

ONES AND TWOS (AND SO ON)

An odd observation about real-life numbers

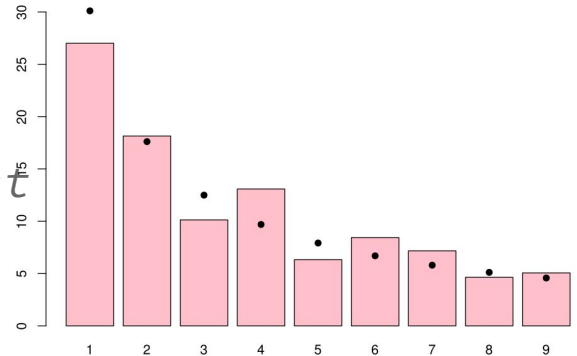
BENFORD'S LAW

In many real-life sets of numerical data, the leading digit is likely to be small. In sets that obey the law,

1 appears as the leading significant digit about 30 % of the time, while

9 appears as the leading significant digit less than 5 % of the time.

eg: ([wikipedia](#)) Distribution of first digits in the population of the 237 countries of the world



FRANK BENFORD'S DATA SET

e.g.

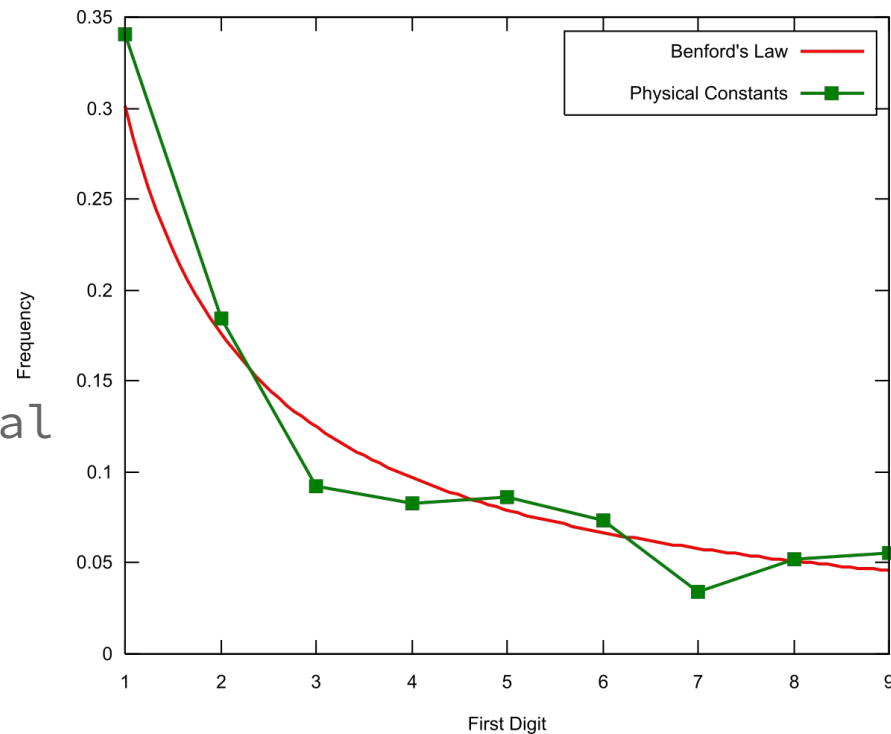
- the surface areas of 335 rivers,
- the sizes of 3259 US populations,
- 308 numbers contained in an issue of *Reader's Digest*,
- the street addresses of the first 342 persons listed in *American Men of Science*



maybe real numbers are just... smallish?

BUT ALSO

- 1800 molecular weights,
- 5000 entries from a mathematical handbook
- the first significant digit of physical constants (e.g. [link](#))



AND EVEN

the leading digit of

- 1,2,4,8,16,32,64,128,... ([link](#))
- 0,1,1,2,3,5,8,13,21,...



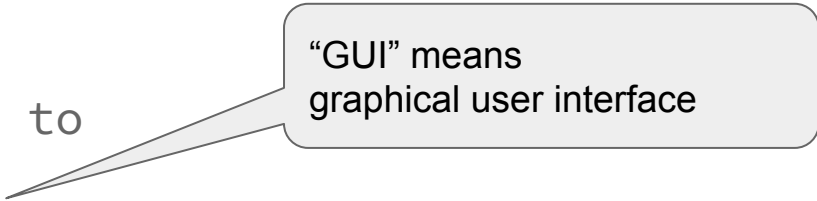
LET'S WRITE SOME CODE TO CHECK THIS OUT

We will need to

- ~~read a text file (using File)~~
- ~~work our way through it (using a “scanner”)~~
- several times (a “for” loop)
- present the results somehow (maybe draw a histogram?)

But first we should learn how to

- set up a GUI with buttons
- pass parameters into a method, and get results back



“GUI” means
graphical user interface