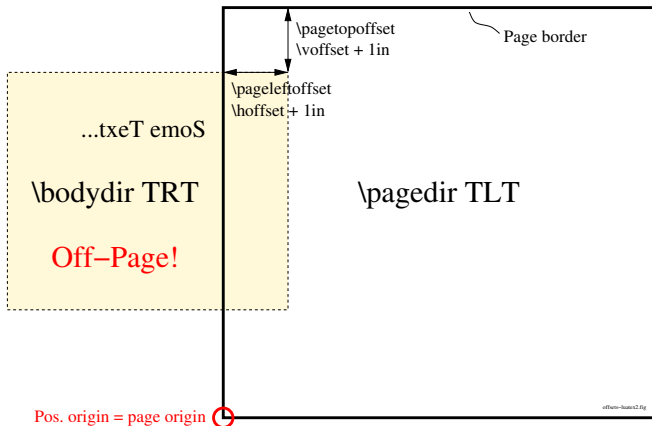
Multidirectional Positioning

Page offsets in LuaTeX depend on \pagedir — There are new offset parameters

For most directions \pagewidth and \pageheight are needed as well.

Multidirectional Positioning

\pagetopoffset
\voffset + 1in

Page border

\pageleftoffset
\hoffset + 1in

...txeT emoS

\bodydir TRT

Off–Page!

\pagedir TLT

offsets–linens2.fig
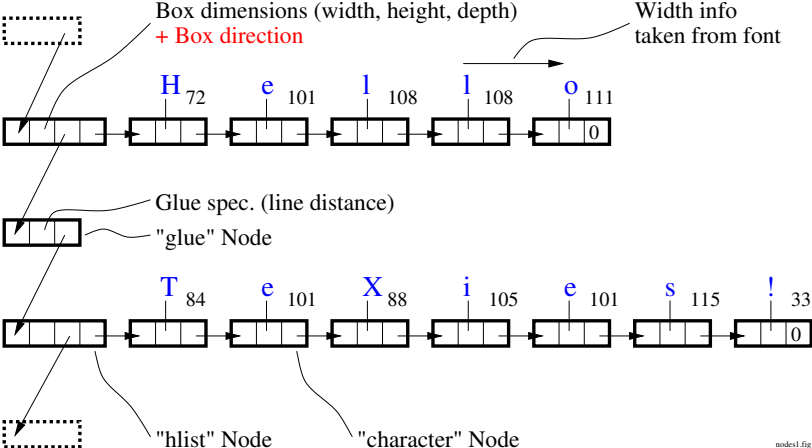
Pos. origin = page origin

Multidirectional Positioning

Available direction setting commands

- ► \pagedir ***
- ► \bodydir ***
- ► \pardir ***
- ► \textdir ***
- ► \mathdir ***
- ► \hbox dir *** {...}
- ► \vbox dir *** {...}

There are also commands for querying directions.

Multidirectional Positioning

What the output routine sees (simplified) — Node lists. . .

Box dimensions (width, height, depth)
+ Box direction

Width info
taken from font

H 72   e 101   l 108   l 108   o 111

Glue spec. (line distance)

"glue" Node

T 84   e 101   X 88   i 105   e 101   s 115   ! 33

"hlist" Node   "character" Node

nodes1.fig

Multidirectional Positioning

Two pairs of *global* position variables (TLT coordinates only):

- ► cur_h, cur_v — where the output routine is
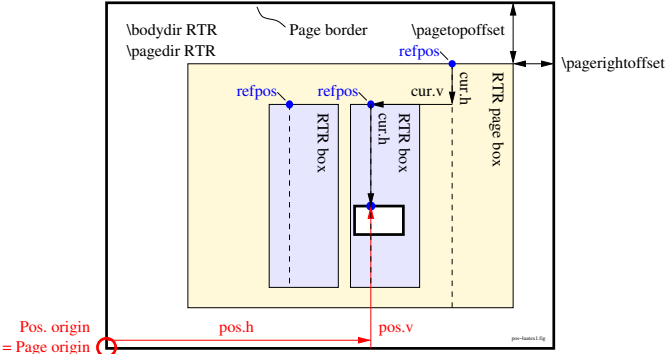- ► dvi_h, dvi_v — what goes into the DVI file
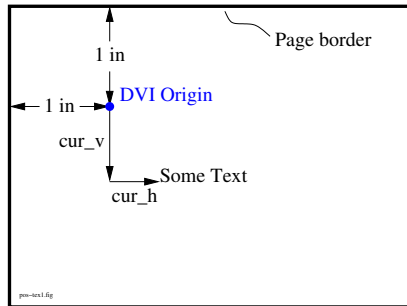
Before typesetting some item, dvi_h/v is synchronized to cur_h/v.

Multidirectional Positioning

New: Local box coordinates, global page coordiates

cur coordinates are *local* to box, in box coordinate system.

pos coordinates are in output page coordinate system.

The output routine keeps track of refpos and calculates pos from (cur.h, cur.v) and local box direction.

Multidirectional Positioning
News from the LuaTeX back-end

- ▶ New `scaledpos` structure (e. g., `cur.h`, `cur.v`).
- ▶ PDF page positioning calculations re-written (new design).
- ▶ Combined `dvi_ship_out()` and `pdf_ship_out()` into one.
- ▶ Combined `dvi_*list_out()` and `pdf_*list_out()` in one.
- ▶ Switching between DVI and PDF now by function pointers for back-end (node/whatsit) output functions.

$\longrightarrow$ Multidir positioning in the back-end is same for PDF & DVI.

- ▶ PDF and DVI positioning behaves identical.
- ▶ Less code to manage.
- ▶ Possibility to add other back-ends (e. g., Lua), while keeping multidir functionality consistent.

Global Leaders

Leaders are . . . . this.
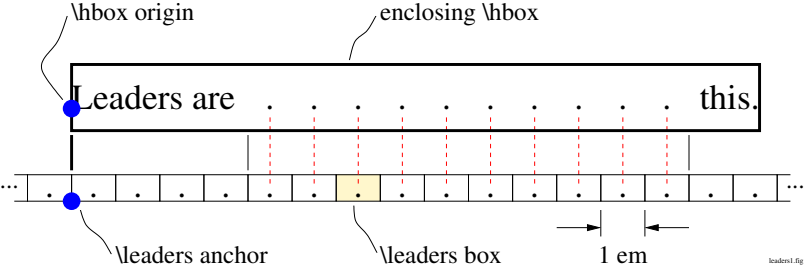
Leaders are\leaders\hbox to 1em{\hfil.\hfil}\hfil this.

Global Leaders

Leaders are . . . . this.

```
Leaders are\leaders\hbox to 1em{\hfil.\hfil}\hfil this.
```


leaders1.fig

Global Leaders

Leaders are . . . . this.

```
Leaders are\leaders\hbox to 1em{\hfil.\hfil}\hfil this.
```
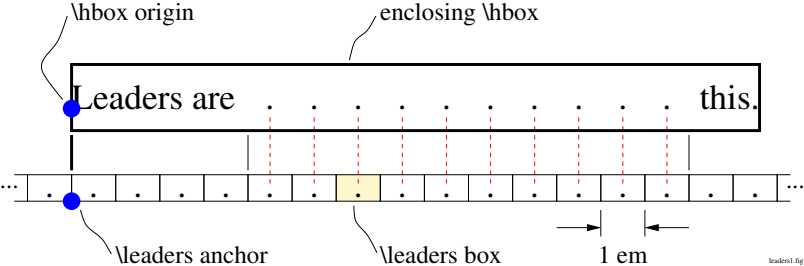

In `tex82.bug`, DEK, 1983:

152. \leaders to align by the smallest enclosing box. (April 1)

Global Leaders

(Contrived) Example:

Some table:
| a . . . . bc . . . . |
| abcde . . fghijklmnop |
| Two cols . . . . . . | more text . . . . . .

Another line . . . . with leaders

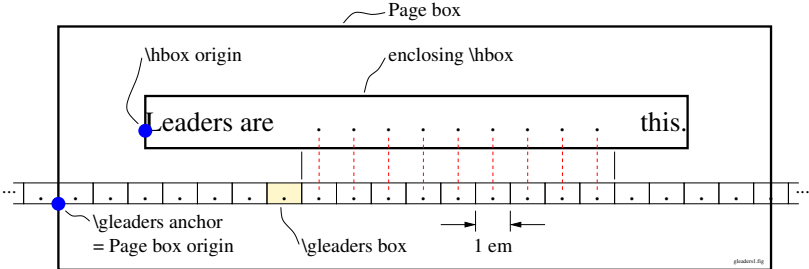$\longrightarrow$ \leaders don't align (different enclosing boxes).

Global Leaders

Experimental LuaTeX primitive \gleaders — Leaders anchored at the page box

Same example, just replace \leaders by \gleaders:

Some table:
| a . . . bc . . . |
| abcde . fghijklmnop |
| Two cols . . . . . . | more text . . . . . .

Another line . . . . with leaders

Same example, just replace \leaders by \gleaders:

\gleaders align by the *largest* enclosing box.

Global Leaders

Discussion

- ▶ \gleaders are an experimental primitive in LuaTEX.
- ▶ They don't use any LuaTEX-exclusive functions.
- ▶ The \gleaders mechanism could have been in TEX already.
- ▶ In LuaTEX \gleaders work multidir (hopefully).
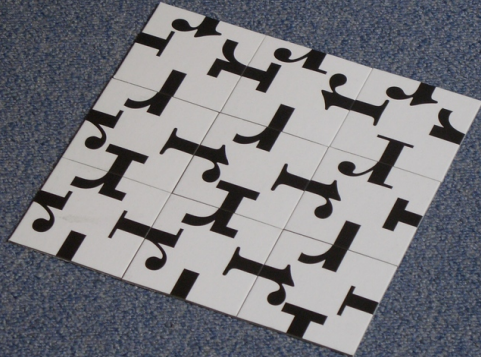- ▶ Useful? Drawbacks? Bugs?

Example:

```
\directlua{
  rgbrand = function()
    pdf.print(" "
      .. math.random() .. " " .. math.random() .. " "
      .. math.random() .. " " .. " rg "
    )
  end
}

Colored leaders\leaders
\hbox to 2pt{\latelua{rgbrand()}\hfil.\hfil}\hfill
          \latelua{pdf.print(" 0 g ")}like this.
```

Colored leaders...like this.

Thank you for your attention!