# Hashing Data Structure

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**Basics :**

1. [Introduction](https://www.geeksforgeeks.org/hashing-set-1-introduction/)
2. [Index Mapping (or Trivial Hashing)](https://www.geeksforgeeks.org/index-mapping-or-trivial-hashing-with-negatives-allowed/)
3. [Separate Chaining for Collision Handling](https://www.geeksforgeeks.org/hashing-set-2-separate-chaining/)
4. [Open Addressing for Collision Handling](https://www.geeksforgeeks.org/hashing-set-3-open-addressing/)

**Easy :**

1. [Print a Binary Tree in Vertical Order | Set 2 (Hashmap based Method)](https://www.geeksforgeeks.org/print-binary-tree-vertical-order-set-2/)
2. [Find whether an array is subset of another array](https://www.geeksforgeeks.org/find-whether-an-array-is-subset-of-another-array-set-1/)
3. [Union and Intersection of two Linked Lists](https://www.geeksforgeeks.org/union-and-intersection-of-two-linked-lists/)
4. [Given an array A[] and a number x, check for pair in A[] with sum as x](https://www.geeksforgeeks.org/write-a-c-program-that-given-a-set-a-of-n-numbers-and-another-number-x-determines-whether-or-not-there-exist-two-elements-in-s-whose-sum-is-exactly-x/)
5. [Check if a given array contains duplicate elements within k distance from each other](https://www.geeksforgeeks.org/check-given-array-contains-duplicate-elements-within-k-distance/)
6. [Given an array of pairs, find all symmetric pairs in it](https://www.geeksforgeeks.org/given-an-array-of-pairs-find-all-symmetric-pairs-in-it/)
7. [Group multiple occurrence of array elements ordered by first occurrence](https://www.geeksforgeeks.org/group-multiple-occurrence-of-array-elements-ordered-by-first-occurrence/)
8. [How to check if two given sets are disjoint?](https://www.geeksforgeeks.org/check-two-given-sets-disjoint/)
9. [Pair with given product | Set 1 (Find if any pair exists)](https://www.geeksforgeeks.org/pair-with-given-product-set-1-find-if-any-pair-exists/)
10. [Find missing elements of a range](https://www.geeksforgeeks.org/find-missing-elements-of-a-range/)
11. [Count pairs with given sum](https://www.geeksforgeeks.org/count-pairs-with-given-sum/)
12. [Convert an array to reduced form | Set 1 (Simple and Hashing)](https://www.geeksforgeeks.org/convert-an-array-to-reduced-form-set-1-simple-and-hashing/)
13. [Return maximum occurring character in an input string](https://www.geeksforgeeks.org/return-maximum-occurring-character-in-the-input-string/)
14. [Find the first repeating element in an array of integers](https://www.geeksforgeeks.org/find-first-repeating-element-array-integers/)
15. [Print All Distinct Elements of a given integer array](https://www.geeksforgeeks.org/print-distinct-elements-given-integer-array/)
16. [Find all permuted rows of a given row in a matrix](https://www.geeksforgeeks.org/find-permuted-rows-given-row-matrix/)

**Intermediate :**

1. [Find Itinerary from a given list of tickets](https://www.geeksforgeeks.org/find-itinerary-from-a-given-list-of-tickets/)
2. [Find number of Employees Under every Employee](https://www.geeksforgeeks.org/find-number-of-employees-under-every-manager/)
3. [Check if an array can be divided into pairs whose sum is divisible by k](https://www.geeksforgeeks.org/check-if-an-array-can-be-divided-into-pairs-whose-sum-is-divisible-by-k/)
4. [Find four elements a, b, c and d in an array such that a+b = c+d](https://www.geeksforgeeks.org/find-four-elements-a-b-c-and-d-in-an-array-such-that-ab-cd/)
5. [Find the largest subarray with 0 sum](https://www.geeksforgeeks.org/find-the-largest-subarray-with-0-sum/)
6. [Longest Consecutive Subsequence](https://www.geeksforgeeks.org/longest-consecutive-subsequence/)
7. [Count distinct elements in every window of size k](https://www.geeksforgeeks.org/count-distinct-elements-in-every-window-of-size-k/)
8. [Design a data structure that supports insert, delete, search and getRandom in constant time](https://www.geeksforgeeks.org/design-a-data-structure-that-supports-insert-delete-search-and-getrandom-in-constant-time/)
9. [Length of the largest subarray with contiguous elements](https://www.geeksforgeeks.org/length-largest-subarray-contiguous-elements-set-2/)
10. [Find if there is a subarray with 0 sum](https://www.geeksforgeeks.org/find-if-there-is-a-subarray-with-0-sum/)
11. [Print all subarrays with 0 sum](https://www.geeksforgeeks.org/print-all-subarrays-with-0-sum/)
12. [Find subarray with given sum | Set 2 (Handles Negative Numbers)](https://www.geeksforgeeks.org/find-subarray-with-given-sum-in-array-of-integers/)
13. [Implementing our Own Hash Table with Separate Chaining in Java](https://www.geeksforgeeks.org/implementing-our-own-hash-table-with-separate-chaining-in-java/)
14. [Vertical Sum in a given Binary Tree](https://www.geeksforgeeks.org/vertical-sum-in-a-given-binary-tree/)
15. [Group Shifted String](https://www.geeksforgeeks.org/group-shifted-string/)
16. [Check for Palindrome after every character replacement Query](https://www.geeksforgeeks.org/check-for-palindrome-after-every-character-replacement-query/)

**Hard :**

1. [Clone a Binary Tree with Random Pointers](https://www.geeksforgeeks.org/clone-binary-tree-random-pointers/)
2. [Largest subarray with equal number of 0s and 1s](https://www.geeksforgeeks.org/largest-subarray-with-equal-number-of-0s-and-1s/)
3. [Palindrome Substring Queries](https://www.geeksforgeeks.org/palindrome-substring-queries/)
4. [Find smallest range containing elements from k lists](https://www.geeksforgeeks.org/find-smallest-range-containing-elements-from-k-lists/)
5. [Cuckoo Hashing – Worst case O(1) Lookup!](https://www.geeksforgeeks.org/cuckoo-hashing/)
6. [Subarrays with distinct elements](https://www.geeksforgeeks.org/subarrays-distinct-elements/)

**Misc :**

1. [Advantages of BST over Hash Table](https://www.geeksforgeeks.org/advantages-of-bst-over-hash-table/)
2. [Internal Working of HashMap in Java](https://www.geeksforgeeks.org/internal-working-of-hashmap-java/)
3. [Hash Table vs STL Map](https://www.geeksforgeeks.org/hash-table-vs-stl-map/)