**Plan Regional 2013**

**(Every Final Plan Should be written here)**

There are many problems to solve. But we can divide the problems during contest time so that wide range of problems can be solved. There will be 2 marathon (maximum 2 days each) and 1 team contest (at least) per week. I have just summarized the syllabus here. So far as we know the regional will be at November 3(Not sure yet). We have to complete the following syllabus within 7 weeks. The topic of the syllabus should not be changed. But we can give flexibility in number of solved problems. You can add any new topic, make plans about the contest and give your opinions here (as we are not always in touch). I would synchronize my dropbox coding folder with forhadvhai and mustafizvhai so they can also keep track of what we are doing and thus help us.There are 750-800 problems here(don’t panic). Among them we have completed at least 60 string related problems. 40 data structure related problems. So there are 750-60-40=650 problems left to do. This is the maximum limit and of course we will not do all the problems. So I have divided my plans in terms of needed contest. We have approximately 10 weeks to regional. In 7 weeks we will complete the syllabus. So we can have 7\*2=14 marathon contest. These are not enough contests for solving all the categories individually. So here we have to divide the categories also.The last 3 weeks will be spent in revision.

**Main Groups**

* DP–180-200 problems (5 )
* Graphs – 130-150 problems
* Data Structure- 55-60 problems
* String Algorithms- 70 problems.
* Flow – 70 problems
* Geometry - 50 problems
* Simulation and Backtrack and Adhoc (বাজেcoding) – 70 problems
* Number theory and Combinatorics. (বেশি লাগবে না) – 40 problems
* Others. – 90 -100 problems

**DP**:- It has huge syllabus. So we have to divide them into 2 parts and then practice them in different times. Three are some categories which falls in other categories too. The sub-categories are

* State Compression- Reducing states of Dp. There are atleast 20-25 problems.
* Dp Interval – যাবুঝলাম২টাsub-interval এভাগকরাহয়. তারপরসেটাmerge করেanswer বেরকরাহয়(Like segment tree )। 10-12 problems in total.
* Dp 01 Backpack –This is knapsnack problem. There may be some greedy knapsnack. About 20-25 problems to solve.
* Tree Dp- May be tree related Dp. There are about 30-35 problems. I can provide more from codeforces.
* Digit Dp- About 40 problems.
* Monotonus Queue/stack/Convex hull trick/slope optimization/sliding window Technique – The main technique is sliding window or Monotonus queue technique. Convex hull trick is a version of that. We can solve a problem in linear time using this technique. SpeciallyDp’s with n^2 complexity can be solved using these techniques with nlogn or even n compexity. Code is Bangla. Convex Hull Trick solves a problem where

we can apply y=m\*x+c(Recall Data structure workshop from BUBT).30 problems.

* Mat Expo –30 problems.

**N:B**- There is also another category named plug dp. Forhadvhai says it is not necessary right now.

**Graph**- It has huge syllabus also. But we have done finished most of them. Now look at the sub-categories.

* LCA- 10 Problems(There are some more in other sections)
* BFS,DFS,Topological Sort – 10 Problems.
* SCC/Bridge/AP/BCC – 20 Problems
* Floyd/Djkstra/Bellmen Ford – 40-45 Problems
* Euler – 10 Problems
* Mst/Dmst- 30 Proble
* ms
* 2-sat- 15 Problems
* Heavy light decomposition/Stable Marriage/Center of tree- Atleast5-10 problems.

**DataStructure** – It has also huge syllabus. But most of them falls in other categories. So I narrowed its subcategories.

* Segment Tree/BIT.
* 2D Segment Tree/Orthogonal Range Search
* Line sweeping Technique in segment Tree.

(Atleast 40 problems related to segment tree)

* Hashing– Not much problem in the doc. I think atleast 10 problems need to be solved.
* Steiner Tree – May be needed. (Highest 5 problems)

**StringAlgorithms** – String Algorithms mainly is a subpart of Data structure. The sub-categories are

* Trie Tree – 10/12 problems
* KMP/Ahocorasick – 40 problems
* Suffix Array/Suffix Automata – 20 problems

**Flow** – There are many problems and subcategories. Nafis can feel the subcategories more properly. So far my subcategories are

* BPM – 30 problems
* Normal maxFlow, Min-cost maxflow, Hopcroft-carp bipartite matching, Weighted Bipartite matching(Hungarian Algorithm) – At least 40 problems.

**Geometry**- We should plan it with the help of Maksudvhai. So farsub-category are

* Convex Hull
* Half plane cross
* Basic Vector operations
* Pick Formula
* Polygon area
* Two convex hull distance etc.

**Simulation,Backtrack and adhoc**- These part is very important. At least 20 simulation problems should be completed. There are at least 30 backtrack problems in the doc. Adhocs include some easy problems from Codeforces and also greedy problems(at least 20).

**Number Theory and combinatorics** – It is not needed to much. 1 contest will do. The subcategories are.

* Inclusion-exclusion – 10 problems.
* Sum of divisors, number of divisors, Burnside Lemma, Extended Euclid, Chinese remainder Theorem, Mobius function, Probability and expected value, Fast exponentiation permutation group - 25-30 problems at most (last time revision only).

N:B:- Just Basic of Polard’s rho algorithm and Baby Step giant step is needed.

**Others** – The subcategories are

* Gauss Elimination. – 15 problems
* Game theory – 45-50 problems
* K-D tree,FFT(Fast Fourier Transformation) and IDA\* search – (not so important) 10 problems
* Some problems from my interest- May be 20-25

**My Plan**

As told before 14 contest is not enough to solve them. So I recommend togroup the marathon contest into individual and team marathon contest.

Team marathon(must do for all)-

* All the Dp categories except Monotonous Queue may be one or two categories more. (3 contest)
* All the graph categories except heavylight decomposition, stable marriage, center of tree. (1 contest)
* Only sub-category 1-2 of data structure. (1 contest)
* Trie Tree. (1/2 contest)
* Normal max flow and easy BPM. (1 contest)
* Easy geometry. (1 contest)
* Greedy problems. (1/2 contest)
* Easy number theory problems and Game theory(1 contest)

Total 9 contest. So 5 contest left. So you can decide what 5 other contests you would do according to your interest later on. My interest so far for the 5 remaining contests are

* Any remaining category of Dp.
* 3-4 subcategory of data structure.
* 1 contest of good geometry.
* Back track and number theory.
* 1 contest of other category.