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# Basic Data structure :

Standard Template Library :

1) Vector :

* Discussion on vectors.
* Discussion on [A. Sereja and Dima](https://codeforces.com/problemset/problem/381/A) (1)
* Discussion on [852. Peak Index in a Mountain Array](https://leetcode.com/problems/peak-index-in-a-mountain-array/) (0, vector max\_element )

2) String :

* Discussion on String.
* <https://codeforces.com/problemset/problem/118/A>
* [https://www.hackerearth.com/problem/algorithm/the-palindrome-2/description/](https://codeforces.com/problemset/problem/118/A)
* [https://practice.geeksforgeeks.org/problems/sum-of-digit-is-pallindrome-or-not/0](https://codeforces.com/problemset/problem/118/A)
* [https://codeforces.com/contest/112/problem/A](https://codeforces.com/problemset/problem/118/A)
* [https://codeforces.com/contest/78/problem/A](https://codeforces.com/problemset/problem/118/A)
* [https://www.hackerearth.com/problem/algorithm/lexogeek-e6450fb7/description/](https://codeforces.com/problemset/problem/118/A)

3) Pair :

* Discussion on Pair.
* [A. Rank List](https://codeforces.com/problemset/problem/166/A) (1, sort )
* <https://codeforces.com/problemset/problem/166/A>
* <https://practice.geeksforgeeks.org/problems/count-distinct-pairs-with-difference-k/0>
* <https://codeforces.com/contest/44/problem/A>

4) Map:

* Discussion on map.
* [A. Tom Riddle's Diary](https://codeforces.com/contest/855/problem/A) ( 1, string )
* [A. Indian Summer](https://codeforces.com/contest/44/problem/A) ( 1, string, pair )
* [C - Good Sequence](https://atcoder.jp/contests/arc087/tasks/arc087_a) (2, vector unique )

Exercise on map :

* [C. Boxes Packing](https://codeforces.com/contest/903/problem/C) ( 3, greedy )
* [C. Registration system](https://codeforces.com/contest/4/problem/C) (1, string )
* [B. Radio Station](https://codeforces.com/contest/918/problem/B) (1, string )
* [RPLD - Database](https://www.spoj.com/problems/RPLD/) ( 1, pair )

5) Set :

* Discussion on set.
* <https://leetcode.com/problems/contains-duplicate/>
* <https://codeforces.com/problemset/problem/469/A>
* <https://www.hackerrank.com/challenges/cpp-sets/problem>
* <https://practice.geeksforgeeks.org/problems/c-stl-set-6-set/1>
* <https://practice.geeksforgeeks.org/problems/set-operations/1>
* <https://codeforces.com/problemset/problem/22/A>

6) Multiset :

* Discussion on multiset
* [C. Stripe 2](https://codeforces.com/contest/21/problem/C) (3, partial sum )

7) Stack :

* Discussion on stack.
* [balanced brackets](https://www.hackerearth.com/practice/data-structures/stacks/basics-of-stacks/practice-problems/algorithm/balanced-brackets-3-4fc590c6/description/) (1, bracket sequence )

8) Queue :

* Discussion on Queue
* [10935 - Throwing cards away I](https://onlinejudge.org/index.php?option=com_onlinejudge&Itemid=8&page=show_problem&problem=1876) ( 1, stratforward )
* [540 - Team Queue](https://onlinejudge.org/index.php?option=com_onlinejudge&Itemid=8&page=show_problem&problem=481) ( 3 )

9) Deque :

* Discussion on Deque

10) Priority queue :

* Discussion on Priority Queue.
* [B. T-shirt buying](https://codeforces.com/contest/799/problem/B) ( 4, map )[10954 - Add All](https://onlinejudge.org/index.php?option=com_onlinejudge&Itemid=8&page=show_problem&problem=1895) ( 4, nice ).
* [D. Constructing the Array](https://codeforces.com/contest/1353/problem/D) (5, get max by making negative or comparator )

Exercise on Priority Queue :

* [B. T-shirt buying](https://codeforces.com/contest/799/problem/B) ( 4, map )
* [REDARR2 - Reduce the array](https://www.spoj.com/problems/REDARR2/) ( same [10954 - Add All](https://onlinejudge.org/index.php?option=com_onlinejudge&Itemid=8&page=show_problem&problem=1895) )

Binary Search:

11) Binary search :

* Discussion on Binary Search
* [349. Intersection of Two Arrays](https://leetcode.com/problems/intersection-of-two-arrays/) ( binary search, unique, sort )

12) Upper bound & Lower bound :

* Discussion on upper & lower bound.
* [35. Search Insert Position](https://leetcode.com/problems/search-insert-position/) ( 0, implement it just )
* [1351. Count Negative Numbers in a Sorted Matrix](https://leetcode.com/problems/count-negative-numbers-in-a-sorted-matrix/) ( 1,lower bound with rbegin and rend )
* [704. Binary Search](https://leetcode.com/problems/binary-search/) (1, lower bound, binary search )

Exercise on upper bound & lower bound:

* [B. Books](https://codeforces.com/problemset/problem/279/B) (3, partial sum )
* [167. Two Sum II - Input array is sorted](https://leetcode.com/problems/two-sum-ii-input-array-is-sorted/) ( 1, practice )

13) Integer bisection:

* Discussion on integer bisection.
* [MATHLOVE - Math is Love](https://www.spoj.com/problems/MATHLOVE/) ( 2 )
* [SABBIRGAME - Sabbir and Game](https://www.spoj.com/problems/SABBIRGAME/) (2, iteration on array )
* [C. K-Dominant Character](https://codeforces.com/contest/888/problem/C)

Exercise for integer bisection :

* [RPLC - Coke madness](https://www.spoj.com/problems/RPLC/) (2, same as sabbir game )

14) Float bisection:

* Discussion on Float bisection.
* [1072 - Calm Down](http://www.lightoj.com/volume_showproblem.php?problem=1072)
* [1043 - Triangle Partitioning](http://www.lightoj.com/volume_showproblem.php?problem=1043)

Exercise for float bisection:

* [B. Energy exchange](https://codeforces.com/contest/68/problem/B)
* [A. Guilty — to the kitchen!](https://codeforces.com/contest/42/problem/A)

Policy Based data structure:

16) Policy Based data structure :

* Discussion Policy based data structure.
* [D. Petya and Array](https://codeforces.com/problemset/problem/1042/D) ( 3 )
* [1090. In the Army Now](https://acm.timus.ru/problem.aspx?space=1&num=1090) ( 2, smaller )
* [1521. War Games 2](https://acm.timus.ru/problem.aspx?space=1&num=1521) ( 3, index )

Exercise for Policy based data structure:

* [B. Books](https://codeforces.com/problemset/problem/279/B)
* [1028. Stars](https://acm.timus.ru/problem.aspx?space=1&num=1028)
* [1439. Battle with You-Know-Who](https://acm.timus.ru/problem.aspx?space=1&num=1439)
* <https://toph.co/p/cut-the-rope>

# Number theory:

17 ) Sieve of Eratosthenes & Using the template of bitwise sieve.

* Discussion on Sieve of Eratosthenes
* Learn Using the template of bitwise sieve
* Uva 543 - Goldbach's Conjecture

18) Prime factorization

* Discussion on Prime factorization
* Prime factorization using harmonic series.
* 11466 - Largest Prime Divisor
* 583 - Prime Factors

19) Modular arithmetic.

* Modular arithmetic.
* Modular arithmetic template.
* Lightoj 1067 - Combinations
* Lightoj 1214 - Large Division

20) Number of divisor & Sum of divisors

* Number of divisors
* Sum of divisors

21) Euler Totient or Phi Function

22) Upper bound of number of divisors

23) Euler Phi Extension Theorem

24) Euler Phi Divisor Sum Theorem

* Discussion on Euler phi divisor sum theorem
* <https://toph.co/p/life-of-phi>

25) Legendre's formula

<https://www.hackerearth.com/practice/algorithms/searching/binary-search/practice-problems/algorithm/the-furious-five-69521576/>

26) Factorization of factorial

27) Extended Euclidean Algorithm

28) Linear Diophantine equation