

Set APIs (from Algorithms, 4th ed.)

- much like the symbol table APIs but only need the keys as values
- only need:
 - add
 - delete
 - contains
 - empty
 - size
- can add set operations such as
 - union
 - for elem in both lhs and rhs add to tmp set and return tmp
 - intersection
 - create tmp
 - if size of lhs < size of rhs -> for elem in lhs if also in rhs, add to tmp
 - else for elem in rhs, if also in lhs, add to tmp
 - return tmp
 - complement
 - need set containing all elements possible
 - create tmp set
 - for elem in all elements, if not in arg add to tmp
 - return tmp
- can implement using linked list, trees (red-black) (ordered), or hash tables (unordered)
- can have set or multiset
- commonly used for filter clients i.e. whitelist or blacklist, or deduplication

Mathematical notation

- \emptyset - empty set
- \mathbb{Z} - set of integers $\{ \dots -1, 0, 1, \dots \}$
- \mathbb{R} - set of real numbers
- \mathbb{N} - set of natural numbers $\{0, 1, 2, \dots\}$ or $\{1, 2, 3, \dots\}$
- specifies information about subsets and proper subsets
- defines set intersection, union, and difference
- empty set law
- idempotency laws
- commutative laws

- associative laws
- ditributive laws
- absorption laws
- DeMorgan's laws
- set complement
- disjoint
- partition
- finite
- infinite
- n- set
- singleton
- k-subset
- power set
- ordered pair
- Cartesian product
- n-tuples