Competitive Programming

From Problem 2 Solution in O(1)

TopCoder (TC) Online Judge

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TopCoder

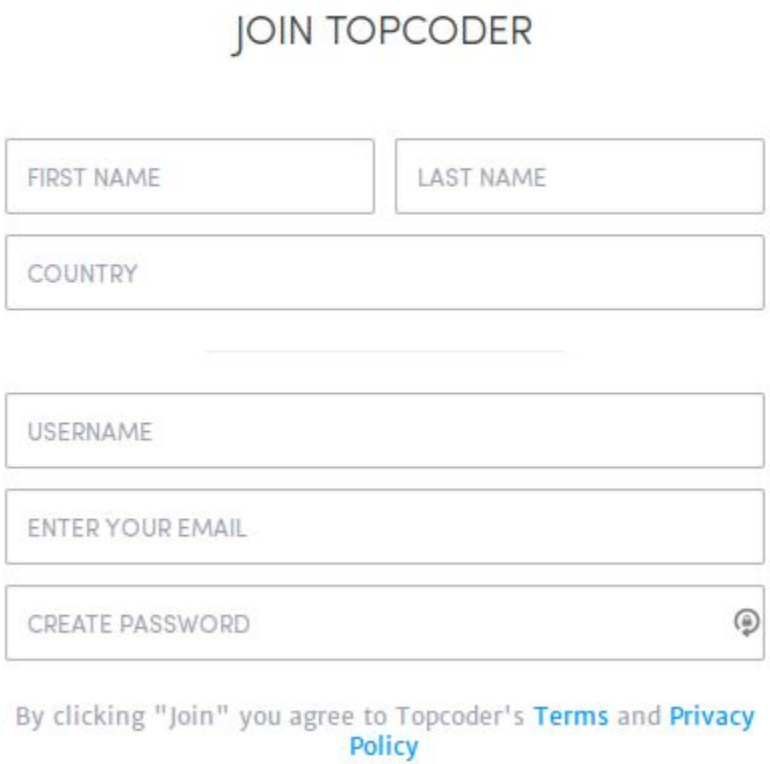
- It runs online 75 minutes Contest (SRMs).
  - Each contest is 2 divisions
  - Division 1 for seniors (rate 1200+), Division 2 for juniors
  - Each Division has 3 sorted problems (easy to hard)
    - Each problem has score: ~ 250, 500, 1000
    - Once problem is viewed, it starts its penalty counter
  - Contestants are split into rooms
- It has complete editorials for 2002-2009 years
  - since 2008 crisis, they minimized srms / don't pay…
  - For training purposes, Start from SRM 250

TopCoder Interfaces

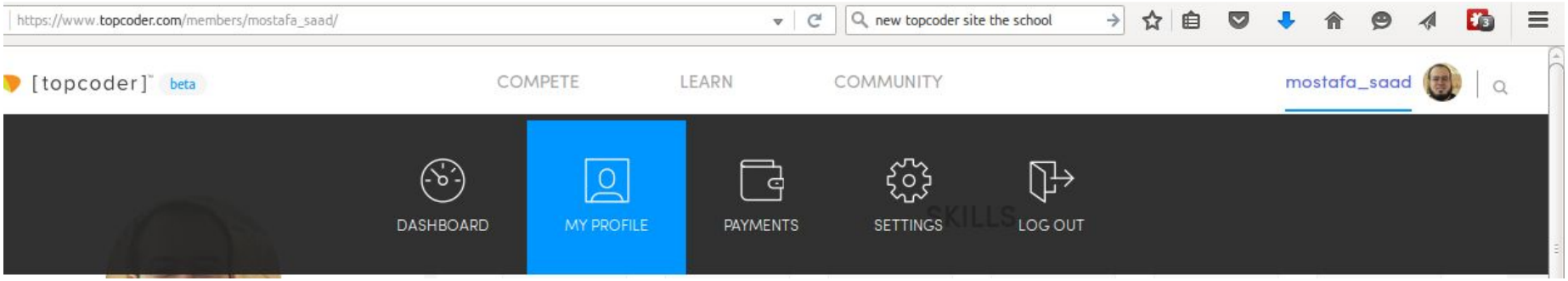
- Topcoder provide 2 main different interfaces
- Web interface
  - You can browse problems, and editorials
  - You can search for problems, see archives
- Applet (Arena)
  - You can browse problems and submit solutions
  - You join contests through it
  - Nowdays, a web beta too available, but not so good
- Today, we will focus on web and later on arena

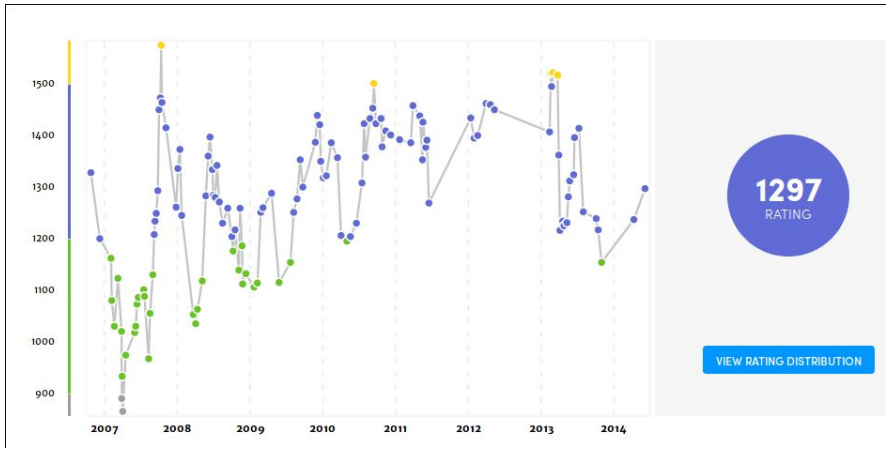
Registration

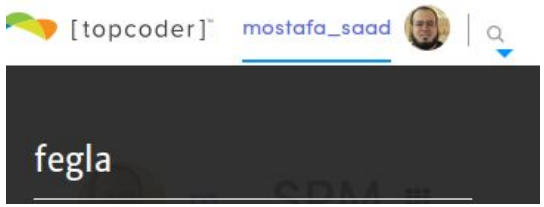
- https://www.topcoder.com/register/



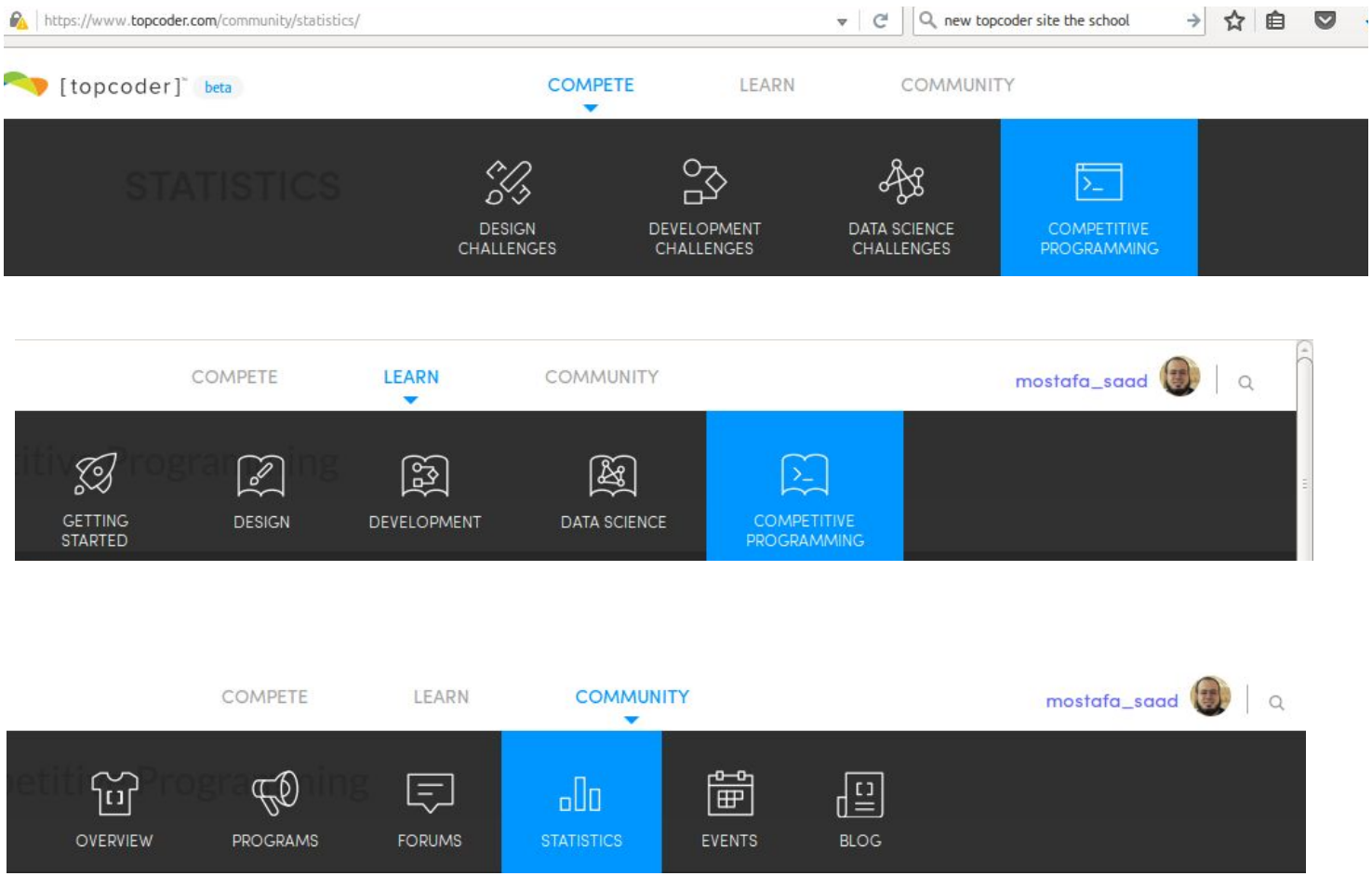
Your Profile







Home Page


https://www.topcoder.com/community/statistics/
new topcoder site the school
[topcoder] beta
COMPETE
LEARN
COMMUNITY
STATISTICS
DESIGN CHALLENGES
DEVELOPMENT CHALLENGES
DATA SCIENCE CHALLENGES
COMPETITIVE PROGRAMMING
COMPETE
LEARN
COMMUNITY
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GETTING STARTED
DESIGN
DEVELOPMENT
DATA SCIENCE
COMPETITIVE PROGRAMMING
COMPETE
LEARN
COMMUNITY
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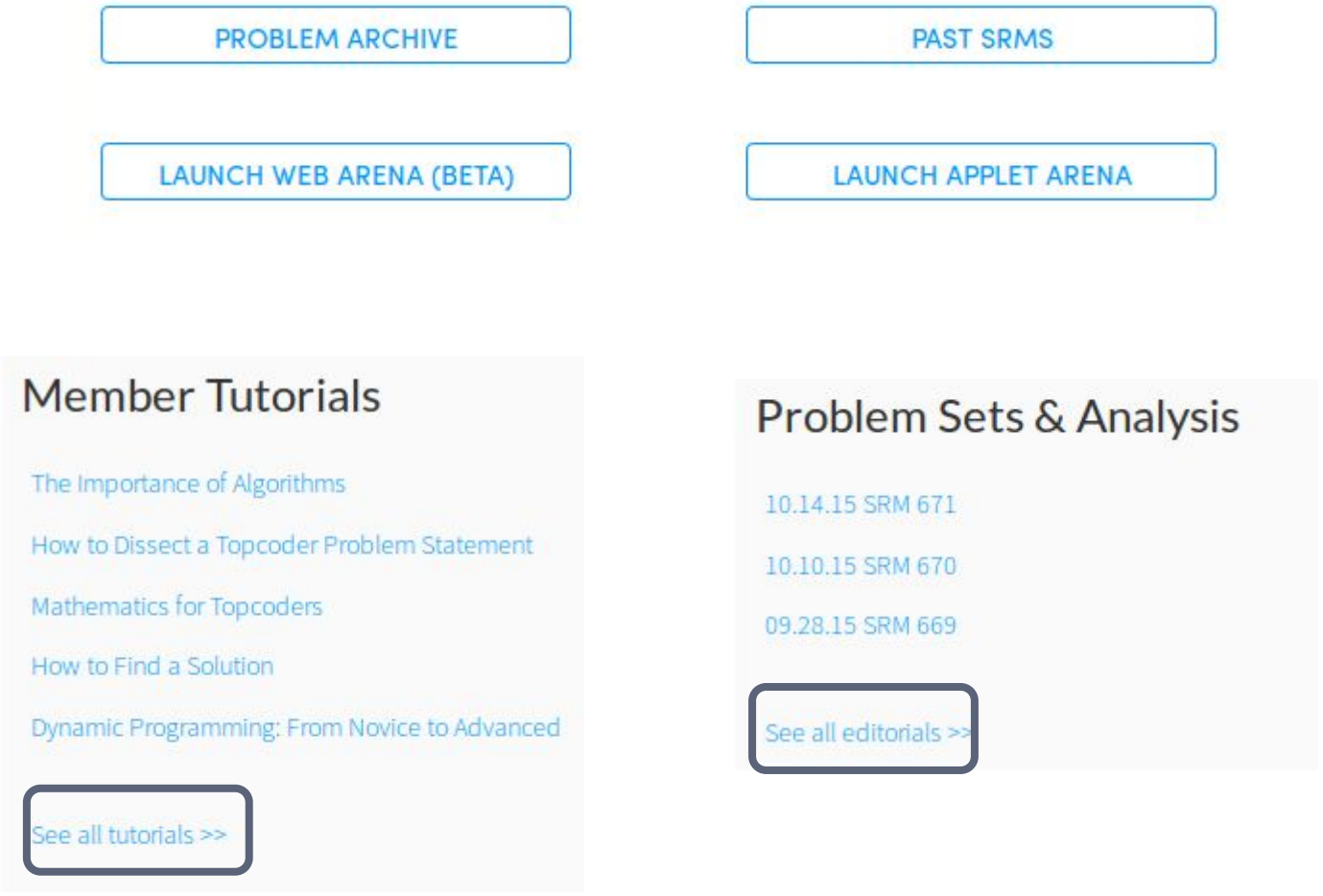
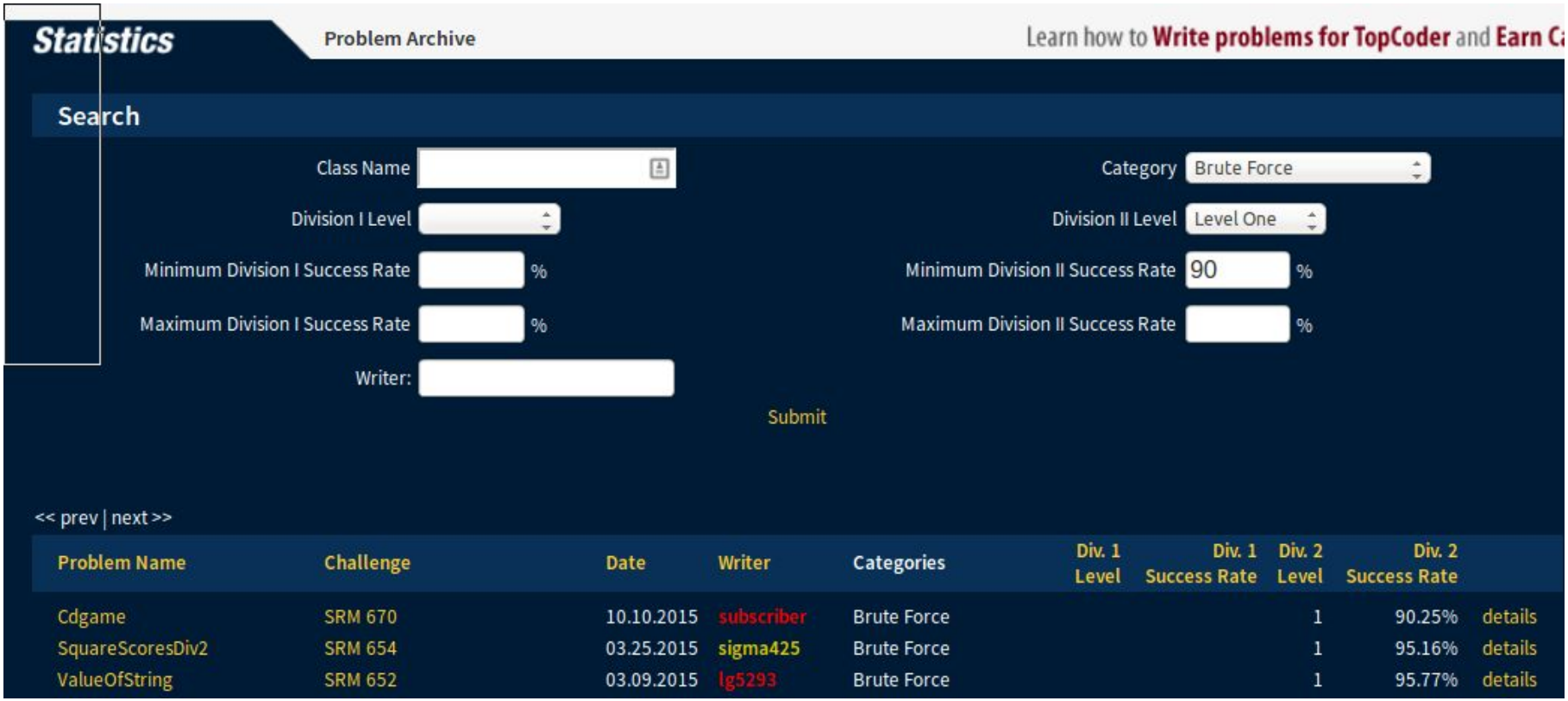
OVERVIEW
PROGRAMS
FORUMS
STATISTICS
EVENTS
BLOG

Learn Tab


PROBLEM ARCHIVE
PAST SRMS
LAUNCH WEB ARENA (BETA)
LAUNCH APPLET ARENA
Member Tutorials
The Importance of Algorithms
How to Dissect a Topcoder Problem Statement
Mathematics for Topcoders
How to Find a Solution
Dynamic Programming: From Novice to Advanced
See all tutorials >>
Problem Sets & Analysis
10.14.15 SRM 671
10.10.15 SRM 670
09.28.15 SRM 669
See all editorials >>

Problem Archive



Past SRMS

Match	Date	Competitors			Solutions Submitted*		Solutions Challenged		Solutions Submitted*		Solutions Challenged		
		Total	Div I	Div II	Total	Avg	Total	Avg	Total	Avg	Total	Avg	
SRM 672	10.20.2015	764	332	432	253	0.76	26	0.08	790	1.83	56	0.13	discuss
SRM 671	10.14.2015	1266	556	710	544	0.98	55	0.10	726	1.02	153	0.22	discuss
SRM 670	10.10.2015	1405	589	816	557	0.95	49	0.08	1319	1.62	73	0.09	discuss
SRM 669	09.28.2015	1007	463	544	482	1.04	256	0.55	964	1.77	40	0.07	discuss
2015 TCO Parallel 3B	09.19.2015	1	1		3	3.00	0	0.00					discuss
2015 TCO 3B	09.19.2015	122	122		203	1.66	21	0.17					discuss
SRM 668	09.15.2015	720	338	382	502	1.49	209	0.62	737	1.93	75	0.20	discuss
SRM 667	09.11.2015	1213	489	724	507	1.04	221	0.45	1120	1.55	114	0.16	discuss

Statistics | **Match Overview**

Please select a round:

Single Round Match 672 > Round 1

Discuss it

Division I Leaders	Score	Placed	Results	Division II Leaders	Score	Placed	Results
[•] xudyh	658.47	1	Room 4	[•] jiangshibiao2	1423.88	1	Room 38
[•] Arterm	619.35	2	Room 6	[•] venkat_coder	1225.15	2	Room 39
[•] Endagorion	614.37	3	Room 3	[•] maxhwardg	1215.04	3	Room 23
[•] jiry_2	606.75	4	Room 5	[•] codtoper	1172.54	4	Room 34
[•] nika	561.61	5	Room 8	[•] omu	1129.43	5	Room 35

Contestant / Room

Statistics

Room Statistics

Please select a round:

Single Round Match 672 > Round 1

Discuss it

Please select a room:

Room 4 - Division-I

[000 - 899 | 900 - 1199 | 1200 - 1499 | 1500 - 2199 | 2200+]

Click the [•] icon to view problem information.

Statistics for Single Round Match 672 > Round 1 > Room 4

	Submissions	Defenses	Challenges	System	Point	Ratings
Coders	Qnty / Points	Qnty / Points	Qnty / Points	Test	Total	Old / New
[xudyh]	3 1169.79	0 0.00	0 0.00	-511.32	658.47	3138 3233▲
[•] falanga	1 106.13	0 0.00	1 50.00	0.00	156.13	1860 1914▲

Problem Information for xudyh

Problems

Class Name	Method Name	Difficulty	Coding Time	Status	Points
Procrastination	findFinalAssignee	Level One	0:16:54.266	Passed System Test	191.05
AlmostEulerianGraph	calculateGraphs	Level Two	0:07:35.897	Passed System Test	467.42
Detective	reveal	Level Three	0:36:03.972	Failed System Test	511.32

Match Editorial

April

04.30.03 SRM 144 - Problem Set & Analysis
04.15.03 SRM 142 - Problem Set & Analysis
04.10.03 SRM 141 - Problem Set & Analysis
04.05.03 2003 TCCC Finals - Problem Set & Analysis
04.04.03 2003 TCCC Semifinals Room #4 - Problem Set & Analysis
04.04.03 2003 TCCC Semifinals Room #3 - Problem Set & Analysis
04.04.03 2003 TCCC Semifinals Room #2 - Problem Set & Analysis
04.04.03 2003 TCCC Semifinals Room #1 - Problem Set & Analysis

Time Discuss it

Used as: Division-II, Level 1:

Value	200
Submission Rate	234 / 252 (92.86%)
Success Rate	212 / 234 (90.60%)
High Score	**haro** for 199.20 points

Implementation

This problem could be solved pretty simply with a couple of division and modulus operators. The important thing here was to understand the % operator which gives you the remainder from a division. Thus, you could find <H>, <M> and <S> easily as follow:

```
int h = seconds/3600;
int m = (seconds%3600)/60;
int s = seconds%60;
```

TopCoder Problems

- For a problem solution, implement a **method** inside a **class**
  - In other words, **no read/write** in TC
  - This imposes limits on **problems style**. E.g. you will never have problem that provides an array of 1M number
  - Vector of **50** numbers is popular method parameter
- It has great problems collection, but when ICPC contest is close, don't train on TC
  - ICPC problems has a different problem style + read file

Problem Time - SRM144-Div2-250

Problem Statement for Time

Problem Statement

Computers tend to store dates and times as single numbers which represent the number of seconds or milliseconds since a particular date. Your task in this problem is to write a method whatTime, which takes an int, **seconds**, representing the number of seconds since midnight on some day, and returns a String formatted as "<H>:<M>:<S>". Here, <H> represents the number of complete hours since midnight, <M> represents the number of complete minutes since the last complete hour ended, and <S> represents the number of seconds since the last complete minute ended. Each of <H>, <M>, and <S> should be an integer, with no extra leading 0's. Thus, if **seconds** is 0, you should return "0:0:0", while if seconds is 3661, you should return "1:1:1".

Definition

```
Class:          Time
Method:         whatTime
Parameters:     int
Returns:        String
Method signature:String whatTime(int seconds)
(be sure your method is public)
```

Constraints

- **seconds** will be between 0 and 24*60*60 - 1 = 86399, inclusive.

Examples

0)
```
0
Returns: "0:0:0"
```
1)
```
3661
Returns: "1:1:1"
```
2)
```
5436
Returns: "1:30:36"
```
3)
```
86399
Returns: "23:59:59"
```

Problem Time - Class Definition

Definition

Class:	Time
Method:	whatTime
Parameters:	int
Returns:	String
Method signature:	String whatTime(int seconds)

(be sure your method is public)

```
// class name as exactly in problem
class Time {
public:

    //method as exactly in problem
    string whatTime(int seconds)
    {
    }

};
```

- No Main
- No read / Write
- Only class and its method
- You can create other classes / Functions

Problem Time - Solution

- Problem Given Seconds, Convert that to string in format hours:minutes:seconds

```
#include <stringstream>
using namespace std;

class Time {
public:
    string whatTime(int seconds) {
        string ret;
        int hr = seconds/3600;
        int min = (seconds%3600)/60;
        seconds = (seconds%3600)%60;
        stringstream s;
        s << hr << ":" << min << ":" << seconds;
        ret = s.str();
        return ret;
    }
};
```

Problem Time - Testing

- You can create main and test your code
- But remove it BEFORE submission
- Or test using topcoder arena (later)

```
int main()
{
    Time t;
    string result = t.whatTime(5436);

    if(result != "1:30:36")
        cout<<"WRONG";
    return 0;
}
```

Community Tab

TOP RANKED

Algorithm	Specification	Component Development
Marathon	Architecture	Assembly
Conceptualization	Component Design	Test Suites

Top Ranked Algorithm

Rank	Handle
1	Petr
2	tourist
3	kuniavski
4	Burunduk1
5	Egor
6	Endagorion
7	Kankuro
8	xudyh
9	bmerry
10	ACRush

Top Ranked Algorithr

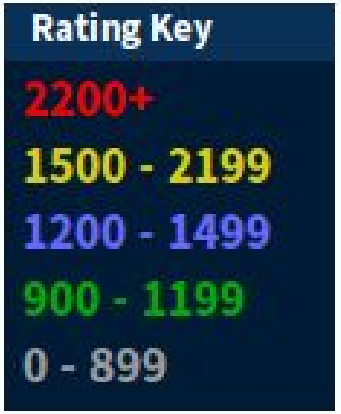
Rank	Handle
1	amrSamir
2	Ahmed_Ossama
3	cpphamza
4	ahmed_aly
5	zetamoo
6	ahmed_thabet
7	ahm.kam_92
8	hossameldeenfci
9	mc_mosa
10	Amirnasr

27	Bangladesh	171
28	Finland	11
29	Egypt	205
30	Germany	34

27	IIIT Hyderabad	India	36
28	Faculty of Computers and Information - Cairo University	Egypt	29
29	BITS PILANI	India	12
30	Beijing Jiaotong University	China	13

Misc

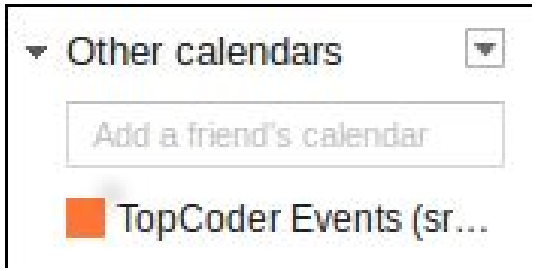
- Topcoder provides 5 colors based on your rate
- Red is very prestigious
  - Top Red => **TARGETS**



- Topcoder has a challenge phase
  - After SRM for 15 minutes, see others code
  - If found bug, create test case and apply it
  - If right, get 50 points...otherwise lose 25 poi
- In contest, each code has color..this reflects the used language (e.g. C++ is yellow)
- TopCoder Open: annual event / multi-rounds

Misc

- You can add many competitions in your Google Calendar. Google web
- C++ compiler is not C++11
- Understand rating
- Some popular figures in TC:
  - tourist, Petr, Egor, bmerry, ACRush, and more



Demo

تم بحمد الله

علمكم الله ما ينفعكم

ونفعكم بما تعلمتم

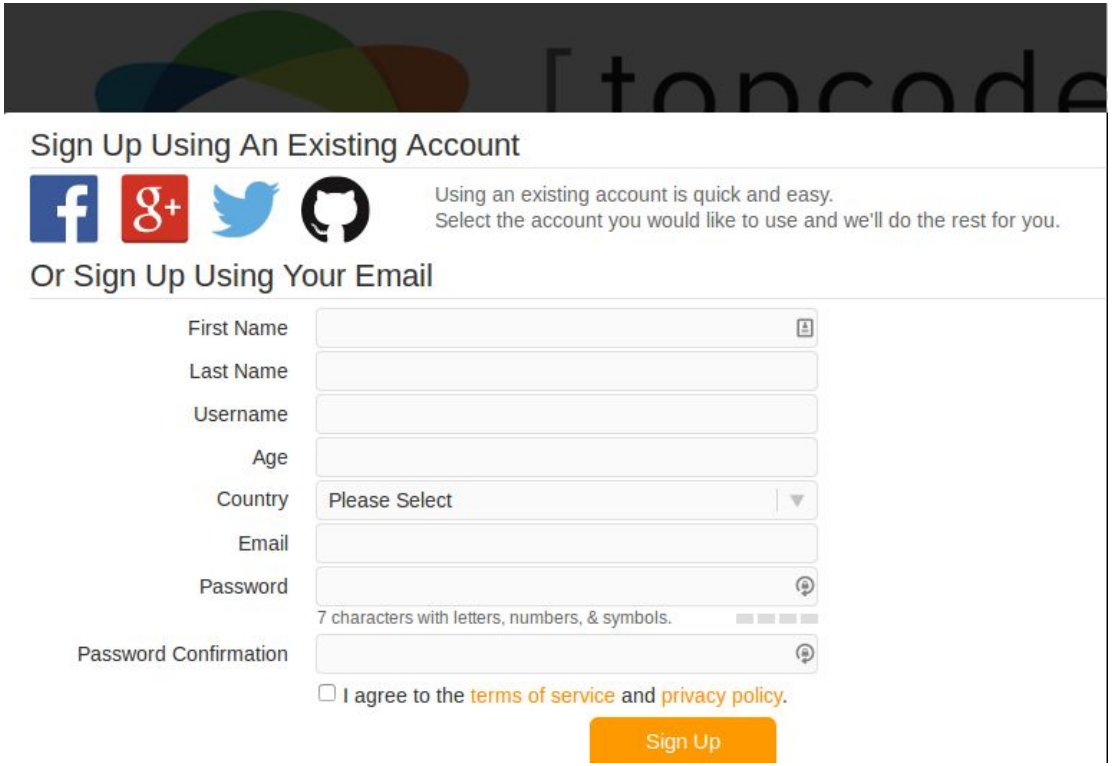
وزادكم علماً

Next screens

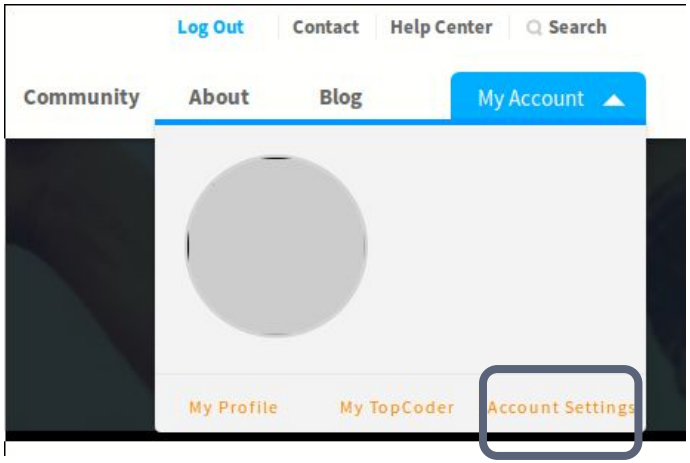
- After I prepared this presentation, Topcoder changes the whole site again :(
- Next screens are not important, except is shows how to change your school
- I don’t know how to change school in new site updates

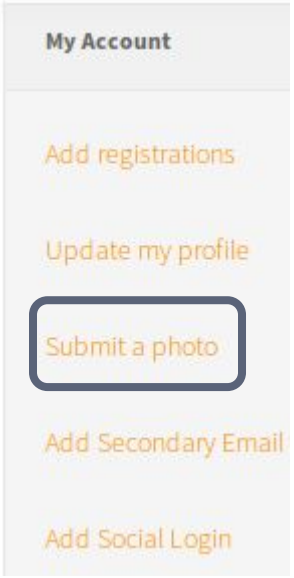
Registration

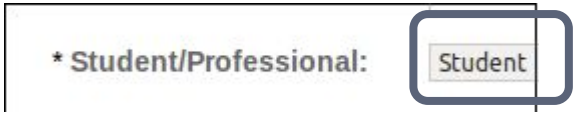
- http://www.topcoder.com



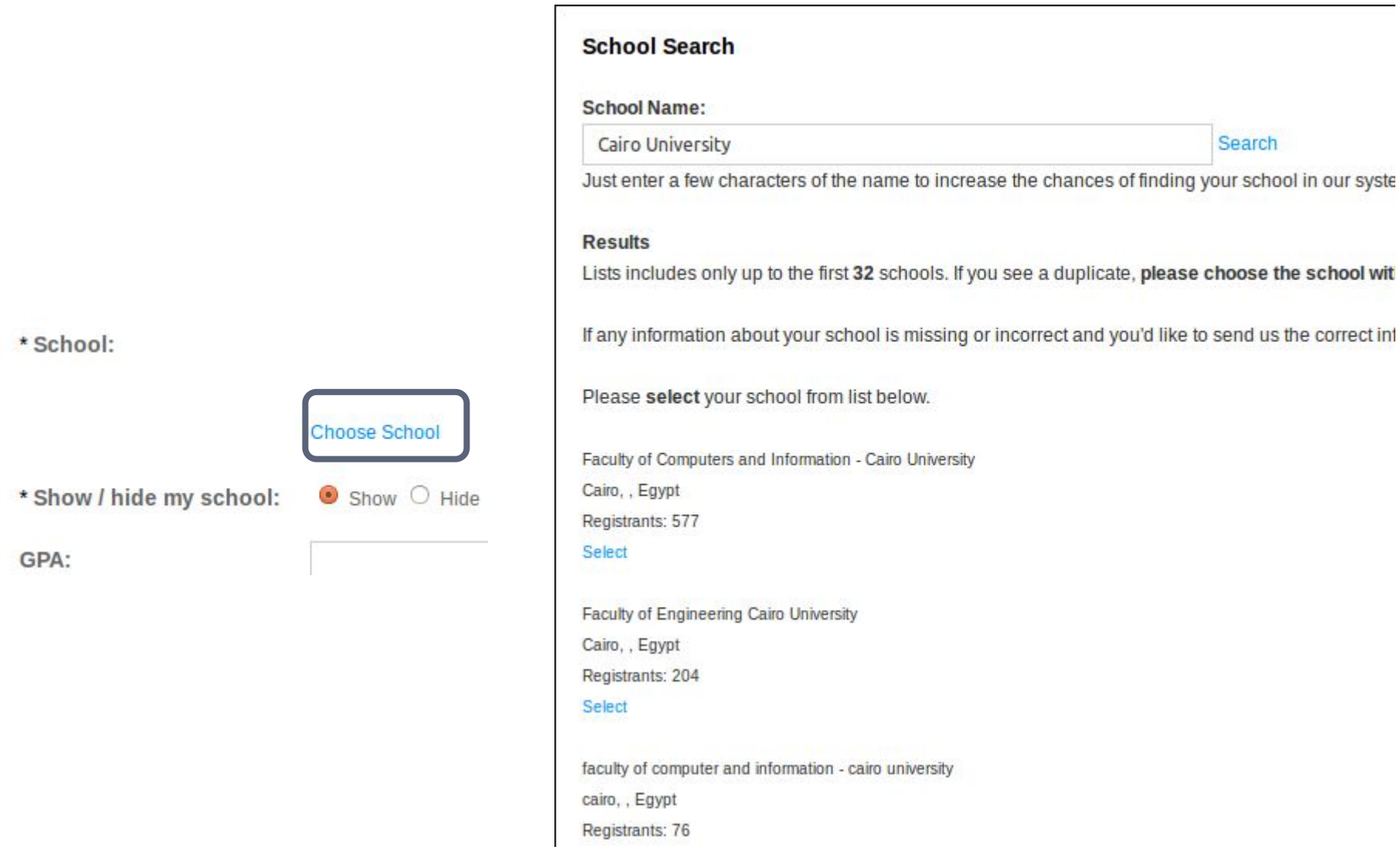
Update Profile







Update Profile



Profile Statistics

Statistics

"Work Smart not Hard. Optimize your methodologies for Understanding, Thinking, Coding and Debugging."

- Achievements
- Forum Post History
- Send A Message

mostafa_saad

Member Since	07.04.2006
Country	Egypt
School	Faculty of Computers and Information - Cairo University

Like 0

Algorithm | High School | Concept | Spec | Arch | Design | Develop | Assembly | Test Suites | Test Scenarios | UI Prototype | RIA Build | Content Creation | Reporting | Marathon Matches

Algorithm

Rating

1297

Competition History

Percentile	N/A
Rank	not ranked
Country Rank	not ranked
School Rank	not ranked
Volatility	344
Maximum Rating	1575
Minimum Rating	865
Default Language	C++
Competitions	125
Most Recent Event	TCO14 Round 2B 06.07.14

Division I Submission

Problem	Submitted	Failed Challenge	Failed Sys.Test	Success %
Level One	82	22	5	67.07%
Level Two	26	8	4	53.85%
Level Three	4	1	2	25.00%
Total	112	31	11	62.50%

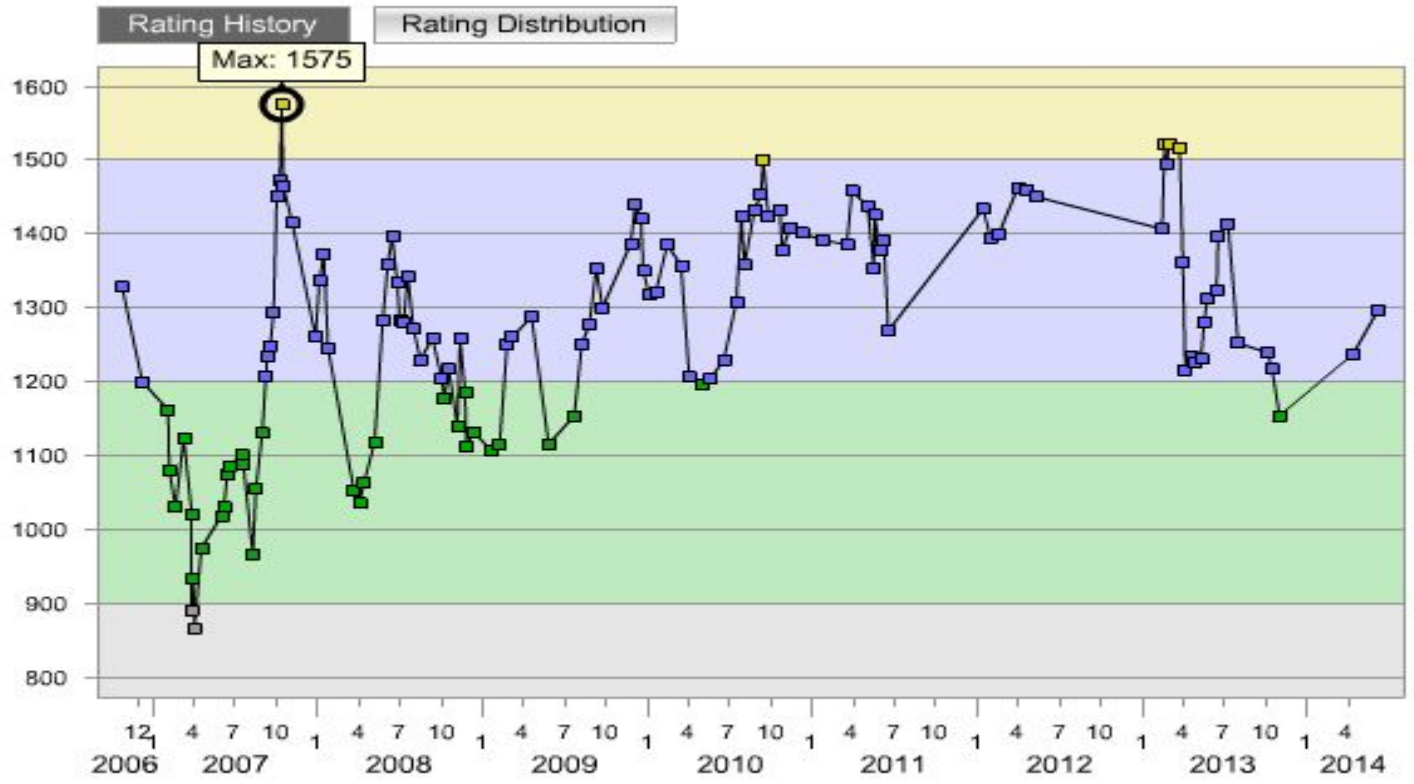
Division II Submission

Problem	Submitted	Failed Challenge	Failed Sys.Test	Success %
Level One	26	3	0	88.46%
Level Two	17	1	4	64.71%
Level Three	7	1	2	57.14%
Total	50	5	6	76.00%

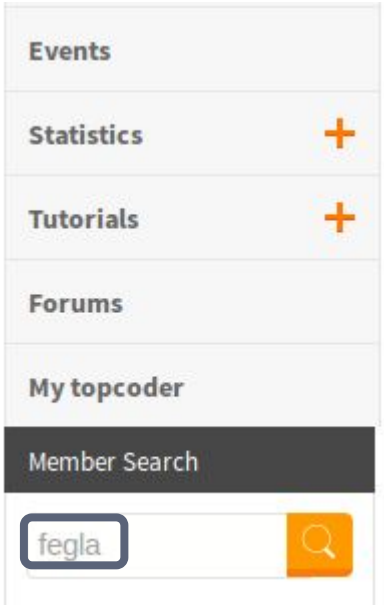
Challenges

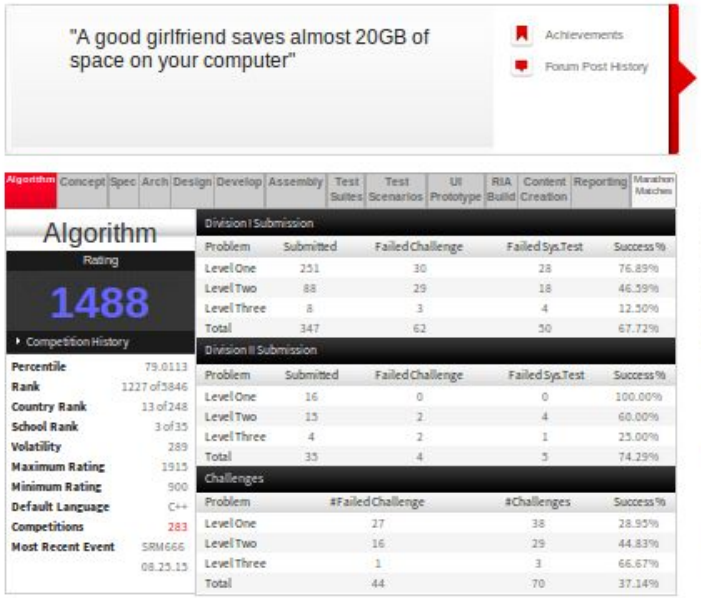
Problem	#Failed Challenge	#Challenges	Success %
Level One	18	22	18.18%
Level Two	13	26	50.00%
Level Three	2	3	33.33%
Total	33	51	35.29%

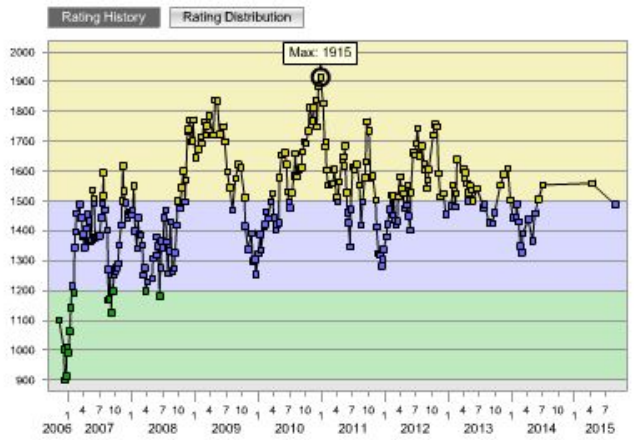
Profile Statistics Curve



Others Profile

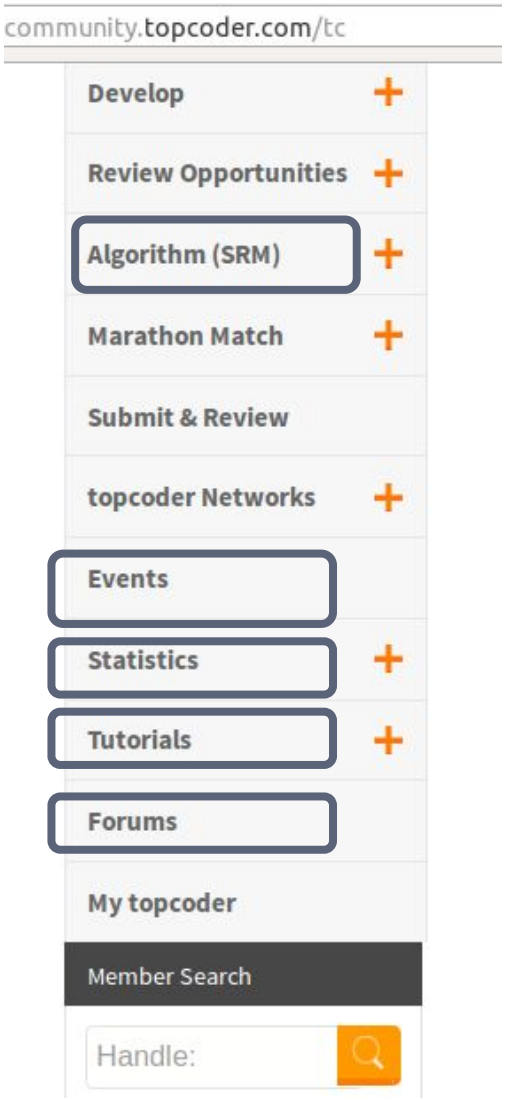
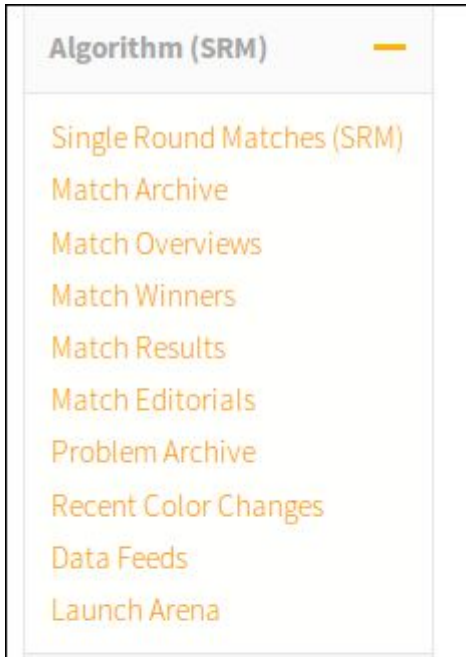






Scores of topcoder is nice indicator

But not so accurate about people level

So don’t be cheated :)

Topcoder main menu