Algorithm and programming Technique list (with relative links)

Mathematics:

- ○ http://community.topcoder.com/tc?module=Static&d1=tutorials&d2=math_for_topcoders

- ❖ Sieve of Eratosthenes (prime finding)
  - ➢ http://en.wikipedia.org/wiki/Sieve_of_Eratosthenes
  - ➢ http://www.shafaetsplanet.com/planetcoding/?p=624
  - ➢ http://translate.googleusercontent.com/translate_c?act=url&depth=1&hl=en&ie=UTF8&prev=_t&rurl=translate.google.com&sl=auto&tl=en&twu=1&u=http://e-maxx.ru/algo/eratosthenes_sieve&usg=ALkJrhhwtnMHMOYCdg4BxIfMFpyTHN-_pA
- ❖ Bitwise Sieve
  - ➢ http://www.shafaetsplanet.com/planetcoding/?p=855
- ❖ Segmented Sieve
  - ➢ http://zobayer.blogspot.com/2009/09/segmented-sieve.html
- ❖ prime factorization
  - ➢ https://www.dropbox.com/s/ndai0fquchmazu7/factorization.pdf (pdf by jan vai)
  - ➢ http://community.topcoder.com/tc?module=Static&d1=tutorials&d2=primeNumbers
  - ➢ http://zobayer.blogspot.com/2013/02/divisor-function.html
- ❖ GCD, LCM
- ❖ Factorial

  - ➢ http://alavolacoder.blogspot.com/2013/04/factorial-facts.html

  - ➢ http://alavolacoder.blogspot.com/2013/04/factorial-facts_9.html

  - ➢ http://zobayer.blogspot.com/2009/07/factorial.html

- ❖ Fibonacci

- ❖ Counting, Permutation, combination

  - ➢ http://community.topcoder.com/tc?module=Static&d1=tutorials&d2=combinatorics

- ❖ Exponentiation

- ❖ Modular Arithmetic

  - ➢ http://www.shafaetsplanet.com/planetcoding/?p=936

- ❖ Euclid, Extended euclid

  - ➢ http://zobayer.blogspot.com/2009/07/extended-euclidean-algorithm.html

  - ➢ http://translate.googleusercontent.com/translate_c?act=url&depth=1&hl=en&ie=UTF8&prev=_t&rurl=translate.google.com&sl=auto&tl=en&twu=1&u=http://e-maxx.ru/algo/euclid_algorithm&usg=ALkJrhhkz3tb4aXWHeD8eIJvJCQhe-jn7Q

  - ➢ http://translate.googleusercontent.com/translate_c?act=url&depth=1&hl=en&ie=UTF8&prev

=_t&rurl=translate.google.com&sl=auto&tl=en&twu=1&u=http://e-maxx.ru/algo/extended_eu
clid_algorithm&usg=ALkJrhgjyM7s9peFmlRPQqhXdBGE9-CeHw

Data Structure:

- ○ http://community.topcoder.com/tc?module=Static&d1=tutorials&d2=dataStructures
- ❖ Stack
  - ➢ http://alavolacoder.blogspot.com/2013/02/stack.html
- ❖ Queue
  - ➢ http://alavolacoder.blogspot.com/2013/03/queue.html
- ❖ Priority Queue
- ❖ Linked list
  - ➢ http://alavolacoder.blogspot.com/2013/02/blog-post_19.html
  - ➢ http://alavolacoder.blogspot.com/2013/02/blog-post_24.html
  - ➢ http://zobayer.blogspot.com/2009/12/cse-102-linked-list-in-c.html
- ❖ Heap
- ❖ Hash table
- ❖ Disjoint Set, Union Find
  - ➢ http://www.shafaetsplanet.com/planetcoding/?p=763
  - ➢ http://community.topcoder.com/tc?module=Static&d1=tutorials&d2=disjointDataStructure
- ❖ Binary Search Tree
  - ➢ http://www.personal.kent.edu/~rmuhamma/Algorithms/MyAlgorithms/binarySearchTree.htm
- ❖ Trie, Suffix Array
  - ➢ http://community.topcoder.com/tc?module=Static&d1=tutorials&d2=usingTries
- ❖ Binary Indexed Tree(BIT)
  - ➢ http://community.topcoder.com/tc?module=Static&d1=tutorials&d2=binaryIndexedTrees
- ❖ Segmented Tree
  - ➢ http://community.topcoder.com/tc?module=Static&d1=tutorials&d2=lowestCommonAncesto
    r
  - ➢ http://www.shafaetsplanet.com/planetcoding/?p=1557
  - ➢ http://www.shafaetsplanet.com/planetcoding/?p=1591
- ❖ Heavy Light decompositon
  - ➢ http://wcipeg.com/wiki/Heavy-light_decomposition
  - ➢ http://translate.googleusercontent.com/translate_c?act=url&depth=1&hl=en&ie=UTF8&prev

=_t&rurl=translate.google.com&sl=auto&tl=en&twu=1&u=http://e-maxx.ru/algo/heavy_light&usg=ALkJrhjj3RdDbiiCaQoThkAzVfSqnJuJkA

Sorting:

- ○ http://community.topcoder.com/tc?module=Static&d1=tutorials&d2=sorting
- ○ http://bongobani.blogspot.com/2010/06/blog-post_1625.html
- ❖ Bubble Sort
  - ➤ http://www.personal.kent.edu/~rmuhamma/Algorithms/MyAlgorithms/Sorting/bubbleSort.htm
- ❖ Selection Sort
  - ➤ http://www.personal.kent.edu/~rmuhamma/Algorithms/MyAlgorithms/Sorting/selectionSort.htm
- ❖ Insertion Sort
  - ➤ http://www.personal.kent.edu/~rmuhamma/Algorithms/MyAlgorithms/Sorting/insertionSort.htm
- ❖ Shell Sort
  - ➤ http://www.personal.kent.edu/~rmuhamma/Algorithms/MyAlgorithms/Sorting/shellSort.htm
- ❖ Quick Sort
  - ➤ http://www.personal.kent.edu/~rmuhamma/Algorithms/MyAlgorithms/Sorting/quickSort.htm
- ❖ Merge Sort
  - ➤ http://www.personal.kent.edu/~rmuhamma/Algorithms/MyAlgorithms/Sorting/mergeSort.htm
  - ➤ http://zobayer.blogspot.com/2010/08/merge-sort.html
  - ➤ http://zobayer.blogspot.com/2010/09/threaded-merge-sort.html
  - ➤ http://zobayer.blogspot.com/2010/11/merge-sort-improvement.html
- ❖ Counting Sort
  - ➤ http://www.personal.kent.edu/~rmuhamma/Algorithms/MyAlgorithms/Sorting/countingSort.htm
- ❖ Radix Sort
  - ➤ http://www.personal.kent.edu/~rmuhamma/Algorithms/MyAlgorithms/Sorting/radixSort.htm
- ❖ Bucket Sort
  - ➤ http://www.personal.kent.edu/~rmuhamma/Algorithms/MyAlgorithms/Sorting/bucketSort.htm
- ❖ Heap Sort

➢ http://www.personal.kent.edu/~rmuhamma/Algorithms/MyAlgorithms/Sorting/heapSort.htm

Searching:

- ❖ Linear Search
- ❖ Binary Search
  - ➢ http://community.topcoder.com/tc?module=Static&d1=tutorials&d2=binarySearch
- ❖ Ternary Search
  - ➢ http://translate.googleusercontent.com/translate_c?act=url&depth=1&hl=en&ie=UTF8&prev=_t&rurl=translate.google.com&sl=auto&tl=en&twu=1&u=http://e-maxx.ru/algo/ternary_search&usg=ALkJrhgQ1I9JBNisS1NAVe5CcgYxCRhqtA
- ❖ Map, HashMap

Dynamic Programming:

- ○ https://sites.google.com/site/smilitude/recursion_and_dp
- ○ http://www.codechef.com/wiki/tutorial-dynamic-programming
- ○ http://community.topcoder.com/tc?module=Static&d1=tutorials&d2=dynProg
- ○ http://www.shafaetsplanet.com/planetcoding/?p=1022
- ○ http://www.shafaetsplanet.com/planetcoding/?p=1211

- ❖ Rod Cutting
- ❖ Maximum Sum (1D, 2D)
- ❖ Coin Change
  - ➢ http://www.shafaetsplanet.com/planetcoding/?p=1158
  - ➢ https://sites.google.com/site/programinggconcept/algorithm
- ❖ Longest Common Subsequence
- ❖ Longest Increasing subsequence, Longest Decreasing Subsequence
- ❖ Calculating nCr using DP
  - ➢ http://zobayer.blogspot.com/2009/08/calculate-ncr-using-dp.html
- ❖ Matrix Chain multiplication
  - ➢ http://www.personal.kent.edu/~rmuhamma/Algorithms/MyAlgorithms/Dynamic/chainMatrixMult.htm
- ❖ Edit Distance

- ❖ 0-1 Knapsack
  - ➢ http://www.personal.kent.edu/~rmuhamma/Algorithms/MyAlgorithms/Greedy/knapscakIO.htm
  - ➢ http://www.shafaetsplanet.com/planetcoding/?p=1072
  - ➢ https://sites.google.com/site/programinggconcept/0-1-knapsack
- ❖ Bitmask DP
  - ➢ http://www.shafaetsplanet.com/planetcoding/?p=1357
- ❖ Traveling Salesman problem
  - ➢ http://www.shafaetsplanet.com/planetcoding/?p=571
  - ➢ http://www.personal.kent.edu/~rmuhamma/Algorithms/MyAlgorithms/AproxAlgor/TSP/tsp.htm
- ❖ Digit DP
  - ➢ http://codeforces.com/blog/entry/7221

Greedy algorithm:

- ○ http://community.topcoder.com/tc?module=Static&d1=tutorials&d2=greedyAlg

- ❖ Activity selection/Task scheduling problem
  - ➢ http://www.personal.kent.edu/~rmuhamma/Algorithms/MyAlgorithms/Greedy/activity.htm
- ❖ Huffman coding
  - ➢ http://www.personal.kent.edu/~rmuhamma/Algorithms/MyAlgorithms/Greedy/huffman.htm
  - ➢ http://zobayer.blogspot.com/2011/01/huffmans-code.html
- ❖ Fractional knapsack problem
  - ➢ http://www.personal.kent.edu/~rmuhamma/Algorithms/MyAlgorithms/Greedy/knapscakFrac.htm

Graph Theory:

- ○ https://sites.google.com/site/smilitude/shortestpath
- ○ https://sites.google.com/site/smilitude/shortestpath_problems
- ○ http://www.codechef.com/wiki/tutorial-graph-theory-part-1
- ○ http://community.topcoder.com/tc?module=Static&d1=tutorials&d2=graphsDataStrucs1
- ○ http://community.topcoder.com/tc?module=Static&d1=tutorials&d2=graphsDataStrucs2
- ○ http://community.topcoder.com/tc?module=Static&d1=tutorials&d2=graphsDataStrucs3

- ❖ Graph Representation(matrix, list/vector)
  - ➢ http://www.shafaetsplanet.com/planetcoding/?p=143
  - ➢ http://www.shafaetsplanet.com/planetcoding/?p=184
  - ➢ http://www.shafaetsplanet.com/planetcoding/?p=211
- ❖ Breadth First Search(BFS)
  - ➢ http://www.personal.kent.edu/~rmuhamma/Algorithms/MyAlgorithms/GraphAlgor/breadthSearch.htm
  - ➢ http://www.shafaetsplanet.com/planetcoding/?p=604
  - ➢ http://www.shafaetsplanet.com/planetcoding/?p=639
  - ➢ http://translate.googleusercontent.com/translate_c?act=url&depth=1&hl=en&ie=UTF8&prev=_t&rurl=translate.google.com&sl=auto&tl=en&twu=1&u=http://e-maxx.ru/algo/bfs&usg=ALkJrhinv0P87U0v_VXJhm3L6aGS5KEuPA
- ❖ Depth First Search(DFS)
  - ➢ http://www.personal.kent.edu/~rmuhamma/Algorithms/MyAlgorithms/GraphAlgor/depthSearch.htm
  - ➢ http://www.shafaetsplanet.com/planetcoding/?p=973
  - ➢ http://translate.googleusercontent.com/translate_c?act=url&depth=1&hl=en&ie=UTF8&prev=_t&rurl=translate.google.com&sl=auto&tl=en&twu=1&u=http://e-maxx.ru/algo/dfs&usg=ALkJrhiWHg30PgqeB1q11ZSAJrvMeOJksw
- ❖ Bipartite Graph checking
  - ➢ http://zobayer.blogspot.com/2010/03/testing-bipartite-graph.html
- ❖ Topological Sort
  - ➢ https://sites.google.com/site/smilitude/topsort
  - ➢ http://www.shafaetsplanet.com/planetcoding/?p=848
  - ➢ http://www.personal.kent.edu/~rmuhamma/Algorithms/MyAlgorithms/GraphAlgor/topoSort.htm
  - ➢ http://translate.googleusercontent.com/translate_c?act=url&depth=1&hl=en&ie=UTF8&prev=_t&rurl=translate.google.com&sl=auto&tl=en&twu=1&u=http://e-maxx.ru/algo/topological_sort&usg=ALkJrhhAS83fGpkoZlfziKQZIpYQy4JZ9A
- ❖ Strongly Connected Component(SCC)
  - ➢ http://www.personal.kent.edu/~rmuhamma/Algorithms/MyAlgorithms/GraphAlgor/strongComponent.htm
  - ➢ http://translate.googleusercontent.com/translate_c?act=url&depth=1&hl=en&ie=UTF8&prev

=_t&rurl=translate.google.com&sl=auto&tl=en&twu=1&u=http://e-maxx.ru/algo/strong_conn
ected_components&usg=ALkJrhip3cmRxf-Uk_1COz-PHg57GuwEGg

- ❖ Minimum Spanning Tree(MST)
  - ➢ Kruskal's Algorithm
    - ■ http://www.shafaetsplanet.com/planetcoding/?p=692
    - ■ http://www.personal.kent.edu/~rmuhamma/Algorithms/MyAlgorithms/GraphAlgor/kru
      skalAlgor.htm
    - ■ http://zobayer.blogspot.com/2010/01/kruskals-algorithm-in-c.html
  - ➢ Prim's Algorithm
    - ■ http://www.shafaetsplanet.com/planetcoding/?p=825
    - ■ http://www.personal.kent.edu/~rmuhamma/Algorithms/MyAlgorithms/GraphAlgor/pri
      mAlgor.htm
    - ■ http://www.graph-magics.com/articles/min_spantree.php
  - ➢ Directed MST
    - ■ http://www.ce.rit.edu/~sjyeec/dmst.html
- ❖ All pair's shortest path(Floyd Warshall)
  - ➢ http://www.graph-magics.com/articles/all_shortest_paths.php
  - ➢ http://translate.googleusercontent.com/translate_c?act=url&depth=1&hl=en&ie=UTF8&prev
    =_t&rurl=translate.google.com&sl=auto&tl=en&twu=1&u=http://e-maxx.ru/algo/floyd_warsh
    all_algorithm&usg=ALkJrhgoQbn-45TnSyPYBa0T2o__DDuJSw
- ❖ Djkastra algorithm
  - ➢ http://www.personal.kent.edu/~rmuhamma/Algorithms/MyAlgorithms/GraphAlgor/dijkstraAlg
    or.htm
  - ➢ http://www.shafaetsplanet.com/planetcoding/?p=1500
  - ➢ http://zobayer.blogspot.com/2009/12/dijkstras-algorithm-in-c.html
- ❖ Bellman Ford Algorithm
  - ➢ http://www.personal.kent.edu/~rmuhamma/Algorithms/MyAlgorithms/GraphAlgor/bellFordAl
    gor.htm
- ❖ Directed Acyclic Graph
- ❖ Bipartite Matching
  - ➢ http://zobayer.blogspot.com/2010/05/maximum-matching-with-dfs.html
  - ➢ http://zobayer.blogspot.com/2010/05/maximum-matching.html
- ❖ Max-Flow, Min-cost max-flow

- ➤ http://community.topcoder.com/tc?module=Static&d1=tutorials&d2=maxFlowRevisited
- ❖ Cayley's Theorem
- ❖ Articulation Point
    - ➤ http://translate.googleusercontent.com/translate_c?act=url&depth=1&hl=en&ie=UTF8&prev=_t&rurl=translate.google.com&sl=auto&tl=en&twu=1&u=http://e-maxx.ru/algo/cutpoints&usg=ALkJrhiSuFiBqY_EBgCC68vfrvW2o5vZnA
- ❖ Bridge
    - ➤ http://translate.googleusercontent.com/translate_c?act=url&depth=1&hl=en&ie=UTF8&prev=_t&rurl=translate.google.com&sl=auto&tl=en&twu=1&u=http://e-maxx.ru/algo/bridge_searching&usg=ALkJrhjv4XdY8Jh7vYLW0UbVsCIgscwhWg
- ❖ Euler tour/path
    - ➤ http://www.personal.kent.edu/~rmuhamma/Algorithms/MyAlgorithms/GraphAlgor/eulerTour.htm
    - ➤ http://zobayer.blogspot.com/2010/06/euler-tour.html
    - ➤ http://www.graph-magics.com/articles/euler.php
    - ➤ http://translate.googleusercontent.com/translate_c?act=url&depth=1&hl=en&ie=UTF8&prev=_t&rurl=translate.google.com&sl=auto&tl=en&twu=1&u=http://e-maxx.ru/algo/euler_path&usg=ALkJrhhfu-QYqtQCLEcIXxB-nQ1lbebqvw
- ❖ Hamiltonian Cycle
- ❖ Stable Marriage problem
    - ➤ http://www.shafaetsplanet.com/planetcoding/?p=1187
- ❖ Chinese Postman problem
- ❖ Minimum Vertex Cover(Graph+DP)
    - ➤ http://www.shafaetsplanet.com/planetcoding/?p=582
    - ➤ http://www.personal.kent.edu/~rmuhamma/Algorithms/MyAlgorithms/AproxAlgor/vertexCover.htm

Number Theory:
- ❖ Josephus Problem
    - ➤ http://en.wikipedia.org/wiki/Josephus_problem
    - ➤ http://www.cut-the-knot.org/recurrence/flavius.shtml
    - ➤ http://translate.googleusercontent.com/translate_c?act=url&depth=1&hl=en&ie=UTF8&prev=_t&rurl=translate.google.com&sl=auto&tl=en&twu=1&u=http://e-maxx.ru/algo/joseph_probl

em&usg=ALkJrhgMHDKM8tt5il-GjN79rqFrWqWtFg

- ❖ Farey Sequence,Stern-brocot Tree
  - ➢ http://translate.googleusercontent.com/translate_c?act=url&depth=1&hl=en&ie=UTF8&prev=_t&rurl=translate.google.com&sl=auto&tl=en&twu=1&u=http://e-maxx.ru/algo/stern_brocot_farey&usg=ALkJrhgnF7douyHovchr9Cid9vqFp4yuZw

- ❖ Catalan numbers
  - ➢ http://en.wikipedia.org/wiki/Catalan_number
  - ➢ http://translate.googleusercontent.com/translate_c?act=url&depth=1&hl=en&ie=UTF8&prev=_t&rurl=translate.google.com&sl=auto&tl=en&twu=1&u=http://e-maxx.ru/algo/catalan_numbers&usg=ALkJrhhRH_RJQQbF1YaUhncPRlLVkzJQYw

- ❖ Euler's phi
  - ➢ http://zobayer.blogspot.com/2013/02/euler-totient-function.html
  - ➢ http://translate.googleusercontent.com/translate_c?act=url&depth=1&hl=en&ie=UTF8&prev=_t&rurl=translate.google.com&sl=auto&tl=en&twu=1&u=http://e-maxx.ru/algo/euler_function&usg=ALkJrhidn-VzTqkKA2YBticLAs-ZDj_LKg

- ❖ Burnside's lemma/circular permutation
  - ➢ http://translate.googleusercontent.com/translate_c?act=url&depth=1&hl=en&ie=UTF8&prev=_t&rurl=translate.google.com&sl=auto&tl=en&twu=1&u=http://e-maxx.ru/algo/burnside_polya&usg=ALkJrhhc0pVhgwbXKi01y2l8Ve8IOiSlxg

- ❖ Modular inverse
  - ➢ https://www.facebook.com/notes/emtiaj-hasan/%E0%A6%AE%E0%A6%A1-%E0%A6%A8%E0%A6%BF%E0%A7%9F%E0%A7%87-%E0%A6%AE%E0%A6%A1%E0%A6%B0-%E0%A6%AE%E0%A6%A1%E0%A6%B0-%E0%A6%87%E0%A6%A8%E0%A6%AD%E0%A6%BE%E0%A6%B0%E0%A7%8D%E0%A6%B8-%E0%A6%AE%E0%A6%A1%E0%A7%87%E0%A6%B0-%E0%A6%B8%E0%A6%BE%E0%A6%A5%E0%A7%87-%E0%A6%B8%E0%A6%BF-%E0%A6%86%E0%A6%B0-%E0%A6%9F%E0%A6%BF-%E0%A6%B0-%E0%A6%95%E0%A6%9A%E0%A6%95%E0%A6%9A%E0%A6%BE%E0%A6%A8%E0%A6%BF/448341041903611

- ❖ Probability
  - ➢ http://community.topcoder.com/tc?module=Static&d1=tutorials&d2=probabilities

- ❖ Chinese Remainder Theorem
  - ➢ http://translate.googleusercontent.com/translate_c?act=url&depth=1&hl=en&ie=UTF8&prev

=_t&rurl=translate.google.com&sl=auto&tl=en&twu=1&u=http://e-maxx.ru/algo/chinese_theorem&usg=ALkJrhhib5yTDIZ1VJE7vt1YuEMWyuOm0A

- ❖ Gaussian Elmination method
  - ➤ http://zobayer.blogspot.com/2009/12/gaussjordan-elimination.html
- ❖ Dilworth's Theorem
- ❖ Matrix Exponentiation
  - ➤ http://zobayer.blogspot.com/2010/11/matrix-exponentiation.html
- ❖ Determinant of a matrix
- ❖ RSA public key crypto System

Computation Geometry:

- ○ http://community.topcoder.com/tc?module=Static&d1=tutorials&d2=geometry1
- ○ http://community.topcoder.com/tc?module=Static&d1=tutorials&d2=geometry2
- ○ http://community.topcoder.com/tc?module=Static&d1=tutorials&d2=geometry3
- ○ http://www.personal.kent.edu/~rmuhamma/Compgeometry/compgeom.html
- ❖ Pick's Theorem
- ❖ Convex hull
  - ➤ http://zobayer.blogspot.com/2010/02/convex-hull.html
- ❖ Line Intersection
- ❖ Segment circle intersection
  - ➤ http://zobayer.blogspot.com/2009/11/geometry-segment-circle-intersection.html
- ❖ Point in a polygon
- ❖ Area of a polygon
- ❖ Line Sweeping
  - ➤ http://community.topcoder.com/tc?module=Static&d1=tutorials&d2=lineSweep
- ❖ Polygon intersection
- ❖ Closest Pair

Game Theory:

- ○ http://potasiyam.com/farsan/
- ❖ Take Away game
  - ➤ http://zobayer.blogspot.com/2010/08/simple-take-away-game.html
- ❖ Nim

- ❖ Sprague-grundy Number

String:
- ○ http://community.topcoder.com/tc?module=Static&d1=tutorials&d2=stringSearching
- ○ http://doinik-iut.com/archives/23106
- ❖ Naive String matching
  - ➢ http://www.personal.kent.edu/~rmuhamma/Algorithms/MyAlgorithms/StringMatch/naiveStringMatch.htm
- ❖ Rabin karp Algo
  - ➢ http://www.infoarena.ro/blog/rolling-hash
- ❖ Finite Automata
- ❖ Knuth-Marris-Pratt Algo
  - ➢ http://www.personal.kent.edu/~rmuhamma/Algorithms/MyAlgorithms/StringMatch/kuthMP.htm
- ❖ Manacher's Algo
- ❖ Aho korasick's Algo
- ❖ Boyer-Moore Algorithm
  - ➢ http://www.personal.kent.edu/~rmuhamma/Algorithms/MyAlgorithms/StringMatch/boyerMoore.htm

Others:
- ❖ Recursion
  - ➢ http://community.topcoder.com/tc?module=Static&d1=tutorials&d2=recursionPt1
  - ➢ http://community.topcoder.com/tc?module=Static&d1=tutorials&d2=recursionPt2
  - ➢ http://zobayer.blogspot.com/2009/12/cse-102-attacking-recursion.html
  - ➢ http://zobayer.blogspot.com/2009/12/cse-102-practice-recursions.html
- ❖ Backtracking
  - ➢ http://www.shafaetsplanet.com/planetcoding/?p=1266
  - ➢ http://www.academic.marist.edu/~jzbv/algorithms/Backtracking.htm
- ❖ Hungarian Algorithm
  - ➢ http://community.topcoder.com/tc?module=Static&d1=tutorials&d2=hungarianAlgorithm
- ❖ C++ STL(Standard Template Library)
  - ➢ https://sites.google.com/site/smilitude/cpp

- ➢ https://sites.google.com/site/smilitude/stl
- ➢ http://community.topcoder.com/tc?module=Static&d1=tutorials&d2=standardTemplateLibrary
- ➢ http://community.topcoder.com/tc?module=Static&d1=tutorials&d2=standardTemplateLibrary2
- ❖ Bitwise operations
  - ➢ http://www.codechef.com/wiki/tutorial-bitwise-operations
  - ➢ http://community.topcoder.com/tc?module=Static&d1=tutorials&d2=bitManipulation
  - ➢ http://zobayer.blogspot.com/2009/12/bitwise-operations-in-cc-part-1.html
  - ➢ http://zobayer.blogspot.com/2009/12/bitwise-operations-in-c-part-2.html
  - ➢ http://zobayer.blogspot.com/2009/12/bitwise-operations-in-c-part-3.html