5118008 English for Software Developer

Numbers

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Number

- A number is an arithmetic value representing the quantity and the ordering of things
- A number system defines rules to denote numbers using digits (0 to 9) or symbols
  - In the decimal number system, the digits range from 0 to 9 and the numbers are represented with base 10.
  - Ex. 24601 is a five-digit decimal number
    - the leftmost digit (which is at the ten-thousands place) is 2 and the rightmost digit (which is at the unit place) is 1.

Decimal Notation

- Vocabulary
  - Digits: 0 to 9
  - Decimal mark (decimal seperator): the dot “.”
  - Sign mark: minus, plus

- Composition: [sign] [integer part] [decimal mark] [factional part]
  - Ex. -3.14

- Words for large numbers
  - hundred, thousand, million, billion

Fraction

- A fraction represents how many parts of a whole there are
  - represented as a rational number
- Simple fraction: *n*/*d* or $\frac{n}{d}$
  - *n*: numerator
  - *d*: denominator
  - pronounced as “n over d”, or “n-[d-th](s)”
  - e.g., ½, ¾, 1/5, 2/3, 8/5
- Ratio: x:y
  - equal to x divided by y
  - pronounced as “the ratio of x to y”

Exponentiation and Logartihm

- b^n
  - b: base
  - n: power (exponent)
  - pronounced as “b to the n” or “b raised to the power of n”
  - e.g., 2^5, 17^3

- $\log_b n$
  - b: base
  - n: power
  - pronounced as “log to base b of n”
  - e.g., log 3, $\log_2 9$

Exercise

- 50179712202
- 34.78
- 3^{-2}
- $\frac{3}{4}$
- $5\frac{3}{7}$

Writing Conventions

- Numbers less than 10 are written as words, the others are written in numerals
- Numbers that have been measured or calculated must be in numerals
- Use hyphens for a compound numeral word if it may be confusing
  - Ex. 21 as twenty-one, 3/8 as three-eighths

Different Numbers

- **Cardinal numbers** represent how many certain things exist (e.g., one, two, three)
- **Ordinal numbers** represent position, ranking or order in a sequence (e.g., first, second)
- **Multiplier** is an adjective indicating the number of times something is multiplied (e.g., single, double, triple)
- **Distributive number** represents how many times each (e.g., singly, doubly)

Ordinal Numbers

- An ordinal number shows position or order in a sequence
  - words: first, second, third, fourth, etc.
  - numerals: 1st, 2nd , 3rd , 4th, etc.

- Usages
  - sequential lists: e.g., second year, 10th anniversary, first born, second hand
  - ranking: e.g., first-class ticket, first-tier football league
  - position: e.g., first floor, second in line

Time Order

- Time order words indicates the order in which events happen

Before	First	Next	Sometimes	Last
Earlier	To begin	After	At times	Finally
Previously	Starting with	Consequently	From time to time	In conclusion
Formerly	Initially	Following	Occasionally	To conclude
Previous to...	Originally	In turn	Periodically	In the end
In the past	At the onset	Second	Rarely	Ultimately
Prior to...	At the beginning	Soon after	Seldomly	To finish
Preceding that	To begin with	Then	Some of the time	At the end
Yesterday	At the outset	Henceforth	Every so often	Lastly
Last time	Before all else	Third	On occasion	At last
Until that time	In the first place	Subsequently	Every now and then	In the long run
In advance	To start with	Later	Intermittently	At long last

Examples

- Prior to starting the work, we need to finalize the plan.
- In the preceding years, our profits have been declining.
- Before we proceed, let’s review our guidelines.
- After the event, we will gather for a debriefing.
- Subsequent to the meeting, we will share the minutes.
- I hated math at school but later I found it useful.
- She worked in a series of part-time jobs, followed by time working for a small construction company.

Example: Order in Sequence

8 9 2 15 7 3 6 11 10 4

- The first item is 8, and the last item is 4.
- The first three items are not greater than 10.
- The next to last is 10. The second from last is 11.
- The previous number of 15 is 2. The next number of 15 is 7.
- Number 7 precedes number 11.
- Number 6 is immediately followed by 11.
- Numbers 7, 3 and 6 consecutively appear in the sequence.

Distributive Numerals

- Represent how many things exist/work at once
- Examples
  - singly (solo), doubly (duo), triply (trio), quartet
  - pair
  - one by one
  - one at a time
  - one of each
  - two by two
  - two at a time
  - in twos
  - in threes
  - two-fold, three-fold
  - unary, binary, ternary, N-ary

Example

- She clicks through the results one by one and reads the code to understand how it uses the library.
- When a pair of keywords does not literally match, one technique often used to improve matching is to also match their synonyms or syntactic variants
- Given a pool of 1,000 applications compared two at a time, 499,500 comparisons are required to build the similarity matrix.
- Developers of virtual assistants face a two-fold challenge: how to set user expectations and educate users about what their assistants can do; and how to help these users while they are learning or even afterward as the assistant adds new skills.

Frequency

- Indefinite adverbs
  - Always > Usually > Often (70%) > Sometime (50%) > Rarely > Never
- Definite adverbs
  - Once a day/week/month
  - Twice a day
  - Three times a day
  - Every day (daily)
  - Every other day (each second day)
  - Every week (weekly)
  - Every two months (bimonthly)