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# THE LANGUAGE OF NUMBERS

# COUNTING

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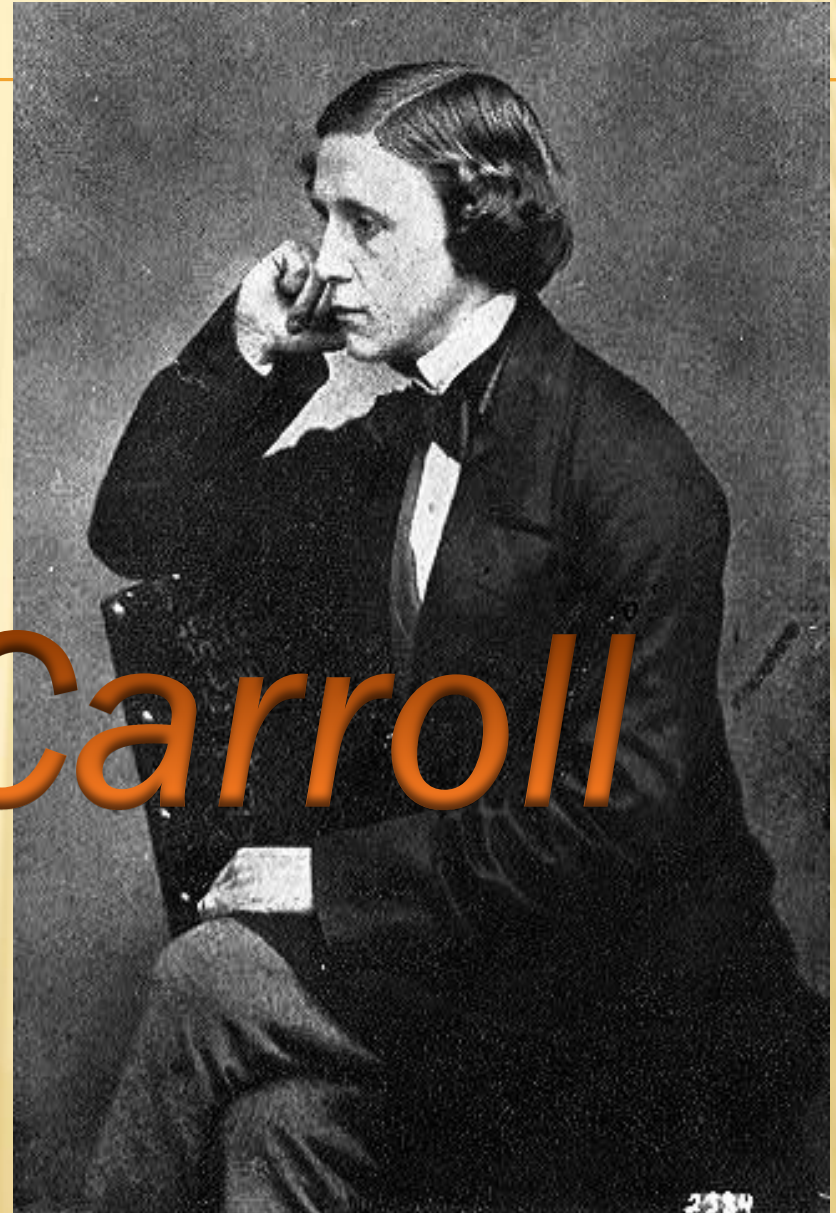
- ✗ What is a number?
- ✗ Numbers are abstractions, yes?
  - + Really, what is “two”?

## COUNTING (CONT.)

- ✗ Who is this?
- ✗ He taught mathematics at Oxford University, primarily on geometry and logic.

*Lewis Carroll*

- ✗ Believe it or not, he also wrote one of the most famous pieces of English literature.



# COUNTING (CONT.)

- ✗ "The time has come," the Walrus said,  
"To talk of many things:  
Of shoes—and ships—and sealing wax—  
Of cabbages—and kings—  
And why the sea is boiling hot—  
And whether pigs have wings."
- ✗ What are they talking about?
  - ✗ Shoes
  - ✗ Ships
  - ✗ Sealing wax
  - ✗ Cabbages
  - ✗ Kings



# COUNTING (CONT.)

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- ✗ So... what are we trying to prove??
- ✗ According to McLeish:
  - + “...we can use the set of ‘number words’, devoid of any concrete content, to describe the miscellaneous set, and we can point to each object in the set, identifying it in a unique way...”  
(Page 9)

# COUNTING (CONT.)

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- ✘ Counting evolved from tallying to the usage of body parts.
- ✘ Some names find root in body language.
  - + “digit” from the Latin *digitus* (finger)
  - + the Aztec word *matlactli* means both “ten” and “two hands”

# THE NUMBER SEQUENCE

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- ✘ Counting is recursive.
- ✘ Fascinatingly enough, the names for numbers ten or less are cross-cultural.
  - + Chart on Page 12
- ✘ Larger numbers, while still counted recursively, do not have similar nomenclature across cultures



# THE FIRST COMPUTER—TWO HANDS/TEN FINGERS

- ✘ It was not Archimedes, Pythagoras, Fibonacci or Newton who invented mathematics. It was unknown men and women, developing fundamentals (McLeish, 13).
  
- ✘ Now it is time to learn some “peasant arithmetic”.

# THE FIRST COMPUTER—TWO HANDS/TEN FINGERS (CONT.)

- ✘ “Peasant arithmetic” was finger calculations used by accountants in Europe for many centuries.
- ✘ First method:  $7 \times 9$
- ✘ Second method:  $13 \times 14$

# WRITTEN NUMBERS

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- ✘ Historically, two types of written numbers coexisted—“sophisticated” and “primitive”.
- ✘ “Primitive” methods were idiosyncratic tallies, used in markets and ordinary life
- ✘ “Sophisticated” numbers became elitist symbols used in philosophy.

# WRITTEN NUMBERS (CONT.)

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- ✘ However, as a necessity for formal calculations increased, the formal “sophisticated” number systems became more commonplace.

# WORKS REFERENCED

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- ✘ McLeish, John. *The Story of Numbers: How Mathematics Has Shaped Civilisations*. 1st Am. ed. New York, NY: Ballantine Books, 1994. Print.
- ✘ — "Googol." *Mathematics and the Imagination*. 2010. Web. <<http://en.wikipedia.org/wiki/Googol>>.