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Competitive Programming Syllabus

3

6

I have been searching for study material for various topics for competitive coding and i found some sort of syllabus for top competitions i thought is worth sharing

List of Topics for programming Competitions

1.Basic Geometry/Euclidean Geometry/Coordinate Geometry/ [3D variants of everything].

1. Computational Geometry.

a. Graham Scan algorithm for Convex Hull O(n * log(n)).

b. Online construction of 3D

convex hull in O(n^2).

c. Bentley Ottmann algorithm to list all intersection points of n line segments in O((n + I) * logn).

■ Suggested Reading 1.

http://softsurfer.com/Archive/algorithm_0108/algorithm_0108.htm

d. Rotating Calipers Technique.

■ Suggested Reading http:// cgm.cs.mcgill.ca/~orm/rotcal.html

■ Problems Refer

the article for a list of problems which can be solved using Rotating Calipers technique.

e. Line Sweep/Plane Sweep algorithms

■Area/Perimeter of Union of Rectangles.

■ Closest pair of points.

■ Suggested Reading 1.

http://www.topcoder.com/tc?module=Static&d1=tutorials&d2=lineSweep

■ Problems Follow

the tutorial for list of problems.

f. Area of Union of Circles.

g. Delayunay Triangulation of n points in O(n * logn).

h. Voronoi Diagrams of n points in O(n * logn) using Fortunes algorithm.

i. Point in a polygon problem

■O(n) solution without preprocessing.

■ O(logn) algorithm with O(n * logn) preprocessing for convex polygons.

j. Problems on computational geometry ■ BSHEEP , BULK , SEGVIS , CONDUIT , RUNAWAY , DIRVS , RAIN1 , SHAMAN , TCUTTER , LITEPIPE , RHOMBS , FSHEEP , FLBRKLIN , CERC07P , BAC , ALTARS , CERC07C , NECKLACE , CH3D , RECTANGL , POLYSSQ , FOREST2 , KPPOLY , RAIN2 , SEGMENTS , ARCHPLG , BALLOON , CIRCLES , COMPASS , EOWAMRT , ICERINK on SPOJ.

■ CultureGrowth , PolygonCover on Topcoder.

k. Suggested Reading ■

Computational Geometry: Algorithms and applications. Mark De Burg.

1. String Algorithm .

a. KnuthMorrisPratt algorithm.

■ Problems NHAY,

PERIOD on SPOJ.

■ Suggested Reading 1.

Cormen chapter on Strings.

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Exotic and Esoteric programm languages

Why is it showing sigsegv error?

Variable time limits for programm languages.

1. http://www.topcoder.com/tc?module=Static&d1=tutorials&d2=stringSearching

b. Aho Corasick algorithm.

■ Problems WPUZZLES on SPOJ.

c. Suffix Arrays

■ O(n^2 * logn) Naive method of suffix array construction

■ O(n * logn^2) method of suffix array construction

■ O(n * logn) method of suffix array construction.

■ O(n) method of suffix array construction

■ O(n) LCA preprocess on Suffix Arrays to solve a variety of string problems.

d. Suffix Trees

■ O(n) construction of Suffix trees using Ukkenon’s algorithm.

■ O(n) construction of Suffix Trees if provided with Suffix Arrays using Farach’s algorithm.

e. Suffix Automata

■ O(n) Suffix Automaton construction.

f. Dictionary Of Basic Factors

■ O(n * logn) method of DBF construction using Radix Sort.

g. Manachar’s algorithm to find Lengh of palindromic substring of a string centered at a position for each position in the string.

Runtime > O(n).

h. Searching and preprocessing Regular Expressions consisting of ‘?’, ‘*’.

i. Multidimensional pattern matching.

j. Problems on Strings [can be solved with a variety of techniques]

■ DISUBSTR , PLD , MSTRING , REPEATS , JEWELS , ARCHIVER , PROPKEY , LITELANG , EMOTICON , WORDS , AMCODES , UCODES , PT07H , MINSEQ , TOPALIN , BWHEELER , BEADS , SARRAY , LCS , LCS2 , SUBST1 , PHRASES , PRETILE on SPOJ

■ http://www.algorithmist.com/index.php/Category:String_algorithms

1. Basic Graphs [beginner] .

a. Representation of graphs as adjacency list, adjacency matrix, incidence matrix and edge list and uses of different representations in different scenarios.

b. Breadth First Search.

■ problems 1. PPATH , ONEZERO , WATER on SPOJ

c. Depth First Search.

d. Strongly Connected Components.

■ problems 1. TOUR and BOTTOM on SPOJ.

e. Biconnected Components, Finding articulation points and bridges].

■ problems 1. RELINETS , PT07A on SPOJ.

f. Dijkstra algorithm ■ problems 1. SHPATH on SPOJ.

g. Floyd Warshall algorithm ■ problems 1. COURIER on SPOJ.

h. Minimum Spanning Tree ■ problems 1. BLINNET on SPOJ.

i. Floodfill algorithm

j. Topological sort

k. BellmanFord algorithm.

l. Euler Tour/Path.

■ problems WORDS1 on SPOJ.

m. Suggested reading for most of the topics in Graph algorithms ■ http://www.topcoder.com/tc?module=Static&d1=tutorials&d2=graphsDataStrucs1 .

■ Also refer to the tutorial for problems concerning these techniques.

■ Cormen chapter 22 to 24.

1. Flow networks/ matching etc etc. [Interdiate/Advanced].

a. Maximum flow using Ford Fulkerson Method.

■ Suggested Reading 1.

http://www.topcoder.com/tc?module=Static&d1=tutorials&d2=maxFlow

- problems TAXI

, POTHOLE , IM , QUEST4 , MUDDY , EN , CABLETV , STEAD , NETADMIN , COCONUTS , OPTM on SPOJ.

b. Maximum flow using Dinics Algorithm.

- Problems PROFIT

on spoj.

c. Minimum Cost Maximum Flow.

- Successive Shortest path algorithm.

- Cycle Cancelling algorithm.

- Suggested Reading 1.

http://www.topcoder.com/tc?module=Static&d1=tutorials&d2=minimumCostFlow1

d. Maximum weighted Bipartite Matching (Kuhn Munkras algorithm/Hungarian Method)

- problems GREED

, SCITIES , TOURS on SPOJ | http://www.topcoder.com/stat?c=problem_statement&pm=8143

e. Stoer Wagner mincut algorithm.

f. Hopcroft Karp bipartite matching algorithm.

- problems ANGELS on SPOJ.

g. Maximum matching in general graph (blossom shrinking)

h. GomoryHu Trees.

- i) Problems MCQUERY on Spoj.

i. Chinese Postman Problem.

- problems http:// acm.uva.es/archive/nuevoportal/data/problem.php?p=4039

- Suggested Reading http:// eie507.eie.polyu.edu.hk/sssubmission/ B7a/

j. Suggested Reading for the full category >

- Network flow Algorithms and Applications by Ahuja

- Cormen book chapter 25.

1. Dynamic Programming.

a. Suggested Reading Dynamic Programming(DP) as a tabulation method

- Cormen chapter on DP

b. Standard problems (you should really feel comfortable with these types)

- http://www.topcoder.com/stat?c=problem_statement&pm=8570&rd=12012&rm=269199&cr=7581406

- http://www.topcoder.com/stat?c=problem_statement&pm=10765&rd=14183

c. State space reduction

- http://www.topcoder.com/stat?c=problem_statement&pm=10902

- http://www.topcoder.com/stat?c=problem_statement&pm=3001

- http://www.topcoder.com/stat?c=problem_statement&pm=8605&rd=12012&rm=269199&cr=7581406

d. Solving in the reverse easier characterizations looking from the end

- http://www.spoj.pl/problems/MUSKET/

- http://www.topcoder.com/stat?c=problem_statement&pm=5908

e. Counting/optimizing arrangements satisfying some specified properties

- http://www.topcoder.com/stat?c=problem_statement&pm=8306

- http://www.topcoder.com/stat?c=problem_statement&pm=7849

f. Strategies and expected values

- http://www.topcoder.com/stat?c=problem_statement&pm=10765&rd=14183

- http://www.topcoder.com/stat?c=problem_statement&pm=10806

- http://www.topcoder.com/stat?c=problem_statement&pm=7828

- http://www.topcoder.com/stat?c=problem_statement&pm=7316

g. DP on probability spaces

- http://www.topcoder.com/stat?c=problem_statement&pm=7422

- http://www.topcoder.com/stat?c=problem_statement&pm=2959

- http://www.topcoder.com/stat?c=problem_statement&pm=10335

h. DP on trees

■ http://www.topcoder.com/stat?c=problem_statement&pm=10800

■ http://www.topcoder.com/stat?c=problem_statement&pm=10737

■ http://www.topcoder.com/stat?c=problem_solution&rm=266678&rd=10958&pm=8266&cr=758140

6

i. DP with datastructures

■ http://www.spoj.pl/problems/INCSEQ/

■ http://www.spoj.pl/problems/INCDSEQ/

■ http://www.spoj.pl/problems/LIS2/

■ http://www.topcoder.com/stat?c=problem_statement&pm=1986

j. Symmetric characterization of DP state

■ http://www.topcoder.com/stat?c=problem_statement&pm=8610

k. A good collection of problems

■ http://codeforces.com/blog/entry/325

■ http://problemclassifier.appspot.com/index.jsp?search=dp&usr=

1. Greedy.

a. Suggested Reading ■

Chapter on Greedy algorithms in Cormen.

■ http://www.topcoder.com/tc?module=Static&d1=tutorials&d2=greedyAlg

b. problems refer to the topcoder tutorial.

1. Number Theory.

a. Modulus arithmetic basic postulates [Including modular linear equations , Continued fraction and Pell's equation]

■ Suggested Reading 1. Chapter 1 from Number Theory for Computing by SY Yan [Recommended] 2. 31.1, 31.3 and 31.4 from Cormen

1. www.topcoder.com/tc?module=Static&d1=tutorials&d2=primeNumbers

■ Problems

1. http://projecteuler.net/index.php?section=problems&id=64
2. http://projecteuler.net/index.php?section=problems&id=65
3. http://projecteuler.net/index.php?section=problems&id=66
4. http://www.topcoder.com/stat?c=problem_statement&pm=6408&rd=9826
5. http://www.topcoder.com/stat?c=problem_statement&pm=2342

b. Fermat's theorem, Euler Totient theorem (totient function, order , primitive roots)

■ Suggested Reading

1. 1.6, 2.2 from Number Theory by SY Yan
2. 31.6 , 31.7 from Cormen

■ Problems

1. http://projecteuler.net/index.php?section=problems&id=70
2. http://www.spoj.pl/problems/NDIVPHI/

c. Chinese remainder theorem

■ Suggested Reading

1. 31.5 from Cormen
2. 1.6 from Number Theory by SY Yan

■ Problems

1. Project Euler 271
2. http://www.topcoder.com/stat?c=problem_statement&pm=10551&rd=13903

d. Primality tests ■

Deterministic O(sqrt(n)) approach

■ Probabilistic primality tests Fermat

primality test, MillerRabin

Primality test

1. Suggested Reading a.

http://www.topcoder.com/tc?module=Static&d1=tutorials&d2=primalityTesting

b. Cormen 31.8

c. 2.2 from Number Theory by SY Yan

1. Problems a.

PON, PRIC, SOLSTRAS on SPOJ

b. http://www.topcoder.com/stat?c=problem_statement&pm=4515

e. Prime generation techniques Sieve of Erastothenes

■ Suggested Problems PRIME1 on SPOJ

f. GCD using euclidean method

■ Suggested Reading

1. 31.2 Cormen

■ Problems 1.

GCD on SPOJ

1. http://uva.onlinejudge.org/external/114/11424.html

g. Logarithmic Exponentiation

■ Suggested Reading 1.

http://www.topcoder.com/tc?module=Static&d1=tutorials&d2=primalityTesting

h. Integer Factorization

■ Naive O(sqrt(n)) method

■ Pollard Rho factorization

■ Suggested Reading

1. 2.3 from Number Theory SY Yan

2. 31.9 Cormen

■ Problems 1. http://www.topcoder.com/stat?c=problem_statement&pm=2986&rd=5862

1. http://www.spoj.pl/problems/DIVSUM2/

2. http://www.topcoder.com/stat?c=problem_statement&pm=4481&rd=6538

i. Stirling numbers

j. Wilson theorem

■ nCr % p in O(p) preprocess and O(log n) query

k. Lucas Theorem

l. Suggested Reading for Number Theory ■

Number theory for computing by Song Y Yan [Simple book describing concepts in details]

■ Concepts are also superficially covered in Chapter 31 of Introduction to Algorithms by Cormen

■ http://www.codechef.com/wiki/tutorialnumbertheory

■ http://www.algorithmist.com/index.php/Category:Number_Theory

m. Problems on Number Theory ■

http://www.algorithmist.com/index.php/Category:Number_Theory

■ http://problemclassifier.appspot.com/index.jsp?search=number&usr=

1. Math (Probability, Counting, Game Theory, Group Theory, Generating functions, Permutation Cycles, Linear Algebra)

a. Probability.

Syllabus

■ Basic probability and Conditional probability

1. Suggested problems

a. http://www.spoj.pl/problems/CT16E/

b. http://www.spoj.pl/problems/CHICAGO/

■ Random variables, probability generating functions

■ Mathematical expectation + Linearity of expectation

1. Suggested problems

a. http://www.spoj.pl/problems/FAVDICE/

b. http://www.topcoder.com/stat?c=problem_statement&pm=10744

■ Special discrete and continuous probability distributions

1. Bernoulli, Binomial, Poisson, normal distribution
2. Suggested Problem

a. http://acm.sgu.ru/problem.php?contest=0&problem=498

■ Suggested Readings

1. Cormen appendix C (very basic)
2. Topcoder probabilty tutorial http://www.topcoder.com/tc?module=Static&d1=tutorials&d2=probabilities
3. http://en.wikipedia.org/wiki/Random_variable
4. http://en.wikipedia.org/wiki/Expected_value
5. William Feller, An introduction to probability theory and its applications

b. Counting

Syllabus

■ Basic principles Pigeon

hole principle, addition, multiplication rules

1. Suggested problems

a. http://acm.timus.ru/problem.aspx?space=1&num=1690

b. http://www.topcoder.com/stat?c=problem_statement&pm=10805

1. Suggested readings

a. http://en.wikipedia.org/wiki/Combinatorial_principles

b. http://www.topcoder.com/tc?module=Static&d1=tutorials&d2=combinatorics

c. http://www.maa.org/editorial/knot/pigeonhole.html \■ Inclusionexclusion

. Suggested readings

a. http://en.wikipedia.org/wiki/Inclusion–exclusion_principle

1. Suggested problems

a. http://www.topcoder.com/stat?c=problem_statement&pm=4463&rd=6536

b. http://www.topcoder.com/stat?c=problem_statement&pm=10238

■ Special numbers

1. Suggested reading Stirling,

eurlerian, harmonic, bernoulli, fibonnacci numbers

a. http://en.wikipedia.org/wiki/Stirling_number

b. http://en.wikipedia.org/wiki/Eulerian_numbers

c. http://en.wikipedia.org/wiki/Harmonic_series_(mathematics)

d. http://en.wikipedia.org/wiki/Bernoulli_number

e. http://en.wikipedia.org/wiki/Fibonnaci_numbers

f. Concrete mathematics by Knuth

1. Suggested problems

a. http://www.topcoder.com/stat?c=problem_statement&pm=1643

b. http://www.topcoder.com/stat?c=problem_statement&pm=8202&rd=11125

c. http://www.topcoder.com/stat?c=problem_statement&pm=8725

d. http://www.topcoder.com/stat?c=problem_statement&pm=2292&rd=10709

■ Advanced counting techniques Polya

counting, burnsides lemma 1. Suggested reading

a. http://en.wikipedia.org/wiki/Burnside's_lemma

b. http://petrmitrichev.

blogspot.com/2008/11/burnsideslemma.

html

1. Suggested Problems

a. http://www.topcoder.com/stat?c=problem_statement&pm=9975

b. http://www.spoj.pl/problems/TRANSP/

c. Game theory

Syllabus

■ Basic principles and Nim game

1. Sprague grundy theorem, grundy numbers

2. Suggested readings

a. http://en.wikipedia.org/wiki/Sprague%E2%80%93Grundy_theorem

b. http://www.topcoder.com/tc?module=Static&d1=tutorials&d2=algorithmGames

c. http://www.ams.org/samplings/featurecolumn/

fcarcgames1

d. http://www.codechef.com/wiki/tutorialgametheory

1. Suggested problems

a. http://www.topcoder.com/stat?c=problem_statement&pm=3491&rd=6517

b. http://www.topcoder.com/stat?c=problem_statement&pm=3491&rd=6517

■ Hackenbush

1. Suggested readings

a. http://en.wikipedia.org/wiki/Hackenbush

b. http://www.ams.org/samplings/featurecolumn/

fcarcpartizan1

1. Suggested problems

a. http://www.cs.caltech.edu/ipsc/problems/g.html

b. http://www.spoj.pl/problems/PT07A/

d. Linear Algebra

Syllabus

■ Matrix Operations

1. Addition and subtraction of matrices

a. Suggested Reading

i. Cormen 28.1

1. Multiplication (Strassen's algorithm), logarithmic exponentiation

a. Suggested reading

i. Cormen 28.2

ii.Linear Algebra by Kenneth Hoffman Section 1.6

b. Problems

i. http://uva.onlinejudge.org/external/111/11149.html

1. Matrix transformations [Transpose, Rotation of Matrix, Representing Linear transformations using matrix]

a. Suggested Reading

i. Linear Algebra By Kenneth Hoffman Section 3.1,3.2,3.4,3.7

b. Problems

i. http://www.topcoder.com/stat?c=problem_statement&pm=6877

ii.JPIX on Spoj

1. Determinant , Rank and Inverse of Matrix [Gaussean Elimination , Gauss Jordan Elimination]

a. Suggested Reading

i. 28.4 Cormen \ ii.Linear Algebra by Kenneth Chapter 1

b. Problems

i. http://www.topcoder.com/stat?c=problem_statement&pm=8174

ii.http://www.topcoder.com/stat?c=problem_statement&pm=6407&rd=9986

iii. http://www.topcoder.com/stat?c=problem_statement&pm=8587

iv.HIGH on Spoj

1. Solving system of linear equations

a. Suggested Reading i. 28.3 Cormen

ii.Linear Algebra by Kenneth Chapter 1

b. Problems i.

http://www.topcoder.com/stat?c=problem_statement&pm=3942&rd=6520

1. Using matrix exponentiation to solve recurrences

a. Suggested Reading

i. http://www.topcoder.com/tc?module=Static&d1=features&d2=010408

b. Problems

i. REC, RABBIT1 , PLHOP on spoj

ii.http://www.topcoder.com/stat?c=problem_statement&pm=6386 ,

http://www.topcoder.com/stat?c=problem_statement&pm=7262,

http://www.topcoder.com/stat?c=problem_statement&pm=6877

1. Eigen values and Eigen vectors

a. Problems

i. http://www.topcoder.com/stat?c=problem_statement&pm=2423&rd=4780

■ Polynomials 1. Roots of a polynomial [Prime factorization of a polynomial, Integer roots of a polynomial, All real roots of a

polynomial]

a. Problems

i. http://www.topcoder.com/stat?c=problem_statement&pm=8273&rd=10798

ii.POLYEQ , ROOTCIPH on Spoj

1. Lagrange Interpolation

a. Problems

i. http://www.topcoder.com/stat?c=problem_statement&pm=10239

ii.http://www.topcoder.com/stat?c=problem_statement&pm=8725

e. Permutation cycles

■ Suggested Reading

1. Art of Computer Programming by Knuth Vol. 3

■ Problems

1. ShuffleMethod, Permutation and WordGame on topcoder.

f. Group Theory ■ Bernside Lemma, Polias theorem

1. Suggested Reading

a. Hernstein's topics in algebra

b. http://petrmitrichev.

blogspot.com/2008/11/burnsideslemma.

html

1. Problems

a. TRANSP on spoj

b. http://www.topcoder.com/stat?c=problem_statement&pm=9975

b. Generating functions

■ Suggested Reading

1. Herbert Wilf's generating functionology

2. Robert Sedgewick and Flajoulet's Combinatorial analysis

10.Data Structures.

i. Basic

a. Arrays/Stacks/Queues :

■ Problems

1. https://www.spoj.pl/problems/STPAR/
2. https://www.spoj.pl/problems/SHOP/
3. https://www.spoj.pl/problems/WATER/

■ Reading:

1. CLRS: section 10.1

2. http://www.topcoder.com/tc?module=Static&d1=tutorials&d2=dataStructures

b. Singly/Doubly Linked List :

- Problems

1. h ttps://www.spoj.pl/problems/POSTERS/

- Reading: CLRS: section 10.2, Mark Allen Weies Chapter 3

c. Hash Tables :

- Problems

1. https://www.spoj.pl/problems/HASHIT/
2. https://www.spoj.pl/problems/CUCKOO/

- Reading: CLRS: Chapter 11, Mark Allen Weies Chapter 5

d. Circular linked list / queue

- Problems

1. https://www.spoj.pl/problems/CTRICK/

e. Binary/nary Trees

- Reading

1. CLRS: section 10.4
2. CLRS: Chapter 12
3. Mark Allen Weies Chapter 4
4. h ttp://www.topcoder.com/tc?module=Static&d1=tutorials&d2=binarySearchRedBlack

f. Heaps

- Problems

1. https://www.spoj.pl/problems/PRO/
2. h ttps://www.spoj.pl/problems/EXPEDI/

- Reading : Mark Allen Weies Chapter 6

ii. Advanced

a. Trie (Keyword tree)

- Problems

1. https://www.spoj.pl/problems/MORSE/
2. https://www.spoj.pl/problems/EMOTICON/

- Reading

b. Interval trees / Segment Trees

- Problems

1. https://www.spoj.pl/problems/ORDERS/
2. https://www.spoj.pl/problems/FREQUENT/

- Reading

c. Fenwick(Binary Indexed) trees

- Problems

1. https://www.spoj.pl/problems/MATSUM/

- Reading: http://www.topcoder.com/tc?module=Static&d1=tutorials&d2=binaryIndexedTrees

d. Disjoint data structures

- Problems

1. https://www.spoj.pl/problems/BLINNET/
2. https://www.spoj.pl/problems/CHAIN/

- Reading:

1. http://www.topcoder.com/tc?module=Static&d1=tutorials&d2=disjointDataStructure
2. Mark Allen Weies Chapter 8

e. Range minimum Query(RMQ)

- Problems

1. https://www.spoj.pl/problems/GSS1/

▪ Reading http://www.topcoder.com/tc?module=Static&d1=tutorials&d2=lowestCommonAncestor

f. Customized interval/segment trees (Augmented DS)

▪ Problems

1. https://www.spoj.pl/problems/GSS3/
2. https://www.spoj.pl/problems/RRSCHED/

▪ Reading: CLRS: Chapter 14 (augmented DS)

g. AVL Trees

▪ Problems

1. https://www.spoj.pl/problems/ORDERS/

▪ Reading

iii. Miscellaneous (Not to be covered)

a. Splay Trees

b. B/B+ Trees

c. kd

Trees

d. Redblack

Trees

e. Skip List

f. Binomial/ Fibonacci heaps

iv. Exercices

1. https://www.spoj.pl/problems/LAZYPROG / (Hint: Heaps)t
2. https://www.spoj.pl/problems/HELPR2D2/ (Hint: Interval Trees)
3. https://www.spoj.pl/problems/SAM/ (Hint: Heaps)
4. https://www.spoj.pl/problems/PRHYME/ (Hint: Trie)
5. https://www.spoj.pl/problems/HEAPULM/ (Hint: Interval Trees)
6. https://www.spoj.pl/problems/CORNET/ (Hint: Disjoint)
7. https://www.spoj.pl/problems/EXPAND/
8. https://www.spoj.pl/problems/WPUZZLES/
9. https://www.spoj.pl/problems/LIS2/

11.Search Techniques/Bruteforce writing techniques/Randomized algorithms.

a. Backtracking [

Beginner].

▪ problems >

1. N queens problems
2. Knights Tour
3. Sudoku Problem
4. Tiling Problem.
5. 15 puzzle.

b. Dancing Links and Algorithm X given by Knuth [

Advanced]

▪ problems PRLGAME,

SUDOKU, NQUEEN on SPOJ

▪ Suggested reading 1.

http://wwwcsfaculty.

stanford.edu/~uno/papers/dancingcolor.

ps.gz

c. Binary Search [

Beginner].

▪ poblems AGGRCOW

on SPOJ. Refer the tutorial for more problems.

■ finding all real roots of a polynomial using binary search. [intermediate].

■ Suggested Reading 1.

http://www.topcoder.com/tc?module=Static&d1=tutorials&d2=binarySearch

d. Ternary Search [

Intermediate].

■ problems 1.

http://www.spoj.pl/problems/KPPOLY/

1. http://www.codechef.com/DEC09/problems/K1/
2. http://www.topcoder.com/stat?c=problem_statement&pm=4705&rd=7993
3. http://www.topcoder.com/stat?c=problem_statement&pm=7741&rd=10671
4. http://www.topcoder.com/stat?c=problem_statement&pm=6464&rd=9994
5. http://www.topcoder.com/stat?c=problem_statement&pm=3501&rd=6529
6. http://www.topcoder.com/stat?c=problem_statement&pm=4567&rd=6539

e. Meet in the middle [Intermediate].

■ problems 1.

http://www.spoj.pl/problems/MAXISET/

1. http://acm.zju.edu.cn/onlinejudge/showProblem.do?problemCode=2868

f. Hill Climbing [Advanced].

g. Regular Iteration to reach a fixed point [Advanced].

■ NewtonRaphson

method to find root of a mathematical function.

■ Iterations to solve linear nonhomogeneous

system of equations.

h. Randomized Algorithms [Intermediate]■

QuickSort.

12.General programming issues in contests >

a. Arithmetic Precision [

Beginner].

■ Suggested Reading 1.

http://www.topcoder.com/tc?module=Static&d1=tutorials&d2=integersReals

b. Representing sets with bitmasks and manipulating bitmasks [

Beginner].

■ Suggested Reading 1.

http://www.topcoder.com/tc?module=Static&d1=tutorials&d2=bitManipulation

■ problems refer

to the tutorial link in Suggested reading section.

syllabus problems programming suggestion

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