



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
 - Nowadays, 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/>

JOIN TOPCODER

FIRST NAME

LAST NAME

COUNTRY

USERNAME

ENTER YOUR EMAIL

CREATE PASSWORD



By clicking "Join" you agree to Topcoder's [Terms](#) and [Privacy Policy](#)

Your Profile

https://www.topcoder.com/members/mostafa_saad/

[topcoder]™ beta

COMPETE LEARN COMMUNITY

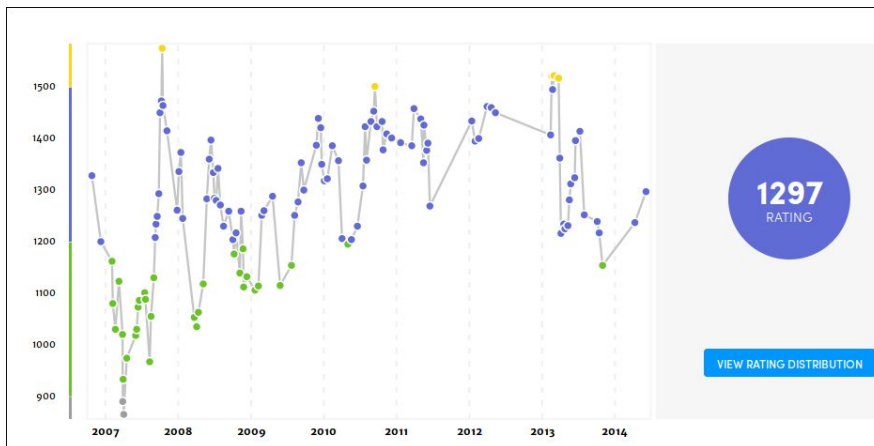
mostafa_saad

DASHBOARD MY PROFILE PAYMENTS SETTINGS LOG OUT

DATA SCIENCE ACTIVITY

SRM

1297
RATING



[topcoder]™ mostafa_saad

fegla

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 APPLLET 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

Statistics

Problem Archive

Learn how to **Write problems for TopCoder** and **Earn C**

Search

Class Name

Category

Division I Level

Division II Level

Minimum Division I Success Rate %

Minimum Division II Success Rate %

Maximum Division I Success Rate %

Maximum Division II Success Rate %

Writer:

Submit

<< prev | next >>

Problem Name	Challenge	Date	Writer	Categories	Div. 1 Level	Div. 1 Success Rate	Div. 2 Level	Div. 2 Success Rate	
Cdgame	SRM 670	10.10.2015	subscriber	Brute Force			1	90.25%	details
SquareScoresDiv2	SRM 654	03.25.2015	sigma425	Brute Force			1	95.16%	details
ValueOfString	SRM 652	03.09.2015	lg5293	Brute Force			1	95.77%	details

Past SRMS

Match	Date	Competitors			Solutions Submitted*		Solutions Challenged		Solutions Submitted*		Solutions Challenged		
		Total	DivI	DivII	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				Division II Leaders			
	Score	Placed	Results		Score	Placed	Results
[*] kudyh	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	Qty / Points		Qty / Points		Qty / 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
Idetective	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 $24 \times 60 \times 60 - 1 = 86399$, 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

Marathon

Conceptualization

Specification

Architecture

Component Design

Component Development

Assembly

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 Algorithm

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

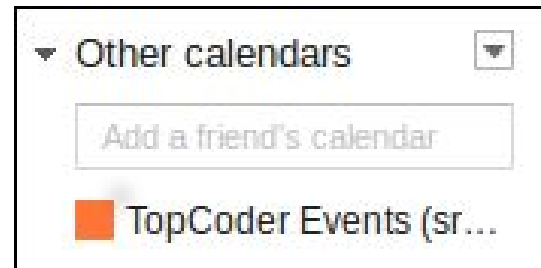
- Topcoder provides 5 colors based on your [rate](#)
- Red is very prestigious
 - Top Red => **TARGETS**
- Topcoder has a challenge phase
 - After SRM for 15 minutes, see others code
 - If found bug, create test case and apply it
 - If right, get 50 points...otherwise lose 25 poi
- In contest, each code has color..this reflects the used language (e.g. C++ is yellow)
- TopCoder Open: annual event / multi-rounds



Rating Key	
2200+	
1500 - 2199	
1200 - 1499	
900 - 1199	
0 - 899	

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

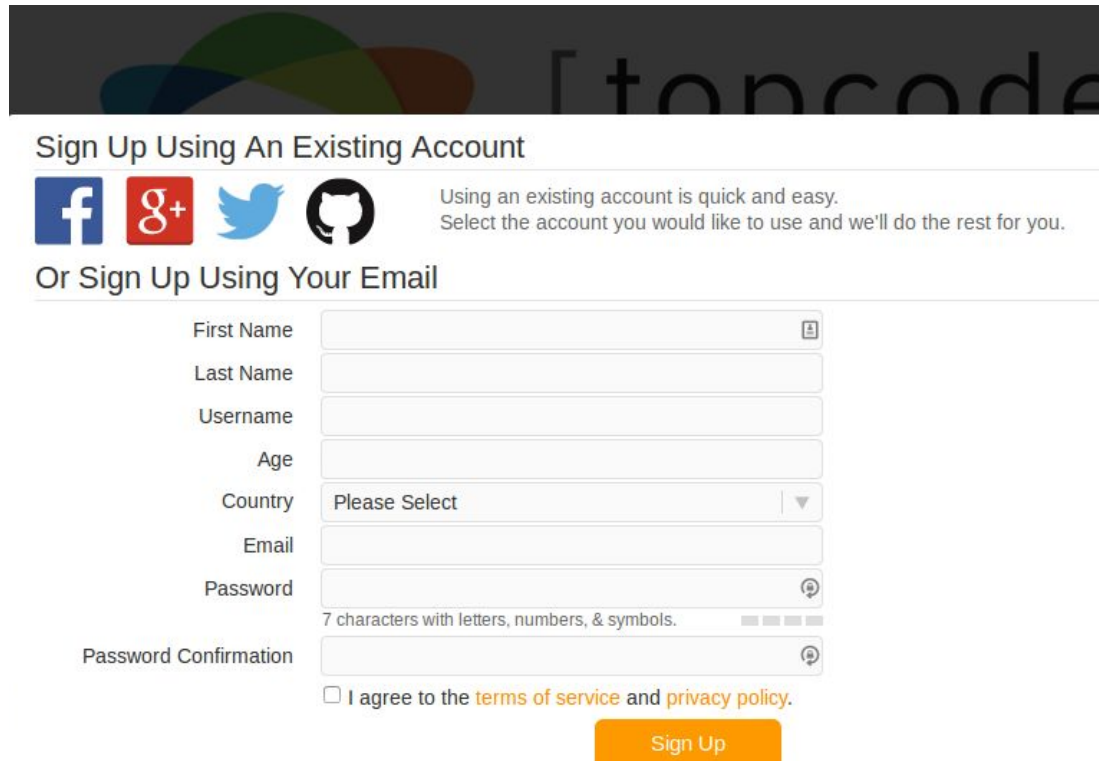
وزادكم علماً

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>



The image shows the registration page of TopCoder. At the top, there's a banner with the TopCoder logo and the text "topcode". Below the banner, the heading "Sign Up Using An Existing Account" is displayed. Under this heading, there are four social media icons: Facebook, Google+, Twitter, and GitHub. To the right of these icons, a text box says "Using an existing account is quick and easy. Select the account you would like to use and we'll do the rest for you." Below this, the heading "Or Sign Up Using Your Email" is shown. Under this heading, there are several input fields: "First Name", "Last Name", "Username", "Age", "Country" (a dropdown menu with "Please Select" as the current selection), "Email", "Password", and "Password Confirmation". The "Password" field has a small icon of a person and a note below it: "7 characters with letters, numbers, & symbols." The "Password Confirmation" field also has a small icon of a person. At the bottom of the form, there is a checkbox labeled "I agree to the terms of service and privacy policy." and an orange "Sign Up" button.

Sign Up Using An Existing Account

Using an existing account is quick and easy.
Select the account you would like to use and we'll do the rest for you.

Or Sign Up Using Your Email

First Name

Last Name

Username

Age

Country Please Select

Email

Password

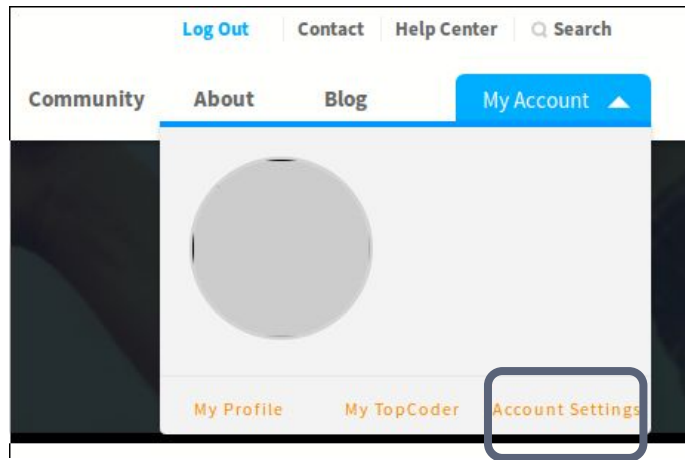
7 characters with letters, numbers, & symbols.

Password Confirmation

☐ I agree to the [terms of service](#) and [privacy policy](#).

Sign Up

Update Profile



Personal Information		Update
	Name:	Fatma Saad
	Company:	
	Address:	
	Country:	

- Email Notifications:**
- ☐ TopCoder competitions - Design
 - ☐ TopCoder competitions - Development
 - ☐ TopCoder competitions - Data
 - ☒ TopCoder Communications

* Student/Professional:

Student

My Account
Add registrations
Update my profile
Submit a photo
Add Secondary Email
Add Social Login

Update Profile

* School:

[Choose School](#)

* Show / hide my school: ☒ Show ☐ Hide

GPA:

School Search

School Name:

Cairo University

[Search](#)

Just enter a few characters of the name to increase the chances of finding your school in our system.

Results

Results list includes only up to the first **32** schools. If you see a duplicate, **please choose the school with the most registrants**.

If any information about your school is missing or incorrect and you'd like to send us the correct information, please contact us.

Please **select** your school from list below.

Faculty of Computers and Information - Cairo University

Cairo, , Egypt

Registrants: 577

[Select](#)

Faculty of Engineering Cairo University

Cairo, , Egypt

Registrants: 204

[Select](#)

faculty of computer and information - cairo university

cairo, , Egypt

Registrants: 76

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

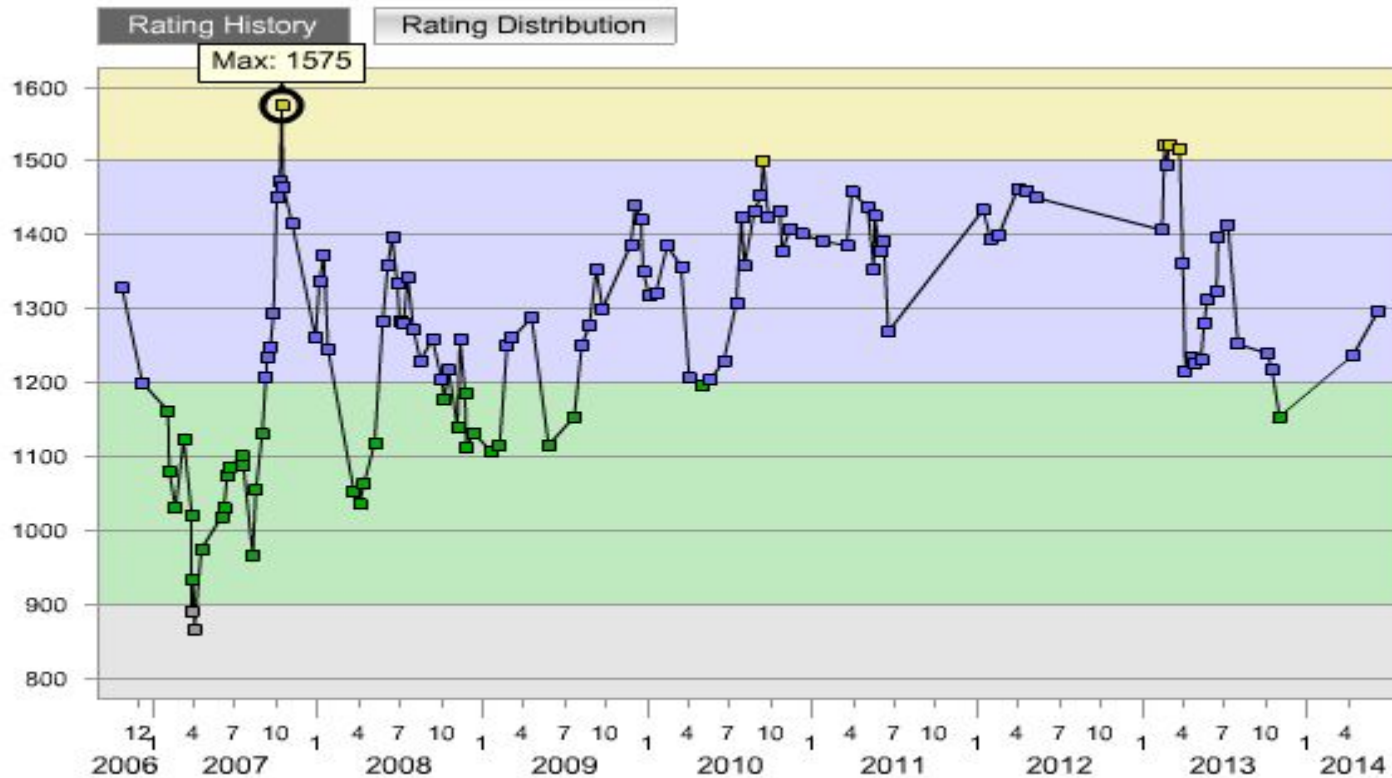
Country Egypt

School
Faculty of Computers and Information -
Cairo University

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

- Events
- Statistics +
- Tutorials +
- Forums
- My topcoder
- Member Search



"A good girlfriend saves almost 20GB of space on your computer"

Achievements
Forum Post History

Algorithm	Concept	Spec	Arch	Design	Develop	Assembly	Test Suites	Test Scenarios	UI Prototype	RIA Build	Content Creation	Reporting	Match Making
Algorithm													
Rating													
1488													
Competition History													
Percentile 79.0113													
Rank 1227 of 3846													
Country Rank 13 of 248													
School Rank 3 of 35													
Volatility 289													
Maximum Rating 1915													
Minimum Rating 900													
Default Language C++													
Competitions 283													
Most Recent Event SRM666													
08.25.15													

Division I Submission				
Problem	Submitted	Failed Challenge	Failed Sys.Test	Success %
Level One	251	30	28	76.89%
Level Two	88	29	18	46.59%
Level Three	8	3	4	12.50%
Total	347	62	50	67.72%
Division II Submission				
Problem	Submitted	Failed Challenge	Failed Sys.Test	Success %
Level One	16	0	0	100.00%
Level Two	15	2	4	60.00%
Level Three	4	2	1	25.00%
Total	35	4	5	74.29%
Challenges				
Problem	#Failed Challenge	#Challenges	Success %	
Level One	27	38	28.95%	
Level Two	16	29	44.83%	
Level Three	1	3	66.67%	
Total	44	70	37.14%	



fegla

Member Since 01.09.2006

Country Egypt

School

Faculty of Computers and Information -
Cairo University






5







































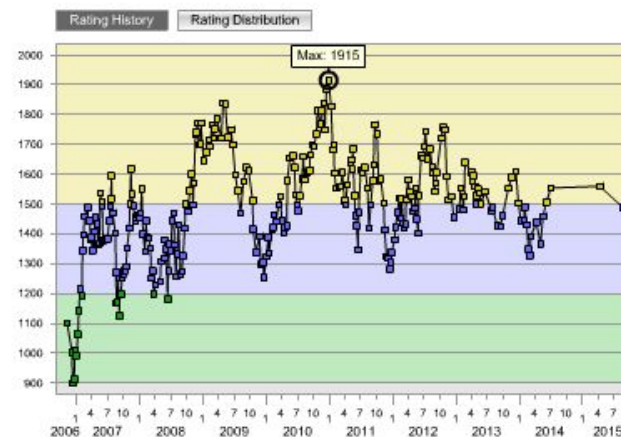





Scores of topcoder is nice indicator

But not so accurate about people level

So don't be cheated :)



Topcoder main menu

community.topcoder.com/tc

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