Bijlage 22

The Oldenburg eTEX/LATEX3/conTEXt meeting

David Carlisle

Present[1]

etex Peter Breitenlohner, Philip Taylor, Bernd Raichle, Jiri Zlatuska, Karel Skoupy.
latex3 Frank Mittelbach, Rainer Schöpf, Chris Rowley, Matthias Clasen, David Carlisle.
context Hans Hagen, Taco Hoekwater.

Categories

To start the discussion, Peter (initially) suggested some basic 'categories' of problem that could be discussed. The following discussion did not always follow this categorisation but it proved a useful starting point (in fact this list was modified during the discussion in the first session, and ended up something like this:

Syntax/Expansion/Programming Extensions to the macro programming language, not directly affecting typesetting.
Line-breaking/hmode
Page-breaking/vmode
Grid Typesetting
Characters and Fonts
Alignments
Math
Character Attributes (eg Colour)
Translation (eg I/O)
List Manipulations Manipulations on token or node lists.

Expansion Control

This was more or less discussed by email before the meeting. The following new commands were *agreed*:

\expanded⟨***general text***⟩ Expandable command returning the full expansion of the tokens in ⟨*general text*⟩.
\expandlater⟨***number***⟩ One level expand the nth token ahead. (`\expandafter` = `\expandlater\tw@`)

The following variants were discussed with no definite conclusion (?)

\expandfromtoken⁀⟨***number***⟩ This would look ahead to token ⁀(as in delimited argument matching) and then move forward (or back if negative) ⟨*number*⟩ tokens and expand the resulting token one level.
\undef⟨***csname***⟩ Undefine ⟨*csname*⟩. Like `\let\xxx\@undefined` but without relying on `\@undefined` being undefined. Some discussion over whether this was really any improvement over the `\let` form (given that you need to know in practice that `\undef` has not been redefined) or whether it would be worth it if it did not also remove ⟨*csname*⟩ from the hash table (which would be hard).
Real Register A data type that has the same behaviour/arithmetic as ⟨*dimen*⟩ but without the need to supply units. (This would save the many uses of `\strip@pt` in latex where units are added just to do arithmetic, and then need to be removed.
Boolean Datatype Some question as to what if anything was wanted here. Boolean variables, or boolean expressions, or... Also any extension would need to fit with current `\if\fi` nesting behaviour.
\ifinsidebox Similar to `\ifinner` but different. (See Hans' email).
Local/Global Assignments Some mechanism to specify that within the current scope global assignments are 'global' to nested groups but local to the current group.[2]

Line Breaking (hmode)

Full typography in hmode A switch to allow hboxes to be constructed with all the features that currently are only active in outer hmode. (Language nodes etc).
Discretionaries after - Switch to turn off automatic insertion of discretionaries after (ligatures ending in) -.
Hyphen desirability levels Two basic proposals.

1. Extended hyphenation patterns with weighted hyphenation points.
2. Extended hyphenation algorithm that tries first with patterns designed to split on compound word boundaries, then if needed a second pass with a finer set of patterns.

1. not everyone present all the time
2. Rainer sketched a possible interface on the board, which didn't make it to my notes — Rainer?

Second version has possible advantages in keeping the current hyphenation file format. Not clear what exactly is needed.

Page Building (vmode)

Need for a vertical analogue of `\discretionary` identified. (Probably just make `\discretionary` work in vmode.) This would seem to solve several problems with current lack of control over top-of-page behaviour.

Agreed new commands:

`\forcebreakpenaltylimit` If set to ≥ -10000 this is is ignored, but if set to < -10000 is taken as the threshold at which penalties force a break.

`\nthmark`⟨***number***⟩⟨***number***⟩⟨***number***⟩
`\nummarks`⟨***number***⟩⟨***number***⟩

`\nummarks`⟨*mark class*⟩⟨*box number*⟩ returns the number of marks of that class in the specified box. `\nthmark`⟨*mark class*⟩⟨*mark number*⟩⟨*box number*⟩ returns the nth mark of the specified class. (Generalises `\firstmark`).

This pair of commands was thought better than the original suggestion of an `\allmarks` command returning a list of all marks.

Other items to be considered:

`\outputpenalty10000` Look at removing the penalty node in the `\outputpenalty`10000 case.

holdinginserts `\holdinginserts=2` (or different name for compatibility reasons) Hold but also copy inserts (ie a combination of current behaviour for 0 and ≥ 1). Alternatively just use `\holdinginserts=1` but give access to individual inserts in some way similar to `\nthmark`.

buildpagehook Insert a token register at the point where 'build page' is called. The (effective) default contents of the register would be `\buildpage`, a new primitive that actually builds the page. cf `\output`/`\shipout`.

Node Handling

Perennial discussion about lack of `\last`* and `\un`* for most node types, and problems with revealing machine dependence and lack of register type corresponding to some nodes, eg rules.

Agree to look at `\removelastnode`.

Parsing General Texts

There was some discussion of generalising the `\uppercase` mapping of character tokens, although any decision would have to wait to see the final outcome of the proposals for symbolic character handling (see below)

General idea is `\map`⟨*map name*⟩⟨*general text*⟩.

Thus `\uppercase`would be `\map\uccode`(or perhaps a special csname to refer to the ⟨*uppercase map*⟩.

Some discussion of whether a token-token map would be enough (especially for the kind of parsing done in the context system) or whether a more general multiple token to multiple token system would be needed, but that leads down the road to implementing regexp replace (or OTP) and it was not clear if that fitted the etex framework.

An alternative to having an explicit map prefix command would be to have a way of automatically applying the map to input characters (but see later discussion on encoding support).

Mathematics

Matthias Clasen[3] reported on an investigation of possible extensions that he had recently done with Michael Downes. (See document Matthias posted.) Briefly the main points were:

mathstyle The providing of an integer valued variable that reveals and controls the current math mode (would work in a way similar to `\interactionmode`). This would require the provision of a prefix form for `\over`and friends. `\over`would still work but would be documented as *not* setting the mathstyle variable to the expected value if this infix form is used.

`\ifcramped` Test for cramped style, together with switch to force entry to cramped style.

kerning Between more kinds of math atoms.

Spacing table Access to the table of spaces inserted between the math atoms.

math classes Extend the number of these to allow more varied automatic spacing possibilities. Also primitive to ask the math class of an atom. (This would save bm taking the `\meaning` and then parsing the information out of the hex string returned.)

subformulas Avoid boxing subformulas.

glyph positions Remove dependence on weird glyph positioning in the font, like radical hanging below baseline, so math fonts could be used with other systems.

3. Matthias has since experimented with some change files to implement some of these ideas, see `ftp://peano.mathematik.uni-freiburg.de/pub/etex`

radical extensions Right end for radical? Or (harder) Both ends extending together.

Horizontal extensibles Some discusion of whether this would need an extension of tfm format. Outcome seemed to be that it would not, just use exsiting tfm data structure, the TeX primitive would know whether it was constructing a horizontal or vertical extension.

overloading of font dimens *Agreed* to look at reducing this.

Fixed parameters eg clearance around rules. *Agreed* to look at this as well.

under accents Use information that could be coded in the 'reverse' kerning with the skewchar for underaccents. However full accent solutions, including multiple accents requires table driven lookup. or otp or ...

16 families Increase?

tfm If format was extended, possible benefits?

Inner loop — lig/kern problems

After discussing several strategies for solving the problem that anything non expandable breaks ligature and kerning, including the possibility of allowing assignments in the inner loop (finally thought to dangerous) the following proposal (from Bernd, initially) was agreed to be worthy of further consideration:

Redesign hpack routine and the linebreak algorithm so that kerning and ligature is separated. First create the hlist with no lig/kern then make a second pass adding the ligatures and kerns. (This is the conceptual algorithm, an implementation may want to interleave these processes when 'safe' eg word by word.)

This would mean that fi always produced the fi ligature.

new primitive would be needed to break ligatures but not break hyphenation process also similarly `\nokern`.

Some questions on semantics of unhbox in this setup, whether the list should be "re-ligatured".

Modified algorithm could further split things up separating ligatures first then kerning. (Currently tex just does whichever comes first in the fonts lig/kern table if both are specified for a pair)

Also discussed mechanisms of overriding ligatures for a font eg the Portugese no fl ligature example. Also, simpler the possibility to turn off *all* ligatures in a font, for verbatim type uses.

Reconsider paragraph

If the possibility is given to re-break an hlist, tex needs to return more information about the resulting paragraph to enable a choice to be programmed. (It was thought unlikely that one could algorithmically set the paragraph parameters to 'correct' an earlier try, but one could at least try several pre-programmed possibilities, and then use the returned information to choose the 'best' outcome.

Possible info that might be useful

- Information currently only available in display math (`\predisplaysize`)
- total number of hyphens
- maximum number of adjacent hyphens
- maximum badness of a line
- minimum badness of a line
- total demerits
- fit class of worst line

The plan implemented but not released in V2 broke the paragraph onto the current vertical list, as normal but returned an hlist for further tries. This means that you need to program the removal of the original paragraph if you need to retry, which means not working on the main vertical list. Some alternatives were considered.

Basic scheme in TEX is:

construct hlist until reach `$$` or `\par` or end-of-vmode-group. Then

- Modification at end (unskip, add parfillskip etc), leave hmode.
- (A)
- look at legal breakpoints & choose optimal path (+/- `\looseness`)
- line break decision (1st pass, hyph, 2nd pass, 3rd pass)
- (B)
- postlinebreak (package, migration, append to vlist)
- in vmode or disply math (first point tex looks for token)

Plan 1 copy list at (A) into one global variable (destroy previous contents). This is a private unpackaged hbox. New primitive to 'unhbox' this where required.

Plan 2 At (B) call 'output routine'. Has badness information from linebreaking routine but not vertical size information. (This plan rejected, as vertical size information seems vital for intended applications).

Plan 2b Append the new vertical material, but don't exercise the page builder.

Word Grabbing

The following proposal seemed the most plausible (after several other schemes were rejected)

New expandable primitive `\grabword`

Expans tokens up to the first non expandable token that is not a ⟨*letter-other-space*⟩. Returns the resulting tokens surrounded by explict `{}` tokens and leaves the 'terminating' non expandable token in place.

Typical use

```
\def\foo#1{<pcdata>#1</pcdata>}
\expandafter\foo\grabword user supplied stuff.
```

Note that the 'word' that is picked up will be prematurely terminated by all the stuff that currently breaks ligatures, but if the symbolic character propsals could be implemented these would rarely need to appear mid word.

Named Reference Points

Named reference points on (h or v)boxes.

Like `\mark\special`etc puts special named reference point into current (vh)list.

When hbox is packaged reference point node has a position relative to reference point on box (integer arithmetic).

These positions could be made available similar to current `\wd` and friends.

`\xxxxx`⟨*number*⟩⟨*name*⟩

takes a box number and a symbolic name and returns the position (might need two commands to get x,y coordinates, or one that returns a pair)

When unbox a vertical list the information is lost but the reference nodes are still in the list so their positions in the new list will be made available when the new list is packaged.

When packaging an outer box, inherit all labels from inner ones.

Possibly (or more likely not) return some some info about the nesting.

Would the linebreaking algorithm need to add labels to each line???

Special `\specials`

A `\special` for writing positional information to the dvi file?

A delayed `\special`. (cf non-immediate `\write`).

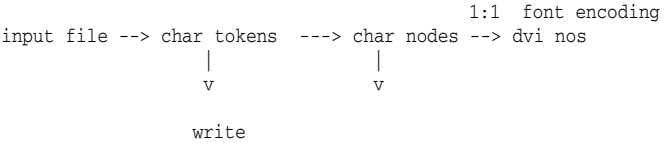
Combining penalties

`\penalty-500 \penalty10000` currently still allowable break, so user has no way to overrule some automatically inserted penalties. Various algorithms considered, eg some average, max, min, etc. In practice probably doesn't matter as long as it preserves 'finiteness'.

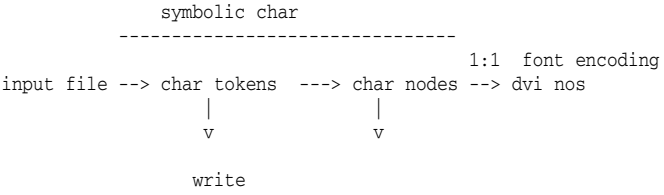
Any algorithm that allows to overwrite existing penalties that favour a break would be a very big improvement and should be *looked at closely*.

Symbolic Characters

Some schematics of current and proposed flow of 'characters' through tex. (Peter can write on the board faster than I can draw ascii art on this laptop. The following diagrams probably are rubbish, but I keep them exactly for now. Need replacing by something a bit more meaningful)[4]



want:



for each language have subset $\leq$ 256 SC which map to hyphenable ascii codes

SC+language encoding+font encoding ——————

Hyphenation Patterns (always based on 8bit table)

Possibly the mapping from symbolic characters to ascii codes may be many to one?

SC + font enc — represented in a font (somehow)

possibility of using unicode as 'symbolic names'

[This section needs filling in in a lot more detail]

Paramater matching

Two sets of extensions to paramater matching were considered.

Alternative delimited argument tokens

`\def\foo#1\a#|\b#|\c#2{...}`

The argument `#1` would be all the tokens up to the first occurence at the current brace group level of `\a` *or* `\b` *or* `\c`.

Within the definition the following forms would be available

`#1` the tokens of the first argument.

`#|1` the tokens delimiting the first argument, thus one of `\a`,`\b`,`\c` in the example.

`#2` the tokens of the second (non-delimited) argument.

4. Mathias has made some more extensive notes on this subject

`#|2` As the second argument is not delimied it is not clear what this should be. Probably empty, but could be an error, either would be OK as a behaviour.

Note that this extension is upwords compatible as the `#|` forms are all error conditions in the current tex.

A step towards regexp matching

Currently `\def\foo#1#2#3\xx{...}` always assigns the smallest possible arguments to the the first and second arguments with the third argument taking up the maximum number of tokens up to the delimiting token.

Proposal to allow

`\def\foo#*1#2#?3\xx{...}`

`#*1` argument may take non or more brace groups or tokens.

`#+1` argument may take one or more brace groups or tokens.

`#?1` argument may take at most one brace groups or tokens.

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