কোন একটা প্রব্লেম সল্ভ করতে হয়তো কারো ১ দিন লেগে গেল।কিন্তু একটা ছোট্ট থিওরি জানলে হয়তো তার এটা করতে কয়েক মিনিট লাগত।তাই আগে আমাদের কিছু জিনিস জানতে হবে,সে অনুযায়ী প্র্যাক্টিস করতে হবে। এই সিলেবাসে বা গাইডলাইনে ক্যাটাগরি অনুযায়ী প্রব্লেম এবং অনেক reading material দেয়া আছে।

**Ad hoc:**

10055, 10071, 11172, 10783, 11877, 11479, 100, 11984, 11936, 11854, 11799, 11727, 11150, 10110, 11875, 10970, 10812, 10079, 10696, 11461, 11388, 11231,

10195, 10302, 10591, 10879, 10346, 11934, 11839, 382, 11777, 11715, 11000, 10693, 10347, 10323, 575, 11185, 11247, 11462, 10035, 11764, 10699, 10929, 11526,

10530, 10327, 10784, 10300, 10161, 673, 591, 913, 694, 579, 10365..

**Topic: Data Structures**

**Reading material:**[**http://sites.google.com/site/smilitude/stl**](http://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=standardTemplateLibrary)

Total Selected Problems: 30

\*Source: all problems are taken from: [www.uva.onlinejudge.org](http://l.facebook.com/l.php?u=http%3A%2F%2Fwww.uva.onlinejudge.org%2F&h=tAQFh_eXZ&s=1)

**Reading material:**

[http://www.cplusplus.com/reference/algorithm/](http://l.facebook.com/l.php?u=http%3A%2F%2Fwww.cplusplus.com%2Freference%2Falgorithm%2F&h=kAQGkiwWa&s=1)

[http://www.cplusplus.com/reference/stl/set/set/](http://l.facebook.com/l.php?u=http%3A%2F%2Fwww.cplusplus.com%2Freference%2Fstl%2Fset%2Fset%2F&h=AAQFMDJvG&s=1)

[http://www.cplusplus.com/reference/stl/map/](http://l.facebook.com/l.php?u=http%3A%2F%2Fwww.cplusplus.com%2Freference%2Fstl%2Fmap%2F&h=9AQFt4i_G&s=1)

[http://www.cplusplus.com/reference/stl/multiset/](http://l.facebook.com/l.php?u=http%3A%2F%2Fwww.cplusplus.com%2Freference%2Fstl%2Fmultiset%2F&h=xAQHfz31v&s=1)

<http://www.cplusplus.com/reference/stl/multimap/>

[http://www.cplusplus.com/reference/string/string/](http://l.facebook.com/l.php?u=http%3A%2F%2Fwww.cplusplus.com%2Freference%2Fstring%2Fstring%2F&h=SAQHoe3ny&s=1)

[http://www.cplusplus.com/reference/string/getline/](http://l.facebook.com/l.php?u=http%3A%2F%2Fwww.cplusplus.com%2Freference%2Fstring%2Fgetline%2F&h=wAQFj2qZL&s=1)

**Pre-requirements:**  basic string problems,

Ad-hoc problems with sorting,

Ad-hoc problems with counting

**Basic Data Structures:**

482, 541, 591, 10038, 10260, 10703, 11933

**C++ STL algorithm (Java Collections):**

146, 11321, 11824

**Sorting-related problems:**

299, 10327, 11462

**C++ STL stack (Java Stack):**

120

**C++ STL queue (Java Queue):**

10935

**C++ STL priority\_queue (Java Priority Queue):**

10954, 11995

**C++ STL map/set (Java TreeMap/TreeSet):**

417, 484, 501, 642, 755, 10226, 10282, 10295, 10374,10815, 11062, 11136

**Graph Data Structures Problems:**

11991

**String: Reading material**: Learn these functions: strtok(),strstr(),substr(),c\_str(),[c\_str is used to convert a string object to c like string]isalpha(),isdigit(),isupper(),islower() 1.  UVA-11734(Big Number Of Teams will solve This)

2.  uva-621(Secret Research)

3.  UVA-11743(Credit Check)

4.  uva-488(Triangle Wave)

5.  uva-490(Rotating Sentence)

6.  uva-11830(Contract Revision)

7.  UVA-10340(All in All)

8.  UVA-11687(DIGITS)

9.  UVA-11716(Digital Fortress)

10. uva-482(Permutation Array)

11. uva-10361(Autometic Poetry)

12. UVA-263(Number Chains)

13. UVA-11362(Phone List)

14. UVA-10293(Word Length and Frequency)

15. UVA-644(Immediate Decodability)

16. UVA-156(Ananagrams)

17. UVA-401(Palindromes)

18. UVA-537(Artificial Intelligence)

19. UVA-12015(Google is feeling Lucky)

20. UVA-10226(Hardwood Species)

21. UVA-11048(Automatic correction of misspellings)

22. UVA-409(Excuses,Excuses)

23. UVA-455(Periodic Strings)

24. UVA-10298(Power Strings)

25. UVA-422(Word-Search Wonder)

26. UVA-10010(Where's Waldorf)

27. UVA-496(Simply Subsets)

28. UVA-11452(Dancing the Cheeky-Cheeky)

29. ACM-ICPC 2010 Dhaka site (Prb-B).

30. UVA-10146 (Dictionary)

31. UVA-11548(Blackboard Bonanza)

**MATH:**

**Category 1:** **Mathematical Simulation**

**Reading Materials**:- Nothing special to know, Simply Brute force approach :)             100 - The 3n + 1 problem

            616 - Coconuts, Revisited

            10346 - Peter's Smokes

            11150 - Cola

            11689 - Soda Surpler

            11877 - The Coco-Cola Store

            11934 - Magic Formula

            11968 - In The Airport

            11970 - Lucky Numbers

            12032 - The Monkey and the Oiled Bamboo

**Category 2: Finding Pattern or Formula**

            Problems:

            913 - Joana and the Odd Numbers

            10161 - Ant on a Chessboard

            10170 - The Hotel with Infinite Rooms

            10427 - Naughty Sleepy Boys

            10499 - The Land of Justice

            10509 - R U Kidding Mr. Feynman?

            10693 - Traffic Volume

            10696 - f91             10970 - Big Chocolate

            10994 - Simple Addition

            11202 - The least possible effort

            11231 - Black and white painting

            11296 - Counting Solutions to an Integral Equation

            10940 - Throwing cards away II

**Category 3:** **Logarithm, Exponentiation, Power**

**Reading Materials**:

 - Review your logarithm, Exponentiation, Power knowledge

 Problems:

113 - Power of Cryptography

11636 - Hello World!

 11666 - Logarithms

 11847 - Cut the Silver Bar

701 - The Archeologists' Dilemma

107 - The Cat in the Hat

**Category 4**:**Binomial Coefficients**

**Reading Materials:**

-Concrete Mathematics by Knuth chapter 5

 326 - Extrapolation Using a Difference Table

 369 - Combinations

 485 - Pascal's Triangle of Death

 530 - Binomial Showdown

 10105 - Polynomial Coefficients

 10219 - Find the ways !

**Category 5: Prime Numbers Reading Materials:**

-Concrete Mathematics by Knuth sec 4.2, 4.3, 4.4, 4.5

-Sieve algorithm  [http://en.wikipedia.org/wiki/Sieve\_of\_Eratosthenes](http://l.facebook.com/l.php?u=http%3A%2F%2Fen.wikipedia.org%2Fwiki%2FSieve_of_Eratosthenes&h=cAQHpJ-Lw&s=1)

-Competitive Programming by Halim (edition 1) 5.3.1

-[http://community.topcoder.com/tc?module=Static&d1=tutorials&d2=primeNumbers](http://l.facebook.com/l.php?u=http%3A%2F%2Fcommunity.topcoder.com%2Ftc%3Fmodule%3DStatic%26d1%3Dtutorials%26d2%3DprimeNumbers&h=OAQElJqjL&s=1)

-[http://community.topcoder.com/tc?module=Static&d1=tutorials&d2=math\_for\_topcoders](http://l.facebook.com/l.php?u=http%3A%2F%2Fcommunity.topcoder.com%2Ftc%3Fmodule%3DStatic%26d1%3Dtutorials%26d2%3Dmath_for_topcoders&h=AAQFMDJvG&s=1)

[http://www.comp.nus.edu.sg/%7Estevenha/myteaching/competitive\_programming/ch5.zip](http://l.facebook.com/l.php?u=http%3A%2F%2Fwww.comp.nus.edu.sg%2F%257Estevenha%2Fmyteaching%2Fcompetitive_programming%2Fch5.zip&h=jAQEPL5Cc&s=1)here you will find implementation of sieve and some other prime number related algorithms

 406 - Prime Cuts

 543 - Goldbach's Conjecture

 686 - Goldbach's Conjecture (II)

 897 - Anagrammatic Primes

 914 - Jumping Champion

 1210 - Sum of Consecutive Prime Numbers

 10140 - Prime Distance

 10168 - Summation of Four Primes

 10200 - Prime Time

 10235 - Simply Emirp

 10394 - Twin Primes

 10852 - Less Prime

 10924 - Prime Words

 10948 - The primary problem

**Category 6: GCD and/or LCM** **Reading Materials:**

 -Competitive Programming by Halim (edition 1) 5.3.2

 -Concrete Mathematics by Knuth sec 4.1

 -[http://community.topcoder.com/tc?module=Static&d1=tutorials&d2=math\_for\_topcoders](http://l.facebook.com/l.php?u=http%3A%2F%2Fcommunity.topcoder.com%2Ftc%3Fmodule%3DStatic%26d1%3Dtutorials%26d2%3Dmath_for_topcoders&h=zAQGrFXDX&s=1)

 332 - Rational Numbers from Repeating Fractions

 408 - Uniform Generator

 412 - Pi

 10193 - All You Need Is Love

 10407 - Simple division

 10892 - LCM Cardinality

 11388 - GCD LCM

 11417 - GCD

 11827 - Maximum GCD

**Category 7**: **Finding Prime Factors**

 583 - Prime Factors  10392 - Factoring Large Numbers

 11466 - Largest Prime Divisor

  160 - Factors and Factorials

 993 - Product of digits

 10061 – How many zero’s and how many digits?

 10139 - Factovisors

 10484 - Divisibility of Factors

 10780 - Again Prime? No Time

 10791 - Minimum Sum LCM

 11889 - Benefit

 12090 - Counting Zeroes

**Category 8: Modulo Arithmetic Reading Materials:**

 - Competitive Programming by Halim (edition 1) 5.3.5

 - [http://en.wikipedia.org/wiki/Modular\_arithmetic](http://l.facebook.com/l.php?u=http%3A%2F%2Fen.wikipedia.org%2Fwiki%2FModular_arithmetic&h=DAQEXAfwm&s=1)

 - Concrete Mathematics by Knuth sec 3.4,4.6

Problems:

 374 - Big Mod

 10127 - Ones

 10174 - Couple-Bachelor-Spinster Numbers

 10176 - Ocean Deep ! - Make it shallow !!

 10212 - The Last Non-zero Digit

 10489 - Boxes of Chocolates

**Category 9: Phi funtion** **Reading Materials:**

- Concrete Mathematics by Knuth sec 3.4,4.6

- Competitive Programming by Halim (edition 1) 4.9

Problems:

 10179 - Irreducible Basic Fractions

 10299 - Relatives

 10820 - Send a Table

 11064 - Number Theory

**Category 10: Extended Euclid** **Reading materials:**

- Competitive Programming by Halim (edition 1) 5.3.4

Problems:

10633 - Rare Easy Problem

10673 - Play with Floor and Ceil **Category 11: Inverse Modulus**

**Reading materials:** [http://www.cs.brown.edu/courses/cs007/modmult/node2.html](http://l.facebook.com/l.php?u=http%3A%2F%2Fwww.cs.brown.edu%2Fcourses%2Fcs007%2Fmodmult%2Fnode2.html&h=YAQEkxTxH&s=1)Problems: lightOj 1067-Combinations [http://www.lightoj.com/volume\_showproblem.php?problem=1067](http://l.facebook.com/l.php?u=http%3A%2F%2Fwww.lightoj.com%2Fvolume_showproblem.php%3Fproblem%3D1067&h=tAQFh_eXZ&s=1)

**Category 11: Catalan Numbers  Reading materials:**

 -[http://en.wikipedia.org/wiki/Catalan\_number](http://l.facebook.com/l.php?u=http%3A%2F%2Fen.wikipedia.org%2Fwiki%2FCatalan_number&h=pAQEapkSW&s=1)

 -Enumerative Combinatorics by Richard P. Stanley Volume 2 (catalan number exercises)

 Problems:

 991 - Safe Salutations

 10007 - Count the Trees

 10223 - How many nodes?

 10303 - How Many Trees?

**Category 12:  Combinatorics** **Reading Materials:**

- [http://community.topcoder.com/tc?module=Static&d1=tutorials&d2=combinatorics](http://l.facebook.com/l.php?u=http%3A%2F%2Fcommunity.topcoder.com%2Ftc%3Fmodule%3DStatic%26d1%3Dtutorials%26d2%3Dcombinatorics&h=KAQFR_ZiB&s=1)

- [http://www.mathsisfun.com/combinatorics/combinations-permutations.html](http://l.facebook.com/l.php?u=http%3A%2F%2Fwww.mathsisfun.com%2Fcombinatorics%2Fcombinations-permutations.html&h=yAQF2jqGo&s=1)

- Competitive Programming by Halim (edition 1) 5.5.1

- Daniel A. Marcus - Combinatorics (A Problem Oriented Approach)

- Enumerative\_Combinatorics by Richard P. Stanley vol 1 and 2

10079 - Pizza Cutting

 10359 - Tiling

 10733 - The Colored Cubes

 10784 - Diagonal

 10790 - How Many Points of Intersection?

 10843 - Anne's game

 11115 - Uncle Jack

 11204 - Musical instruments

 11310 - Delivery Debacle

 11401 - Triangle Counting

 11480 - Jimmy's Balls

 11554 - Hapless Hedonism

 11597 - Spanning Subtree

**Category 13: Big Integer** **Reading materials:**

For c/c++: [http://lightoj.com/article\_show.php?article=1004](http://l.facebook.com/l.php?u=http%3A%2F%2Flightoj.com%2Farticle_show.php%3Farticle%3D1004&h=-AQFyHIjh&s=1)

For java: Competitive Programming by Halim (edition 1) sec 5.4

             424 - Integer Inquiry

             465 - Overflow

             713 - Adding Reversed Numbers

             10013 - Super long sums

             10083 - Division

             10106 - Product

             10523 - Very Easy !!!

             10925 - Krakovia

**Category  14: Fibinacci Numbers Reading Materials:**

            -Concrete Mathematics by Knuth sec 6.6

            -Google for 'Fobonacci Numbers'

            495 - Fibonacci Freeze

            763 - Fibinary Numbers

            900 - Brick Wall Patterns

            10334 - Ray Through Glasses

            10450 - World Cup Noise

            10579 - Fibonacci Numbers

            10862 - Connect the Cable Wires

            11161 - Help My Brother (II)

**Category  15**:**Factorial  Reading Materials:**

 - GENERATING FACTORIALS USING STRING [https://www.google.com/search?sourceid=chrome&ie=UTF-8&q=GENERATING+FACTORIALS+USING+STRING](https://www.facebook.com/l.php?u=https%3A%2F%2Fwww.google.com%2Fsearch%3Fsourceid%3Dchrome%26ie%3DUTF-8%26q%3DGENERATING%2BFACTORIALS%2BUSING%2BSTRING&h=yAQF2jqGo&s=1)

Then go to the second link

324 - Factorial Frequencies

 623 - 500!

 10220 - I Love Big Numbers! 10323-Factorial! You must be kidding

**Category 16: Permutation related Reading materials:**

-[http://www.bearcave.com/random\_hacks/permute.html](http://l.facebook.com/l.php?u=http%3A%2F%2Fwww.bearcave.com%2Frandom_hacks%2Fpermute.html&h=dAQHkEQJ2&s=1)

-[http://marknelson.us/2002/03/01/next-permutation/](http://l.facebook.com/l.php?u=http%3A%2F%2Fmarknelson.us%2F2002%2F03%2F01%2Fnext-permutation%2F&h=GAQHsMs6S&s=1)

-[http://www.cut-the-knot.org/do\_you\_know/AllPerm.shtml](http://l.facebook.com/l.php?u=http%3A%2F%2Fwww.cut-the-knot.org%2Fdo_you_know%2FAllPerm.shtml&h=KAQFR_ZiB&s=1)

-[http://newton.ex.ac.uk/teaching/jmr/recursion.html](http://l.facebook.com/l.php?u=http%3A%2F%2Fnewton.ex.ac.uk%2Fteaching%2Fjmr%2Frecursion.html&h=UAQFUL-9C&s=1)

-Practical Algorithms in C by Flamig chapter 4 sec : permutation generators

**Problems:**

12335 - Lexicographic Order

-More problems will be added soon :)

**Category 17: Probability(Will be covered in Dynamic programming part)**

**Category 18: Special Numbers Reading Materials:**

-Concrete Mathematics by Knuth chapter 6

10844 - Bloques

1118 - Binary Stirling Numbers 12034

Top coder SRM 391 Div 1 500 point problem

**Category 19: Cycle-Finding Reading Materials:**

-Competitive Programming by Halim sec 5.5.2

Problems:

202 - Repeating Decimals

350 - Pseudo-Random Numbers

944 - Happy Numbers

10591 - Happy Number

11053 - Flavius Josephus Reloaded

11634 - Generate random numbers

**Bitmask:  Reading material:**

[http://community.topcoder.com/tc?module=Static&d1=tutorials&d2=bitManipulation](http://l.facebook.com/l.php?u=http%3A%2F%2Fcommunity.topcoder.com%2Ftc%3Fmodule%3DStatic%26d1%3Dtutorials%26d2%3DbitManipulation&h=5AQGfeAf9&s=1)

Bangla tutorial: [http://www.shafaetsplanet.com/planetcoding/?p=1357](http://l.facebook.com/l.php?u=http%3A%2F%2Fwww.shafaetsplanet.com%2Fplanetcoding%2F%3Fp%3D1357&h=YAQEkxTxH&s=1)

Problems:

           12368 - Candles

            10576 - Y2K Accounting Bug

           448 Oops!

           10718 Bit Mask

           10651 Pebble Solitaire

           11553 Grid Game

**Greedy**

Problems:

1.410 - Station Balance

2.10670 - Work Reduction

3.10340 - All in All

4.11054 - Wine trading in Gergovia

**Binary Search: Reading material:**

Competitive programming edition 1, chapter 7,divide and conquer revisited

Problems:

1. 679 - Dropping Balls

2.10341 - Solve It

3.10474 - Where is the Marble?

4. 11057 - Exact Sum

5. 11646 - Athletics Track

6.  10668 - Expanding Rods 7.10611The Playboy Chimp

**Resursion: Reading material:** -নিটনের "সবার জন্য সি" এর "ফাংশান" অধ্যায় থেকে "রিকার্শান"

-[http://zobayer.blogspot.com/2009/12/cse-102-attacking-recursion.html](http://l.facebook.com/l.php?u=http%3A%2F%2Fzobayer.blogspot.com%2F2009%2F12%2Fcse-102-attacking-recursion.html&h=yAQF2jqGo&s=1)

-[http://zobayer.blogspot.com/2009/12/cse-102-practice-recursions.html](http://l.facebook.com/l.php?u=http%3A%2F%2Fzobayer.blogspot.com%2F2009%2F12%2Fcse-102-practice-recursions.html&h=-AQFyHIjh&s=1)

Some well known algorithms:

            i)N-queen problem:computer algorithms by sahni,chapter backtracing

            ii)Sum-of subset:computer algorithms by sahni,chapter backtracing

            iii)Toewrs-of-Hanoi : computer algorithms by sahni,chapter 1

Problems

            1.uva 574 Sum It Up

            2.uva  750 - 8 Queens Chess Problem

            3.uva 10017 The Never Ending Towers of Hanoi

            4.uva 10285 Longest Run on a Snowboard

            5.uva 487 - Boggle Blitz

            6.uva  10344 - 23 out of 5

**GRAPH: Reading material**

**To learn basics of grph theory :**

Tutorial in Bangla : [http://www.shafaetsplanet.com/planetcoding/?p=143](http://l.facebook.com/l.php?u=http%3A%2F%2Fwww.shafaetsplanet.com%2Fplanetcoding%2F%3Fp%3D143&h=DAQEXAfwm&s=1)

[**http://primes.utm.edu/cgi-bin/caldwell/tutor/graph/intro**](http://l.facebook.com/l.php?u=http%3A%2F%2Fprimes.utm.edu%2Fcgi-bin%2Fcaldwell%2Ftutor%2Fgraph%2Fintro&h=lAQHqXLHw&s=1)

Introduction to Algorithm-Corman P 531-549 At first read this:[http://community.topcoder.com/tc?module=Static&d1=tutorials&d2=graphsDataStrucs1](http://l.facebook.com/l.php?u=http%3A%2F%2Fcommunity.topcoder.com%2Ftc%3Fmodule%3DStatic%26d1%3Dtutorials%26d2%3DgraphsDataStrucs1&h=fAQHVAhbV&s=1)

Implementation of some graph algorithms is here :[http://www.comp.nus.edu.sg/%7Estevenha/myteaching/competitive\_programming/ch4.zip](http://l.facebook.com/l.php?u=http%3A%2F%2Fwww.comp.nus.edu.sg%2F%257Estevenha%2Fmyteaching%2Fcompetitive_programming%2Fch4.zip&h=sAQEgkbF_&s=1)

**BFS**

Tutorial in bangla : [http://www.shafaetsplanet.com/planetcoding/?p=604](http://l.facebook.com/l.php?u=http%3A%2F%2Fwww.shafaetsplanet.com%2Fplanetcoding%2F%3Fp%3D604&h=6AQEh9OOe&s=1)

BFS coding : [http://www.shafaetsplanet.com/planetcoding/?p=639](http://l.facebook.com/l.php?u=http%3A%2F%2Fwww.shafaetsplanet.com%2Fplanetcoding%2F%3Fp%3D639&h=rAQGi_D7Z&s=1)

Reading material: [http://sites.google.com/site/smilitude/shortestpath](http://l.facebook.com/l.php?u=http%3A%2F%2Fsites.google.com%2Fsite%2Fsmilitude%2Fshortestpath&h=8AQEslZcW&s=1)[http://community.topcoder.com/tc?module=Static&d1=tutorials&d2=graphsDataStrucs2](http://l.facebook.com/l.php?u=http%3A%2F%2Fcommunity.topcoder.com%2Ftc%3Fmodule%3DStatic%26d1%3Dtutorials%26d2%3DgraphsDataStrucs2&h=AAQFMDJvG&s=1)[http://sites.google.com/site/smilitude/shortestpath\_problems](http://l.facebook.com/l.php?u=http%3A%2F%2Fsites.google.com%2Fsite%2Fsmilitude%2Fshortestpath_problems&h=JAQEH90Cl&s=1)

            336 - A Node Too Far(Easy)

567 Risk

  439 Knight Moves(2D graph use stracture or pair(STL))

            417 - Word Index

            532 - Dungeon Master

            10067 - Playing with Wheels 321 The new villa

            10150 - Doublets

            10610 - Gopher and Hawks

            11513 - 9 Puzzle

            11792 - Krochanska is Here!

            11377 - Airport Setup

            571 - Jugs

**DFS/FloodFill Reading Material:**Introduction to Algorithm-Corman P 540-549

Competitive Programming-Halim P 61

Tutorial in Bangla : [http://www.shafaetsplanet.com/planetcoding/?p=973](http://l.facebook.com/l.php?u=http%3A%2F%2Fwww.shafaetsplanet.com%2Fplanetcoding%2F%3Fp%3D973&h=nAQF58KAp&s=1)

            469 - Wetlands of Florida

            352 - The Seasonal War

            10336 - Rank the Languages

            11518 - Dominos 2

            11470 - Square Sums

            11244 - Counting Stars

            11561 - Getting Gold

            1247 - Interstar Transport

**Topological Sort Reading Material:**

 [http://sites.google.com/site/smilitude/topsortIntroduction](http://l.facebook.com/l.php?u=http%3A%2F%2Fsites.google.com%2Fsite%2Fsmilitude%2FtopsortIntroduction&h=kAQGkiwWa&s=1) to Algorithm-Corman P 549-552

Competitive Programming-Halim P 66

Tutorial in Bangla : [http://www.shafaetsplanet.com/planetcoding/?p=848](http://l.facebook.com/l.php?u=http%3A%2F%2Fwww.shafaetsplanet.com%2Fplanetcoding%2F%3Fp%3D848&h=gAQHXHRxC&s=1)

SPOJ PFDEP - Project Files Dependencies

UVA 124 - Following Orders

UVA 452 - Project Scheduling

UVA 10305 - Ordering Tasks

UVA 10917 - A Walk Through the Forest

UVA 109 26 - How Many Dependencies

UVA 11060 - Beverages

UVA 11174 - Stand in a line

UVA11686 - Pick up sticks

**Bipartite Graph Check**

            10004 - Bicoloring

            11080 - Place the Guards

**SIMPLE DFS WITH COLOR**

**Finding Articulation Points/Bridges**

**Reaidng material:**Competitive Programming-Halim P 62

            315 - Network

            610 - Street Directions

            796 - Critical Links

            10199 - Tourist Guide

**Finding Strongly Connected Components**

**Reading material:**[http://en.wikipedia.org/wiki/Tarjan's\_strongly\_connected\_components\_algorithm](http://l.facebook.com/l.php?u=http%3A%2F%2Fen.wikipedia.org%2Fwiki%2FTarjan%27s_strongly_connected_components_algorithm&h=AAQFMDJvG&s=1)

            11504 - Dominos

            11770 - Lighting Away

            1229 - Sub-dictionary

**Dijkstra**

**Reading Material:** Introduction to Algorithm-Corman P 595-599

            341 - Non-Stop Travel

            10986 - Sending email

            929 - Number Maze

            10801 - Lift Hopping

            11492 - Babel

            10603 - Fill

**Bellman Ford's Reading Material:** Introduction to Algorithm-Corman P 588

            558 - Wormholes

            10557 - XYZZY

            11280 - Flying to Fredericton

**Floyd Warshall**

**Reading Material:** Introduction to Algorithm-Corman P 629

            341 - Non-Stop Travel

            186 - Trip Routing

            423 - MPI Maelstrom

            1198 - The Geodetic Set Problem

            1247 - Interstar Transport

**Variant**

**Reading material:**Competitive Programming-Halim P 80

            534 - Frogger

            544 - Heavy Cargo

            869 - Airline Comparison

**MST**

**Reading Material:** Introduction to Algorithm-Corman P 567

            10034 - Freckles

            908 - Re-connecting Computer Sites

            1208 - Oreon

**Maximum Flow/Min Cut**

**Reading Material:** Competitive Programming-Halim P 81

[http://en.wikipedia.org/wiki/Maximum\_flow\_problem](http://l.facebook.com/l.php?u=http%3A%2F%2Fen.wikipedia.org%2Fwiki%2FMaximum_flow_problem&h=qAQHFCB9Y&s=1)

[http://en.wikipedia.org/wiki/Edmonds](http://l.facebook.com/l.php?u=http%3A%2F%2Fen.wikipedia.org%2Fwiki%2FEdmonds&h=YAQEkxTxH&s=1)–Karp\_algorithm

            820 - Internet Bandwidth

            10594 - Data Flow

            10480 - Sabotage

**Dynamic Programming(DP)**

**Reading material:**

1)[http://sites.google.com/site/smilitude/%E0%A6%A1%E0%A6%BE%E0%A6%87%E0%A6%A8%E0%A6%BE%E0%A6%AE%E0%A6%BF%E0%A6%95%E0%A6%AA%E0%A7%8D%E0%A6%B0%E0%A7%87%E0%A6%BE%E0%A6%97%E0%A7%8D%E0%A6%B0%E0%A6%BE%E0%A6%AE%E0%A6%BF%E0%A6%82%E0%A6%8F%E0%A6%B0%E0%A6%B8%E0%A7%82%E0%A6%9A%E0%A6%A8%E0%A6%BE](http://l.facebook.com/l.php?u=http%3A%2F%2Fsites.google.com%2Fsite%2Fsmilitude%2F%25E0%25A6%25A1%25E0%25A6%25BE%25E0%25A6%2587%25E0%25A6%25A8%25E0%25A6%25BE%25E0%25A6%25AE%25E0%25A6%25BF%25E0%25A6%2595%25E0%25A6%25AA%25E0%25A7%258D%25E0%25A6%25B0%25E0%25A7%2587%25E0%25A6%25BE%25E0%25A6%2597%25E0%25A7%258D%25E0%25A6%25B0%25E0%25A6%25BE%25E0%25A6%25AE%25E0%25A6%25BF%25E0%25A6%2582%25E0%25A6%258F%25E0%25A6%25B0%25E0%25A6%25B8%25E0%25A7%2582%25E0%25A6%259A%25E0%25A6%25A8%25E0%25A6%25BE&h=WAQHUggok&s=1)

2)[http://community.topcoder.com/tc?module=Static&d1=features&d2=040104](http://l.facebook.com/l.php?u=http%3A%2F%2Fcommunity.topcoder.com%2Ftc%3Fmodule%3DStatic%26d1%3Dfeatures%26d2%3D040104&h=WAQHUggok&s=1)

3)[http://sites.google.com/site/smilitude/recursion\_and\_dp](http://l.facebook.com/l.php?u=http%3A%2F%2Fsites.google.com%2Fsite%2Fsmilitude%2Frecursion_and_dp&h=lAQHqXLHw&s=1)

**Now solve some classical DP:**

**1) LCS (longest common subsequence)**

**Reading material:** you have already learned this from here[http://community.topcoder.com/tc?module=Static&d1=features&d2=040104](http://l.facebook.com/l.php?u=http%3A%2F%2Fcommunity.topcoder.com%2Ftc%3Fmodule%3DStatic%26d1%3Dfeatures%26d2%3D040104&h=KAQFR_ZiB&s=1)

Introduction to algorithms by Coreman chapter 15(dynamic programming) page 350 second edition

            Problems from uva:

            7.10066 - The Twin Towers

            8.10192 - Vacation

            9.10405 - Longest Common Subsequence

**2) Coin change:**

**Reading material:**[https://sites.google.com/site/programinggconcept/algorithm](https://www.facebook.com/l.php?u=https%3A%2F%2Fsites.google.com%2Fsite%2Fprograminggconcept%2Falgorithm&h=eAQF0lsWD&s=1)

Problems from uva:

            10.147 - Dollars

            11.357 - Let Me Count the Ways

            12.674 - Coin Change

**3) Knapsack:**

**Reading material:** you have seen it earlier: [http://community.topcoder.com/tc?module=Static&d1=features&d2=040104](http://l.facebook.com/l.php?u=http%3A%2F%2Fcommunity.topcoder.com%2Ftc%3Fmodule%3DStatic%26d1%3Dfeatures%26d2%3D040104&h=nAQF58KAp&s=1)

[https://sites.google.com/site/programinggconcept/0-1-knapsack](https://www.facebook.com/l.php?u=https%3A%2F%2Fsites.google.com%2Fsite%2Fprograminggconcept%2F0-1-knapsack&h=aAQH5qgDj&s=1)

            Problems from uva:

            13.10130 - SuperSale

            14.624 - CD

**4) Maximum sum:**

**Reading material:** Competitive programming

--by halim, chap 3 p 47, 1st edition

            Problems from uva:

            15.108 - Maximum Sum

            16.836 - Largest Submatrix

            17.10074 - Take the Land

            18.10667 - Largest Block

            19.507 - Jill Rides Again

            20.10684 - The jackpot

**5) Matrix chain multiplication:**

**Reading material:** Introduction to algorithms by Coreman chapter 15(dynamic programming) page 331 second edition

            Problems from uva:

            21.348 - Optimal Array Multiplication Sequence

**6) LIS (longest increasing subsequence)/LDS(longest decreasing subsequence)**

**Reading material:**[http://www.algorithmist.com/index.php/Longest\_Increasing\_Subsequence](http://l.facebook.com/l.php?u=http%3A%2F%2Fwww.algorithmist.com%2Findex.php%2FLongest_Increasing_Subsequence&h=uAQHTRHyx&s=1)

[http://www.algorithmist.com/index.php/Longest\_Increasing\_Subsequence.cpp](http://l.facebook.com/l.php?u=http%3A%2F%2Fwww.algorithmist.com%2Findex.php%2FLongest_Increasing_Subsequence.cpp&h=wAQFj2qZL&s=1)

            Problems from uva:

            22.111 - History Grading

            23.481 - What Goes Up?

            24.10534 - Wavio Sequence

            25.11790 - Murcia's Skyline

            26.10131 - Is Bigger Smarter

**7) Edit Distance:**

**Reading material:**[http://www.csse.monash.edu.au/~lloyd/tildeAlgDS/Dynamic/Edit/](http://l.facebook.com/l.php?u=http%3A%2F%2Fwww.csse.monash.edu.au%2F%7Elloyd%2FtildeAlgDS%2FDynamic%2FEdit%2F&h=tAQFh_eXZ&s=1)

            Problems from uva:

            27.164 - String Computer

            28.526 - String Distance and Edit Process

**NON-CLASSICAL:**

            29. uva 10003 - Cutting Sticks

            30. Topcoder AvoidRoads TCO '03 Semifinals 4 Div I[http://community.topcoder.com/stat?c=problem\_statement&pm=1889&rd=4709](http://l.facebook.com/l.php?u=http%3A%2F%2Fcommunity.topcoder.com%2Fstat%3Fc%3Dproblem_statement%26pm%3D1889%26rd%3D4709&h=tAQFh_eXZ&s=1)

            31. UVa 825

            32. UVa 11067

            33. TCCC '03 Round 4 Div I [http://community.topcoder.com/stat?c=problem\_statement&pm=1592&rd=4482](http://l.facebook.com/l.php?u=http%3A%2F%2Fcommunity.topcoder.com%2Fstat%3Fc%3Dproblem_statement%26pm%3D1592%26rd%3D4482&h=TAQGoCVxL&s=1)

            34. ShortPalindromes SRM 165 Round 1 - Division II, Level Three

            35. uva 10739 - String to Palindrome

            36. uva 11151 - Longest Palindrome

Problems from TOPCODER:

            37. Primesums TCO 2008 qualification round 1

            38. LostParentheses SRM 348 d 1 l 1

            39. entencedecomposition srm 411

            40.fairworkload srm 169

            41.Thepriceisright srm 159

            42.CheapestTabComplete TCCC 06 online round 2

            43.FIELDDiagrams srm 401 div 2 level 2

**DP + bitmask:**

            Problems from uva:

            44.10911 - Forming Quiz Teams

            45.10364 - Square

            46.10651 - Pebble Solitaire

            47.10908 - Largest Square

**Probability Reading Materials:**

-[http://www.mathsisfun.com/data/probability-false-negatives-positives.html](http://l.facebook.com/l.php?u=http%3A%2F%2Fwww.mathsisfun.com%2Fdata%2Fprobability-false-negatives-positives.html&h=xAQHfz31v&s=1)

-[http://www.mathsisfun.com/data/probability-shared-birthday.html](http://l.facebook.com/l.php?u=http%3A%2F%2Fwww.mathsisfun.com%2Fdata%2Fprobability-shared-birthday.html&h=vAQH3I5mU&s=1)

-[http://www.mathsisfun.com/data/probability-events-conditional.html](http://l.facebook.com/l.php?u=http%3A%2F%2Fwww.mathsisfun.com%2Fdata%2Fprobability-events-conditional.html&h=BAQHp6Kya&s=1)

-[http://www.mathsisfun.com/activity/dice-experiment-2.html](http://l.facebook.com/l.php?u=http%3A%2F%2Fwww.mathsisfun.com%2Factivity%2Fdice-experiment-2.html&h=wAQFj2qZL&s=1)

-[http://www.mathsisfun.com/data/index.html](http://l.facebook.com/l.php?u=http%3A%2F%2Fwww.mathsisfun.com%2Fdata%2Findex.html&h=tAQFh_eXZ&s=1)

-[http://www.dartmouth.edu/~chance/teaching\_aids/books\_articles/probability\_book/amsbook.mac.pdf](http://l.facebook.com/l.php?u=http%3A%2F%2Fwww.dartmouth.edu%2F%7Echance%2Fteaching_aids%2Fbooks_articles%2Fprobability_book%2Famsbook.mac.pdf&h=hAQGtFE22&s=1)

-Probability and statistics by walpole

-Concrete Mathematics by Knuth chapter 8

-First course in probability by ross

-Introduction to probability models by ross

 Topcoder: The DiceGame srm 381 div 2 level 2

Topcoder: RandomSort SRM 402 div2,level 3

uva 12369 – Cards

10056 - What is the Probability?

 10238 - Throw the Dice

 10328 - Coin Toss

 10491 - Cows and Cars

 10759 - Dice Throwing

 11181 – Probability | Given

 11500 - Vampires

 11628 - Another lottery

 12024 - Hats

**Game theory :( using DP)**

Topics: Game of Nim and Grundy number

**Reading material:**

[http://community.topcoder.com/tc?module=Static&d1=tutorials&d2=algorithmGames](http://l.facebook.com/l.php?u=http%3A%2F%2Fcommunity.topcoder.com%2Ftc%3Fmodule%3DStatic%26d1%3Dtutorials%26d2%3DalgorithmGames&h=pAQEapkSW&s=1)

[http://sps.nus.edu.sg/~limchuwe/cgt/](http://l.facebook.com/l.php?u=http%3A%2F%2Fsps.nus.edu.sg%2F%7Elimchuwe%2Fcgt%2F&h=LAQECt9Sr&s=1)

            Chomp TCO 08 online round 1

            10578 - The Game of 31

[http://www.lightoj.com/volume\_showproblem.php?problem=1199](http://l.facebook.com/l.php?u=http%3A%2F%2Fwww.lightoj.com%2Fvolume_showproblem.php%3Fproblem%3D1199&h=HAQEjppQT&s=1)

[http://www.lightoj.com/volume\_showproblem.php?problem=1315](http://l.facebook.com/l.php?u=http%3A%2F%2Fwww.lightoj.com%2Fvolume_showproblem.php%3Fproblem%3D1315&h=YAQEkxTxH&s=1)

[http://www.lightoj.com/volume\_showproblem.php?problem=1247](http://l.facebook.com/l.php?u=http%3A%2F%2Fwww.lightoj.com%2Fvolume_showproblem.php%3Fproblem%3D1247&h=cAQHpJ-Lw&s=1)

[http://www.lightoj.com/volume\_showproblem.php?problem=1253](http://l.facebook.com/l.php?u=http%3A%2F%2Fwww.lightoj.com%2Fvolume_showproblem.php%3Fproblem%3D1253&h=nAQF58KAp&s=1)

যা কিছু বাকি রয়ে গেছেঃ Computational Geometry [http://community.topcoder.com/tc?module=Static&d1=tutorials&d2=alg\_index](http://l.facebook.com/l.php?u=http%3A%2F%2Fcommunity.topcoder.com%2Ftc%3Fmodule%3DStatic%26d1%3Dtutorials%26d2%3Dalg_index&h=HAQEjppQT&s=1)

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