Administrivia

- Registration ✓
- Labs ✓
- Homeworx + Guided Problem Sets ✓
- Office hours + homework parties + review sessions
- Ed Discussion + Discord
- Extensions - 24 hrs 50%
- 100% with extension
- DRES

Policies

- Don't be a jerk / CSC CARES
- Collaboration / Academic integrity / cite sources / write in your own words
- ChatGPT 🙃
def Collatz(n: int) → None:
    while (n > 1):
        if (n % 2 == 0):
            n = n / 2
        else:
            n = 3 * n + 1
    print("Yo!")

def 3SUM(A : List[int]) → bool:
    sort A
    for i = 1 to len(A):
        j = 1
        k = len(A)
        while (j < k):
                r = True
                k--
            else
                j++
    return False

O(n²) time

Finite

String = sequence of characters

Alphabet = Finite set Σ

typically Σ = \{0, 1\}

string is either

ε (empty string)

(a, x) a ∈ Σ x is a string

2·x
2x

STRING = (S, TRING)

= (S, ([T, [E, [E, [N, [G, [E]]]]]]))
**Theorem:** For all strings $w$ and $z$, $|w \cdot z| = |w| + |z|$

**Proof:** Let $w$ and $z$ be arbitrary strings.
Assume for all string $x$ such that $|x| < |w|$, then $|x \cdot z| = |x| + |z|$

There are two cases:

- **$w = \varepsilon$:**

  \[
  |w \cdot z| = |\varepsilon \cdot z| = |z| = 0 + |z| = |z| = |w| + |z| = w = \varepsilon
  \]

- **$w = a \cdot x$:**

  \[
  |w \cdot z| = |a \cdot (x \cdot z)| = 1 + |x \cdot z| = 1 + |x| + |z| = |a \cdot x| + |z| = |w| + |z| = w = a \cdot x
  \]

Therefore, $|w \cdot z| = |w| + |z|$