Hashing — Illustrated Guide

Overview

Hashing stores and retrieves data in O(1) expected time using hash tables (dicts/sets).

Core Techniques

- Hash map for value->index or value->count
- Hash set for membership checks
- Canonical keys for grouping strings
- Prefix-sum hashing for subarray counts

Included Problems

1) Two Sum — complement lookup
2) Group Anagrams — canonical key grouping
3) First Unique Character — counting
4) Longest Consecutive — sequence expansion
5) Subarray Sum Equals K — prefix sum + frequency map

Complexities

- Two Sum: O(n)
- Group Anagrams: O(N * L log L)
- First Unique Character: O(n)
- Longest Consecutive: O(n)
- Subarray Sum Equals K: O(n)

Tips

- Use sets for fast membership tests.
- Use dicts for mapping or counting.
- Initialize prefix maps with {0:1} for subarray sum problems.