

# Grap: A command-line plotting tool

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1 May 2014

# \*roff toolchain for typesetting

- Simple typesetting language
  - ◊ Troff, nroff, ditroff, groff
- Pipelined pre-processors
  - ◊ Tbl for tables
  - ◊ Pic for diagrams
  - ◊ Refer for citations
  - ◊ Eqn for math
  - ◊ Grap for plots/graphs
- GNU \*roff – groff – implemented all but grap

# Grap: \*roff toolchain plotter

- “Grap-A Language for Typesetting Graphs, Tutorial and User Manual,” by Jon L. Bentley and Brian W. Kernighan
  - ◇ <http://www.kohala.com/start/troff/cstr114.ps>
- I gave up on groff late in life
- Always wanted to use grap
  - ◇ So I wrote it...

# Grap sits in a pipeline to groff

- Invocation

- ◇ `$ grap < file | pic | eqn | groff -ms > file.ps`

- ◇ `$ groff -peG -ms < file > file.ps`

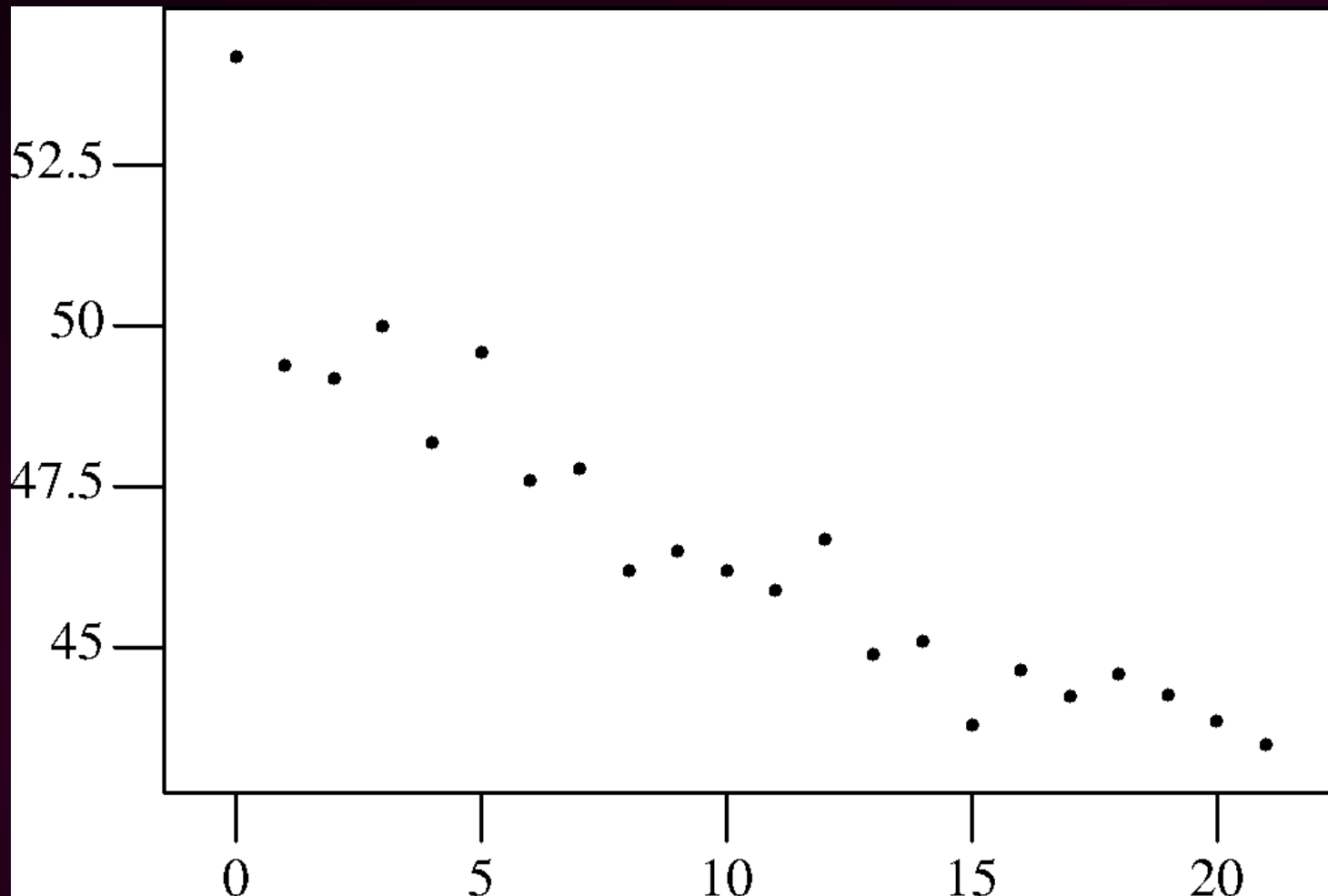
- Finds grap snippets in the code
- Replaces them with pic snippets

# Domain Specific Language

- Frame and axes
  - ◊ Log/linear
  - ◊ Labels and tickmarks
- Data to plot
  - ◊ Line and plot styles
  - ◊ Colors
- Examples...

# Simplest grap program

```
.G1  
    copy "400mtimes.d"  
.G2
```



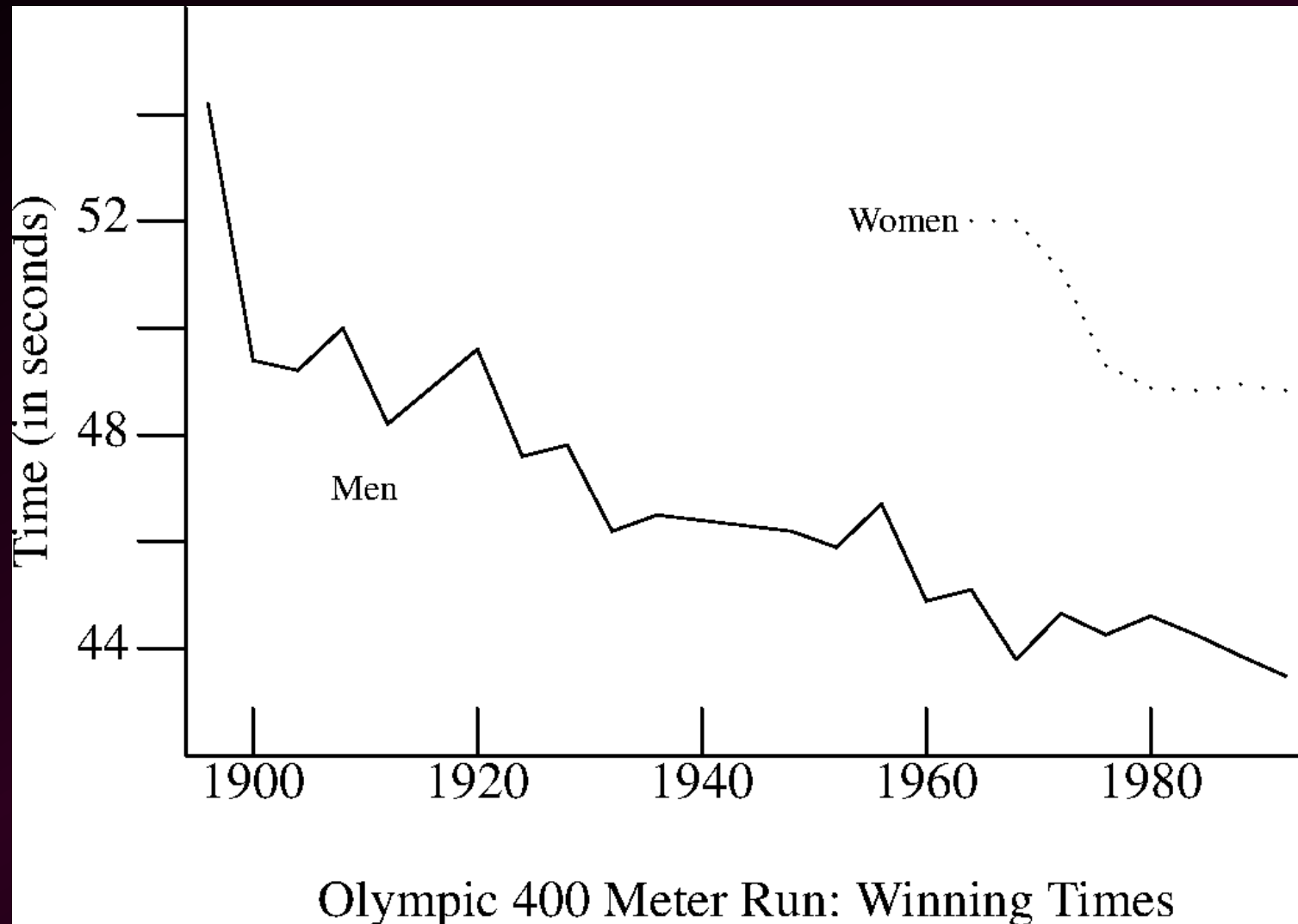
# A More Complex Plot

.G1

```
frame invis ht 2 wid 3 left solid bot solid
label left "Time (in seconds)"
label bot "Olympic 400 Meter Run: Winning Times"
coord x 1894, 1994 y 42, 56
ticks left out at 44 , 46 "", 48, 50 "", 52, 54 ""
ticks bot in from 1900 to 1980 by 20
draw solid
copy "400mpairs.d" thru {next at $1, $2;}
new dotted
copy "400wpairs.d"
"Women" size -3 at 1958,52
"Men" size -3 at 1910,47
```

.G2

# The More Complex Plot

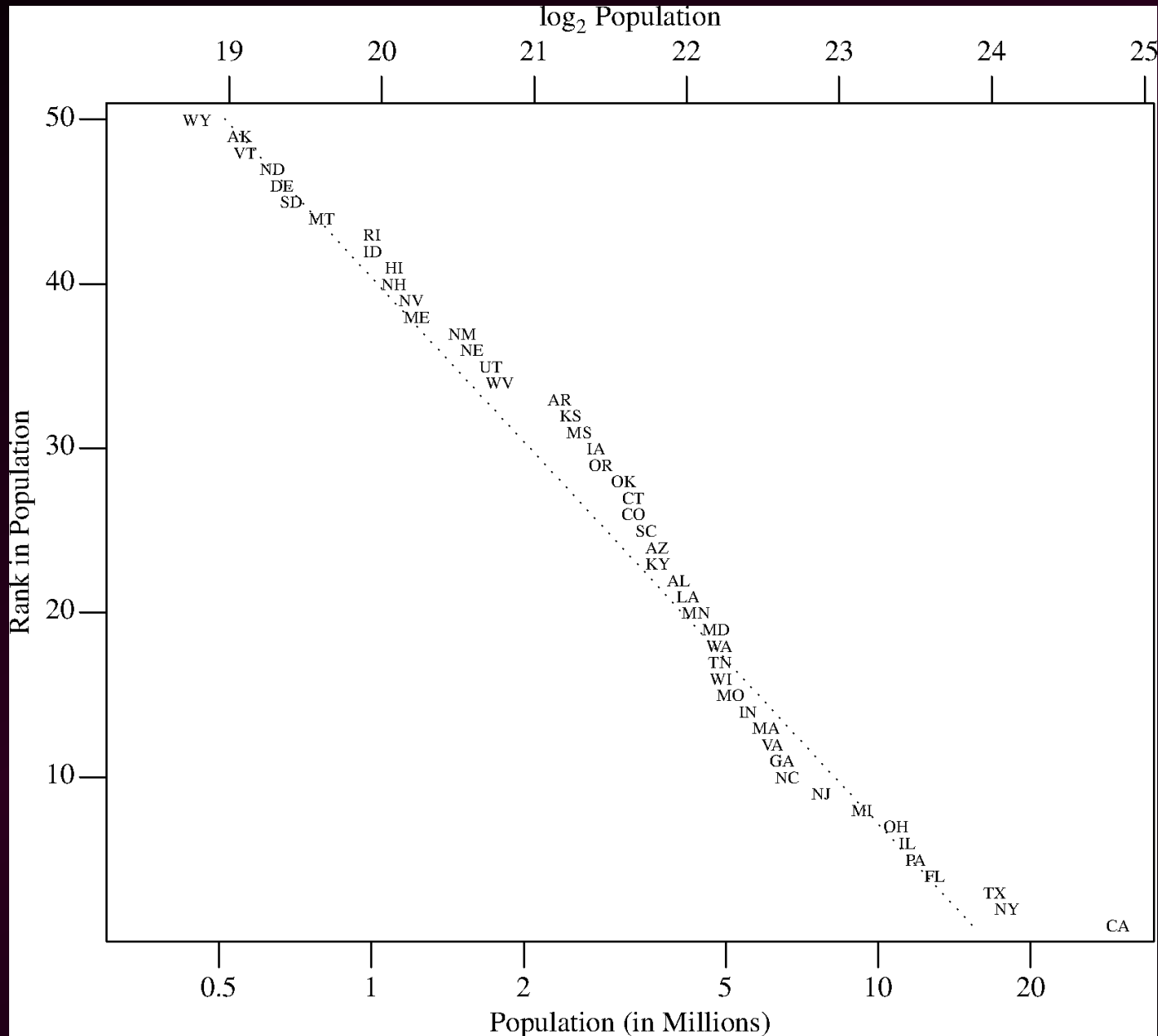




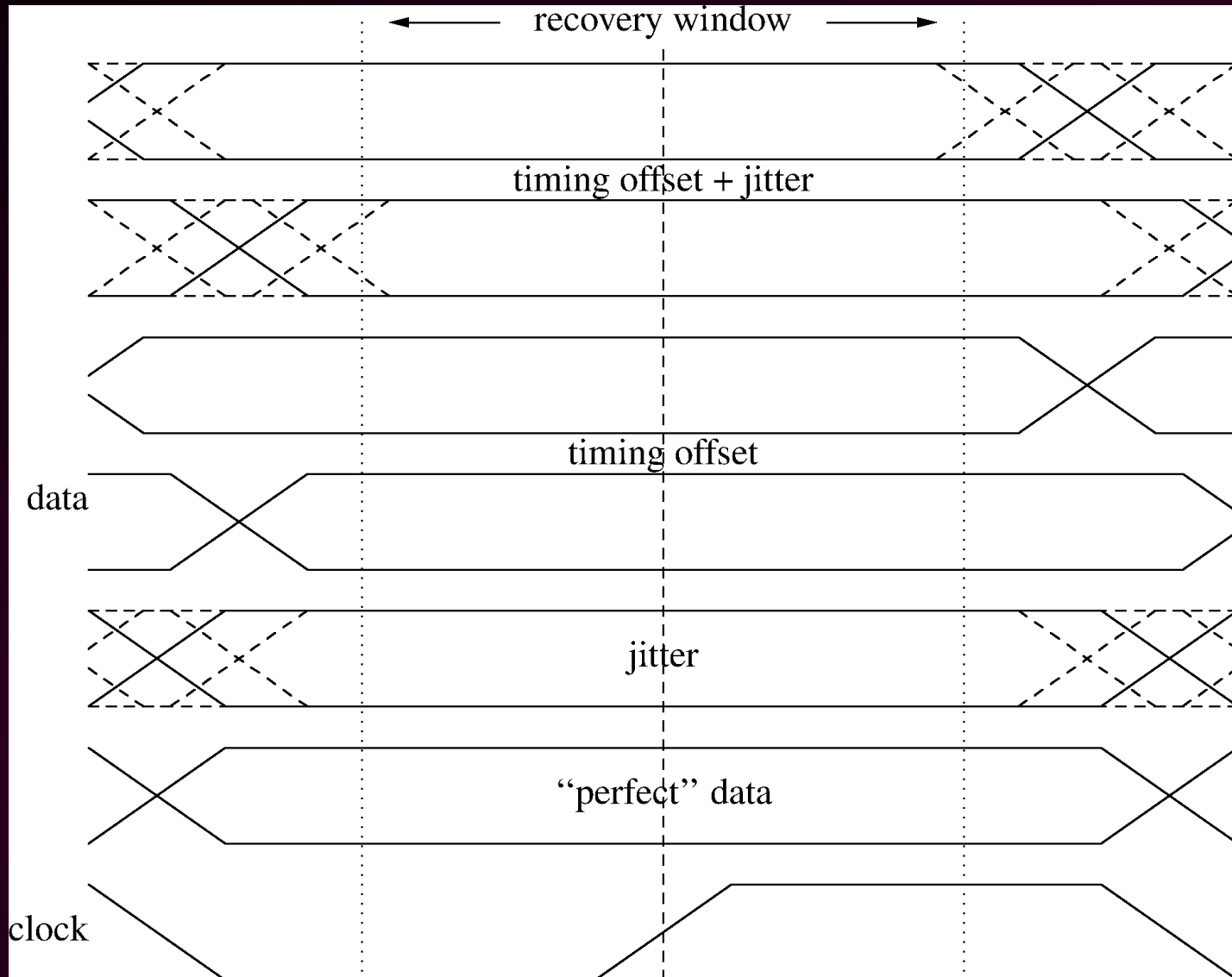
# One More Analysis Plot

```
.EQ
delim $$
.EN
.G1
  frame wid 5 ht 4
  label left "Rank in Population"
  label bot "Population (in Millions)"
  label top "$log sub 2$ Population"
  coord x .3, 35 y 0, 51 log x
  define L { (2.0^$1)/1e6 "$1" }
  ticks bot out at .5, 1, 2, 5, 10, 20
  ticks left out from 10 to 50 by 10
  ticks top out at L(19), L(20), L(21), L(22), L(23), L(24), L(25)
  thisy = 50
  copy "states.d" thru {
    "$1" size -4 at $3/1e6, thisy
    thisy = thisy-1
  }
  line dotted from 15.3,1 to .515, 50
.G2
```

# One More Analysis Plot



# Just Showing Off (Bruce Lilly)



# Conclusions

- Simple, powerful domain specific language
  - ◊ Fewer pre-set graphs
  - ◊ Much more control
- Somewhat Archaic Tool Chain
- Nice for simple analysis