troff and friends

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this talk

- history and background
- theory
- practical usage

... of `nroff`, `troff`, and friends (`tbl`, `eqn`, `refer`, `pic`)

please interrupt me at any time in case of questions

please tell me what I should demonstrate

goal: motivate to learn and use these programs

my troff history

years ago	first contact through man pages wrote some simple documents, just to try it
a year ago	used `pic` for my diploma thesis
two months ago	started to learn `troff` better

thus: It's all pretty new to me too :-)

historical background

see my talk on “old software treasuries”

quick summary:

- terminal = keyboard + line printer
- no screen orientation
- size limits on software

history of typesetting

- completely by hand
- “hot metal” typesetting (Linotype)
- completely by computers (line printers and photo-typesetters)

goal: text automatically right-adjusted and hyphenated

history of troff

early 60s at MIT:

- `RUNOFF` for CTSS
- “right-justifying type-out program”
- ported to many systems (also MULTICS)

around 1970 at Bell Labs:

- `roff` by McIlroy (Unix version of `RUNOFF`)
- used daily at Bell Labs

history of troff (2)

`nroff` (“new roff”)

- by Joe Ossanna
- strength: macro programmable
- still only for daisy wheel/golf ball printers

`troff` (“typesetting roff”?)

- superset of `nroff`
- written when Bell Labs got a phototypesetter
- supports different fonts, font sizes, more characters, ...
- basically the same program as `nroff` with different output

different names

- word processing
- text formating
- document preparation
- typesetting

and: `nroff`, `ditroff`, `troff`, `otroff`

`groff` is the GNU implementation of `troff` and friends

TeX

Differences:

	metaphor	**basic entity**
troff	hand composer	line
TeX	raster image	paragraph

Heirloom `troff` does also include paragraph-at-once adjustment, hanging characters, and micro typography

but no question, TeX is great software!

nroff

nroff

overview

nroff does:

- filling ($\rightarrow$ hyphenation)
- adjusting ($\rightarrow$ adding inter-word spaces)

nroff input

Input consists of:

- command lines (match to `/^[.']/`)
- input lines (everything else)
- plus escape sequences (introduced with backslash)

All commands and names are one or two characters

Unrecognized commands are simply ignored

<nroff demo>

number registers

- own namespace
- set with: `.nr XY 42`
- substitute value: `\n(XY`
- increment, decrement in defineable steps possible
- defineable format: `.af XY 0001` (1, 0001, i, I, a, A)
- remove register: `.rr XY`

strings

- namespace together with macros and diversions
- set with: `.ds AB "foo`
- substitute value: `\*(AB`
- append: `.as AB "bar`
- rename: `.rn AB CD`
- remove: `.rm AB`
- may contain escape sequences

(diversions collect text for later insertion – not covered here)

macros

- share namespace with strings and diversions
- define:

```
.de AB
.  \" number of arguments: \n(.$
.  \" first argument: \$1
..
```

- append with: `.am`
- rename and remove like with strings
- add backslashes to delay interpretation
- may be nested

if

two kinds:

- `.if` with only one branch
- `.ie` and `.el` with two branches

true is:

- `!` false
- `'string'string'`
- non-negative number (-1 is false!)
- valid numeric comparison
- `e`/`o` and `t`/`n` in the matching cases

multiline branches with `\{` and `\}`

<nroff demo>

troff

troff

a `nroff` for phototypesetters

supports:

- high resolution and small movements
- different fonts
- different font sizes
- special characters

<troff demo>

macro packages

reasons

“It is fair to say that almost all of the Unix document preparation software is designed to cover up some parts of naked troff.”

headings instead of font sizes

macro packages

- principally not different from normal input
- get prepended to the normal input
- searched for at a central location
- usage: `troff –ms input.ms`
  (is the same as: `troff s input.ms`)
- multiple macro packages for one document possible, but beware of conflicts
- well known macro packages are: ms, mm, me, man

ms

- the standard macros
- developed for Bell Labs internal documents
- used for these slides
- easy to learn
- superseded by mm

man

- the man page macros
- that’s what you use when you write man pages
- stripped down to this specific task

slides

- came from Sape Mullender over Uriel to me
- `http://repo.cat-v.org/troff-slider/sample_slides.ms`
- I took `.SS` and `.IT` and added `.PA`, that's all
- could be improved ... and I plan to do that to learn more about troff ;-)
- these slides are created with those macros, of course

<macros demo>

warning

“[...] you should on no account try to modify the ms or mm macros. Strong men have been reduced to tears trying to comprehend the inner workings of these packages.”

preprocessors

preprocessors

- add “features” to `troff`
- work only on text between start and end markers
- copy everything else through
- they are a very nice concept to extend software!

write your own preprocessor (in the language of your choice) if you want to add some functionality

tbl

by Mike Lesk

example code:

```
.TS
center box;
lfB | cfB | cfB
l | c | c.
tab     separated       fields
=
several lines   of data
_
last    format  applies
_
to all  further lines
.TE
```

eqn

- by Kernighan and Cherry
- the first preprocessor
- would hardly exist without `yacc`
- write formulas as spoken in English
- Greek letters and math symbols available
- inline formulas possible with `delim $$`

example:

```
x sub {1,2}~=~{ -b ~+-~ sqrt { b sup 2~-~4 a c } } over { 2 a }
```

$$x_{1,2} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

refer

- by Mike Lesk
- for literature references (like `bibtex` for LaTeX)
- but does a “fuzzy” search
- macro package needs to support `refer`

example:

```
.[
words unique to the referenced document
.]
```

sample database entry:

```
%T Title
%A Author
%D Date of publication
%I Issuer
```

pic

- by Kernighan
- draw diagrams by “explaining” them
- impressed me much

example:

```
.PS
ED: box "ed"
arrow right
box "ex"
arrow
box "vi"
arrow up right from ED.ne
box "grep"
arrow down right from ED.se
box "sed"
.PE
```

further stuff

postprocessors

`dpost`

- for `troff`
- converts device independent output to PostScript

`col`

- for `nroff`
- removes backward movements (primary for multi column text)

doctype

- frequent question: which preprocessors are needed?
- `doctype` gives the answer
- introduced in “The Unix Programming Environment”
- a script, mainly in `awk`
- easy to extend to personal needs

literature

- “**Text Processing and Typesetting with Unix**” by Barron and Rees explains everything pretty good (focus on `nroff`)
- “**Heirloom Documentation Tools Nroff/Troff User's Manual**” by Ossanna, Kernighan, and Ritter is more a technical reference
- Various documents collected on `http://troff.org`

this talk was prepared using tools of the Heirloom project:
`http://heirloom.sf.net`

the slides macros were taken from
`http://repo.cat-v.org/troff-slider/`

all editing was done with `ed`, of course :-)

the slides and examples are available on my website
`http://marmaro.de/docs` and on
`http://ulm.ccc.de/ChaosSeminar/`

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