**Dynamic Programming**

**Standard DP Problems. Must know:**

[**http://people.cs.clemson.edu/~bcdean/dp\_practice/**](http://people.cs.clemson.edu/~bcdean/dp_practice/)

**Initial Problems (Must Solve)**

* <http://www.spoj.com/problems/COINS/>
* <http://www.codechef.com/problems/DELISH>
* <http://www.codechef.com/problems/KSUBSUM/>
* <http://www.codechef.com/JUNE13/problems/LEMOUSE>
* <http://www.spoj.com/problems/MAXWOODS/>
* <http://www.spoj.com/problems/EDIST/>
* <http://www.spoj.com/problems/ADFRUITS/>
* <http://www.spoj.com/problems/IOIPALIN/>
* <http://www.codechef.com/problems/PPTEST/>
* <http://www.codechef.com/problems/MAXPR>
* <http://www.codechef.com/problems/LEBALONS>
* <http://www.codechef.com/problems/DBOY/>
* <http://www.codechef.com/problems/HAREJUMP>

Problem Set 1

1) <http://www.codechef.com/problems/COUPON>

2) <http://www.codechef.com/problems/SPIDY2/>

Solutions

SPIDY2 : <http://pastebin.com/QYCX9ujN>

COUPON : <http://pastebin.com/5yX3ivjy>

Problem Set 2

1) <http://www.spoj.com/problems/GNYR09F/>

2) <http://www.spoj.com/problems/PERMUT1/>

3) <http://www.spoj.com/problems/SQRBR/>

4) <http://www.spoj.com/problems/JEDNAKOS/>

5) <http://codeforces.com/contest/467/problem/C>

Solutions

1) GNYR09F : <http://pastebin.com/2tBcRRcx>

2) PERMUT1 : <http://pastebin.com/wNuquV1V>

3) SQRBR : <http://pastebin.com/mwq47v0H>

4) JEDNAKOS : <http://pastebin.com/DEnCyraP>

5) George and Job : <http://pastebin.com/E7UgMXa4>

Problem Set 3

1) <http://www.spoj.com/problems/FARIDA/>

2) <http://www.codechef.com/problems/COINS>

3) <http://www.spoj.com/problems/BEHAPPY/>

4) [http://community.topcoder.com/stat…](http://community.topcoder.com/stat?c=problem_statement&pm=1259)

5) <http://www.codechef.com/problems/DELISH>

6) <http://www.codechef.com/problems/FROGV/>

7) <http://www.spoj.com/problems/EDIST/>

8) <http://www.spoj.com/problems/WACHOVIA/>

9) <http://codeforces.com/contest/455/problem/A>

Solutions :

1) FARIDA : <http://pastebin.com/X2c6jyY1>

2) COINS : <http://pastebin.com/2kg5gw29>

3) BEHAPPY : <http://pastebin.com/HyY4nVCs>

4) ZigZag : <http://pastebin.com/SiA8Z8rz>

5) DELISH : <http://pastebin.com/qtnQMwif>

6) FROGV : <http://www.codechef.com/viewplaintext/4183317>

7) EDIST : <http://pastebin.com/d7pVRMcd>

8) WACHOVIA : <http://pastebin.com/yUqUFKHs>

9) Boredom : <http://pastebin.com/t895hYhg>

Problem Set 4

1) <http://www.spoj.com/problems/MFISH/>

2) <http://www.codechef.com/problems/LEPAINT/>

3) <http://www.codechef.com/problems/SEATSR/>

4) <http://www.spoj.com/problems/INS14E/>

5) <http://www.spoj.com/problems/MARTIAN/>

6) [http://community.topcoder.com/stat…](http://community.topcoder.com/stat?c=problem_statement&pm=12989)

7) <http://www.codechef.com/problems/LEBLOCKS>

8) <http://www.codechef.com/problems/LEMOVIE>

9) <http://www.codechef.com/problems/LEMAGIC>

10) <http://www.codechef.com/problems/LECOINS>

Solutions :

1) MFISH : <http://pastebin.com/vc7SwrQ4>

2) LEPAINT : <http://pastebin.com/11Dj5bxH>

3) SEATSR : <http://pastebin.com/wW2sfNWA>

4) INS14E : <http://pastebin.com/3xEYefg7>

5) MARTIAN : <http://pastebin.com/8eDpF5Zd>

6) VocaloidsAndSongs : <http://pastebin.com/Tng63sfW>

7) LEBLOCKS : <http://pastebin.com/MKyZcMXF>

8) LEMOVIE : <http://pastebin.com/w2dCL5fy>

9) LEMAGIC : <http://paste.ubuntu.com/9933878/>

More Problems:

[https://www.hackerrank.com/.../xaero-and-game-of-thrones](https://www.hackerrank.com/contests/101hack29/challenges/xaero-and-game-of-thrones)  
[https://www.hackerearth.com/.../algorithm/buy-me-some-coke/](https://www.hackerearth.com/september-easy-15/algorithm/buy-me-some-coke/)  
[https://www.hackerearth.com/.../the-art-of-security-4/](https://www.hackerearth.com/july-easy-15/algorithm/the-art-of-security-4/)  
[https://www.hackerearth.com/.../alg.../supernatural-squad-2/](https://www.hackerearth.com/july-easy-15/algorithm/supernatural-squad-2/)  
[https://www.hackerearth.com/.../algorithm/decreasing-paths/](https://www.hackerearth.com/problem/algorithm/decreasing-paths/)

<https://www.codechef.com/KGP14ROS/problems/KGP14H>  
 <https://www.codechef.com/KGP14ROS/problems/KGP14D>  
 <https://www.codechef.com/ACMAMR14/problems/ACM14AM5>  
 <https://www.codechef.com/ACMKAN14/problems/ACM14KN2>  
 <https://www.codechef.com/ACMAMR14/problems/ACM14AM3>  
 <https://www.codechef.com/KAN13ACM/problems/KAN13A>  
 <https://www.codechef.com/ACMAMR14/problems/ACM14AM5>  
 <https://www.codechef.com/KAN13ACM/problems/KAN13H>

[http://www.spoj.com/problems/MARTIAN/](http://www.spoj.pl/problems/MARTIAN/)  
[http://www.spoj.com/problems/MIXTURES/](http://www.spoj.pl/problems/MIXTURES/)  
[http://www.spoj.com/problems/SQRBR/](http://www.spoj.pl/problems/SQRBR/)  
[http://www.spoj.com/problems/SAMER08D/](http://www.spoj.pl/problems/SAMER08D/)  
[http://www.spoj.com/problems/ACMAKER/](http://www.spoj.pl/problems/ACMAKER/)  
[http://www.spoj.com/problems/AEROLITE/](http://www.spoj.pl/problems/AEROLITE/)  
[https://www.spoj.com/problems/AIBOHP/](https://www.spoj.pl/problems/AIBOHP/)  
[https://www.spoj.com/problems/BACKPACK/](https://www.spoj.pl/problems/BACKPACK/)  
[http://www.spoj.com/problems/COURIER/](http://www.spoj.pl/problems/COURIER/)  
[http://www.spoj.com/problems/DP/](http://www.spoj.pl/problems/DP/)  
[http://www.spoj.com/problems/EDIST/](http://www.spoj.pl/problems/EDIST/)  
[http://www.spoj.com/problems/KRECT/](http://www.spoj.pl/problems/KRECT/)  
[http://www.spoj.com/problems/GNY07H/](http://www.spoj.pl/problems/GNY07H/)  
[http://www.spoj.com/problems/LISA/](http://www.spoj.pl/problems/LISA/)  
[http://www.spoj.com/problems/MINUS/](http://www.spoj.pl/problems/MINUS/)  
[http://www.spoj.com/problems/NAJKRACI/](http://www.spoj.pl/problems/NAJKRACI/)  
[http://www.spoj.com/problems/PHIDIAS/](http://www.spoj.pl/problems/PHIDIAS/)  
[http://www.spoj.com/problems/PIGBANK/](http://www.spoj.pl/problems/PIGBANK/)  
[http://www.spoj.com/problems/PT07X/](http://www.spoj.pl/problems/PT07X/)  
[http://www.spoj.com/problems/VOCV/](http://www.spoj.pl/problems/VOCV/)  
[http://www.spoj.com/problems/TOURIST/](http://www.spoj.pl/problems/TOURIST/)  
[http://www.spoj.com/problems/MKBUDGET](http://www.spoj.pl/problems/MKBUDGET)  
[http://www.spoj.com/problems/MMAXPER](http://www.spoj.pl/problems/MMAXPER)  
[http://www.spoj.com/problems/ANARC07G](http://www.spoj.pl/problems/ANARC07G)  
[http://www.spoj.com/problems/MENU](http://www.spoj.pl/problems/MENU)

[http://www.spoj.com/problems/MKBUDGET](http://www.spoj.pl/problems/MKBUDGET)  
[http://www.spoj.com/problems/MMAXPER](http://www.spoj.pl/problems/MMAXPER)  
[http://www.spoj.com/problems/MPILOT](http://www.spoj.pl/problems/MPILOT)  
[http://www.spoj.com/problems/PARTY](http://www.spoj.pl/problems/PARTY)  
[http://www.spoj.com/problems/CRSCNTRY](http://www.spoj.pl/problems/CRSCNTRY)  
[http://www.spoj.com/problems/MBLAST](http://www.spoj.pl/problems/MBLAST)  
[http://www.spoj.com/problems/MBALL](http://www.spoj.pl/problems/MBALL)  
[http://www.spoj.com/problems/MSTRING](http://www.spoj.pl/problems/MSTRING)  
[http://www.spoj.com/problems/NGON](http://www.spoj.pl/problems/NGON)  
[http://www.spoj.com/problems/PIGBANK](http://www.spoj.pl/problems/PIGBANK)  
[http://www.spoj.com/problems/SCUBADIV](http://www.spoj.pl/problems/SCUBADIV)  
[http://www.spoj.com/problems/MINVEST](http://www.spoj.pl/problems/MINVEST)  
[http://www.spoj.com/problems/ANARC07G](http://www.spoj.pl/problems/ANARC07G)  
[http://www.spoj.com/problems/FOOL--](http://www.spoj.pl/problems/FOOL--)  
[http://www.spoj.com/problems/MENU](http://www.spoj.pl/problems/MENU)

**Advanced Dynamic Programming**

For Reading

Commonly Used DP state domains : [http://apps.topcoder.com/forums/…](http://apps.topcoder.com/forums/?module=Thread&threadID=697369&start=0)

General Aspects of DP : [http://apps.topcoder.com/forums/…](http://apps.topcoder.com/forums/?module=Thread&threadID=700080&start=0)

Optimizing DP solutions : [http://apps.topcoder.com/forums/…](http://apps.topcoder.com/forums/?module=Thread&threadID=697925&start=0)

Dynamic Programming Optimizations

Convex Hull Trick 1 : <http://wcipeg.com/wiki/Convex_hull_trick>

Problem(s) : <http://codeforces.com/contest/319/problem/C>

Divide and Conquer Optimization :

<http://codeforces.com/contest/321/problem/E>

[https://www.hackerrank.com/…/chall…/guardians-lunatics-ioi14](https://www.hackerrank.com/contests/ioi-2014-practice-contest-2/challenges/guardians-lunatics-ioi14) (Solve problems with the help of editorial to learn)

Convex Hull Trick 2 : [http://apps.topcoder.com/forums/…](http://apps.topcoder.com/forums/?module=Thread&threadID=608334&start=0&mc=14#1120736)

Problem(s) : <http://www.spoj.com/problems/NKLEAVES/>

<http://codeforces.com/contest/311/problem/B>

Digit DP

[http://stackoverflow.com/…/how-to-count-integers-…/22394258…](http://stackoverflow.com/questions/22394257/how-to-count-integers-between-large-a-and-b-with-a-certain-property/22394258#22394258)

<http://codeforces.com/blog/entry/8221>

Problem(s) : <http://www.codechef.com/problems/ANUBGC>

<http://www.spoj.com/problems/LUCIFER/>

<http://www.spoj.com/problems/RAONE/>

<http://www.spoj.com/problems/GONE/>

DP on trees

[http://www.iarcs.org.in/…/online-study-…/topics/dp-trees.php](http://l.facebook.com/l.php?u=http%3A%2F%2Fwww.iarcs.org.in%2Finoi%2Fonline-study-material%2Ftopics%2Fdp-trees.php&h=CAQHI13py&enc=AZNPzl-drz0L1BjRRu33EEnwCei41oPsRgRLLmx2-MIGONtL48qb57FMRDf8f4eI7gMrxIrUryhEf7Ld-dr0isOBXOVnUsTgXESeE2dPCgEvB12y5Udwaggam16kG76worhuZAFUIMsOO6UvX_ha5AzK&s=1)

**Recommended:**

<https://threads-iiith.quora.com/Dynamic-Programming-on-Trees-Tutorial>

Problem(s) : [http://www.spoj.com/problems/PT07F/](http://l.facebook.com/l.php?u=http%3A%2F%2Fwww.spoj.com%2Fproblems%2FPT07F%2F&h=EAQEvAv3m&enc=AZPKS6g5rl-jFsqzR14LGdJFiOOWkXlhTWP3jyT_HBPAaKHIfFTBS_li_1n1HHGK9HnvxgCAUh9eizg64lBsYM8mZojdfdaeAZpdViFlWALPKqrKVttUiE1V7M7uubqY_MVfwR-uX21gzJax7ZwyNPZg&s=1)

[https://www.spoj.com/problems/PT07X/](https://www.facebook.com/l.php?u=https%3A%2F%2Fwww.spoj.pl%2Fproblems%2FPT07X%2F&h=oAQG-N9qG&enc=AZMEFbYwSMDFNS0L2eoPmDDrH9UwiTncDKOxj11cQuzDg22wBXuoepoZWiS9x3hEi4P2AGbmn6Gb8oe1WfOX_pYd3RAhbSq92znSjSsI3bLTKlOVXeIUWfUW2X7uaOBg6VRw0D34PEgzVvLHYKiaS9tr&s=1)

[http://www.spoj.com/problems/VOCV/](http://l.facebook.com/l.php?u=http%3A%2F%2Fwww.spoj.pl%2Fproblems%2FVOCV%2F&h=xAQEmU4V0&enc=AZPB1wTjeLeS7rbiI3pOk0iQ4hTGByHGBZt2JusUQU-IobZDxLDtz_u-FP7I5B6xi_kJQQLjqpx4Bsc6euZz_b6ih1035N70dYvePTJ5zU-eOP8JPx-haW8GY0kAwudIWJxf_Nlyjd98zI5P5i9yeKwJ&s=1)

Bitmask DP

[http://community.topcoder.com/tc…](http://l.facebook.com/l.php?u=http%3A%2F%2Fcommunity.topcoder.com%2Ftc%3Fmodule%3DStatic%26d1%3Dtutorials%26d2%3DbitManipulation&h=lAQFmrKYS&enc=AZMwVnppiKWx4VP_AhFYgRsACbjM-gDnxhRCEBx7xL852I2JLMRj_qp-GJ0KEXkaYC2M7TWYJsM5wQ5eloQQklmm23umXZJWptYFimkFlnd-fiR3kBkMsgr76-co7B9_6Q1H10UpAzUCJbbQUPW1q5v-&s=1)

Problem(s) : <http://www.codechef.com/problems/TSHIRTS>

<http://usaco.org/index.php?page=viewproblem2&cpid=515>

<http://www.spoj.com/problems/HIST2/>