# Codeforces Online Judge


## Prepared by: Mohamed Ayman

Algorithm Software Engineer and Deep Learning Researcher at Valeo

Research and Teaching Assistant at The American University in Cairo (AUC)

[Spring 2021]

sw.eng.MohamedAyman@gmail.com

linkedin.com/in/cs-MohamedAyman

github.com/cs-MohamedAyman

codeforces.com/profile/Mohamed_Ayman

# Codeforces Online Judge Guide

# Lecture Agenda

We will discuss in this lecture the following topics

1- Codeforces Online Judge

2- How to Create an Account

3- How to Solve a Problem

4- How to Learn from Other Solutions

5- How to Compete in Contest

6- How to Learn from Contest Tutorial

Let's
START UP

# Lecture Agenda

Section 1: Codeforces Online Judge

Section 2: How to Create an Account

Section 3: How to Solve a Problem

Section 4: How to Learn from Other Solutions

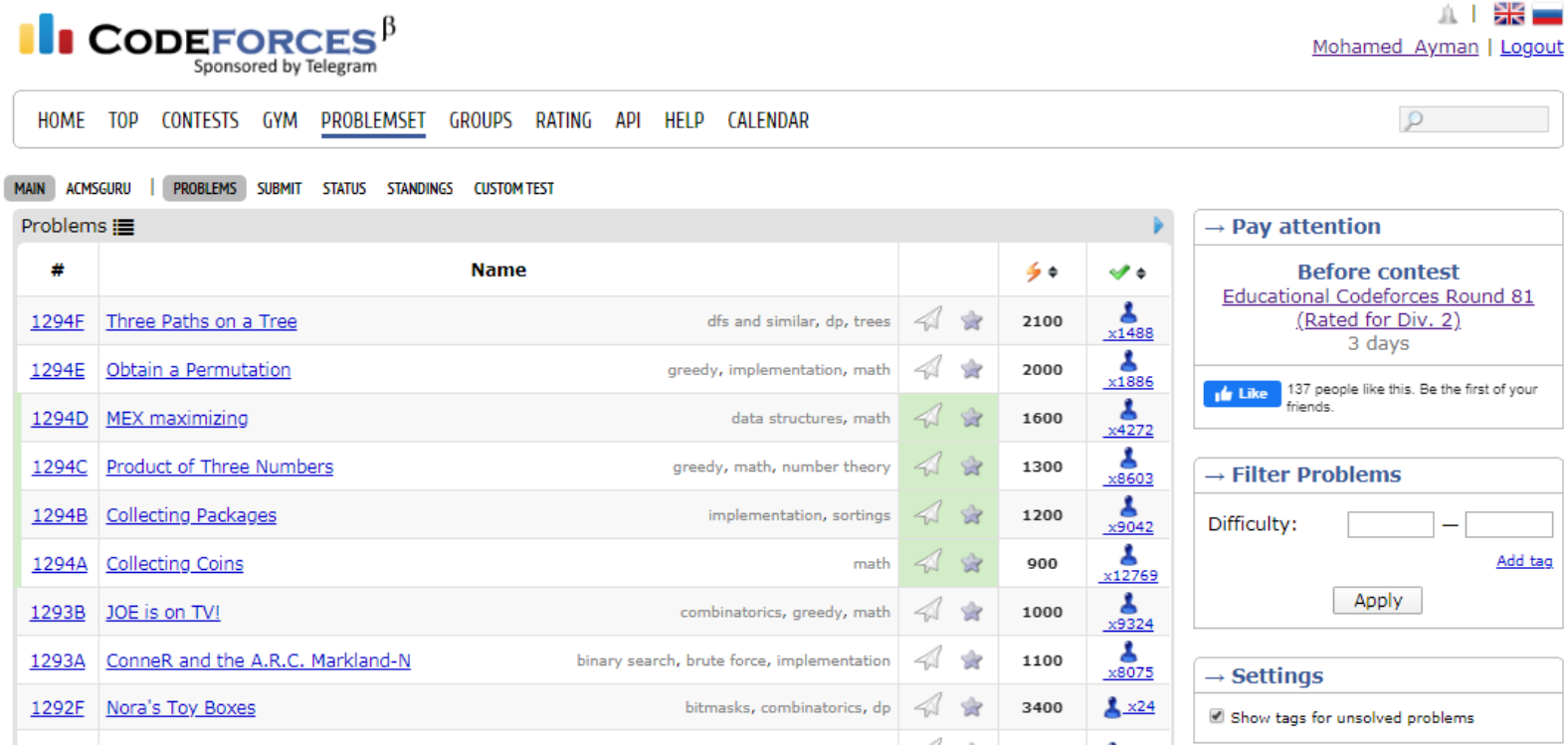
Section 5: How to Compete in Contest

Section 6: How to Learn from Contest Tutorial

# Codeforces Online Judge

Codeforces is a website that hosts competitive programming contests. It is maintained by a group of competitive programmers from ITMO University led by Mikhail Mirzayanov.

# Codeforces Online Judge



# Lecture Agenda

- ✓ Section 1: Codeforces Online Judge
- **Section 2: How to Create an Account**
- Section 3: How to Solve a Problem
- Section 4: How to Learn from Other Solutions
- Section 5: How to Compete in Contest
- Section 6: How to Learn from Contest Tutorial

# How to Create an Account

1- Go To Registration

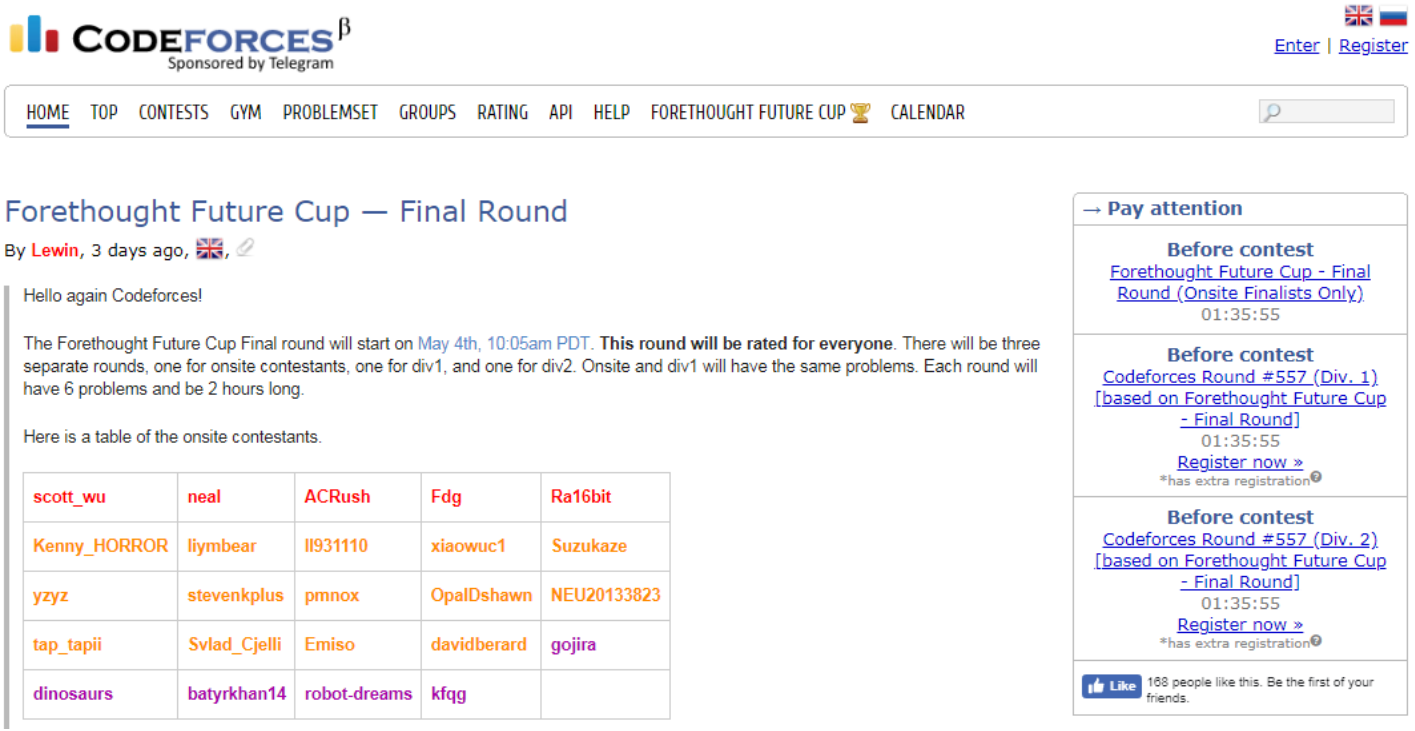
2- Fill Your Data

3- Verify your Registration from your Mail

4- Log-in Your Account

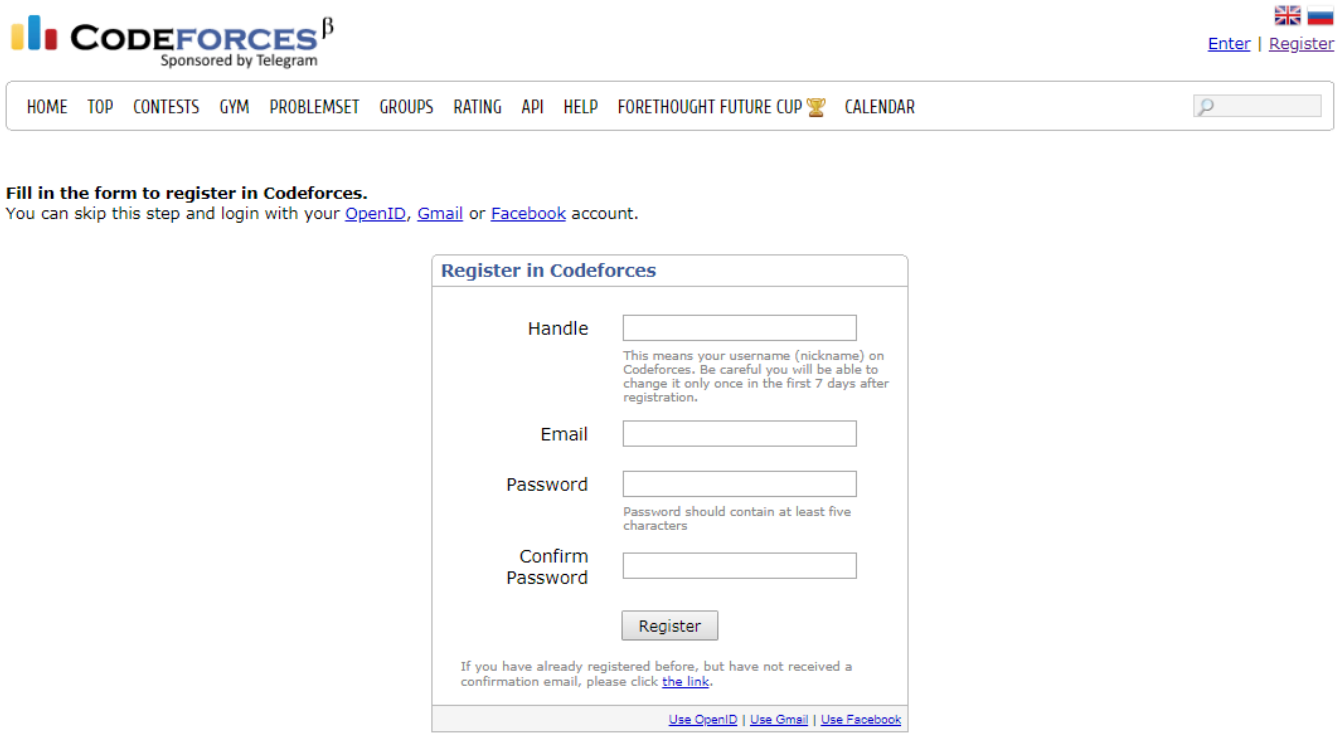
# Codeforces Registration

## Select Register from this Link: codeforces.com



# Registration Form

Fill your data and you will receive a verification mail



# Your Profile

After verification your account from your mail, your profile will be appeared from you

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Expert
**Mohamed_Ayman**

Mohamed Ayman, Cairo, Egypt
From FCAI - Cairo university

Contest rating: **1614** (max. expert, 1627)

Contribution: 0

Friend of: 272 users

My friends

Change settings

sw.eng.MohamedAyman@gmail.com (not visible)

Last visit: **online now**

Registered: 7 years ago

Blog entries (0), comments

Write new entry

View my talks

Change photo

→ Pay attention

**Before contest**
Educational Codeforces Round 108 (Rated for Div. 2)
5 days

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Rating: 1614
Contribution: 0

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- Contests

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# Lecture Agenda

- ✔ Section 1: Codeforces Online Judge
- ✔ Section 2: How to Create an Account
- **Section 3: How to Solve a Problem**
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# How to Solve a Problem

1- Read the Problem Statement

2- Think for a Problem Solution

3- Implement an Efficient & Correct Algorithm

4- Test Your Solution

5- Submit Your Solution

6- Go to Step 1 Till You Get Accepted

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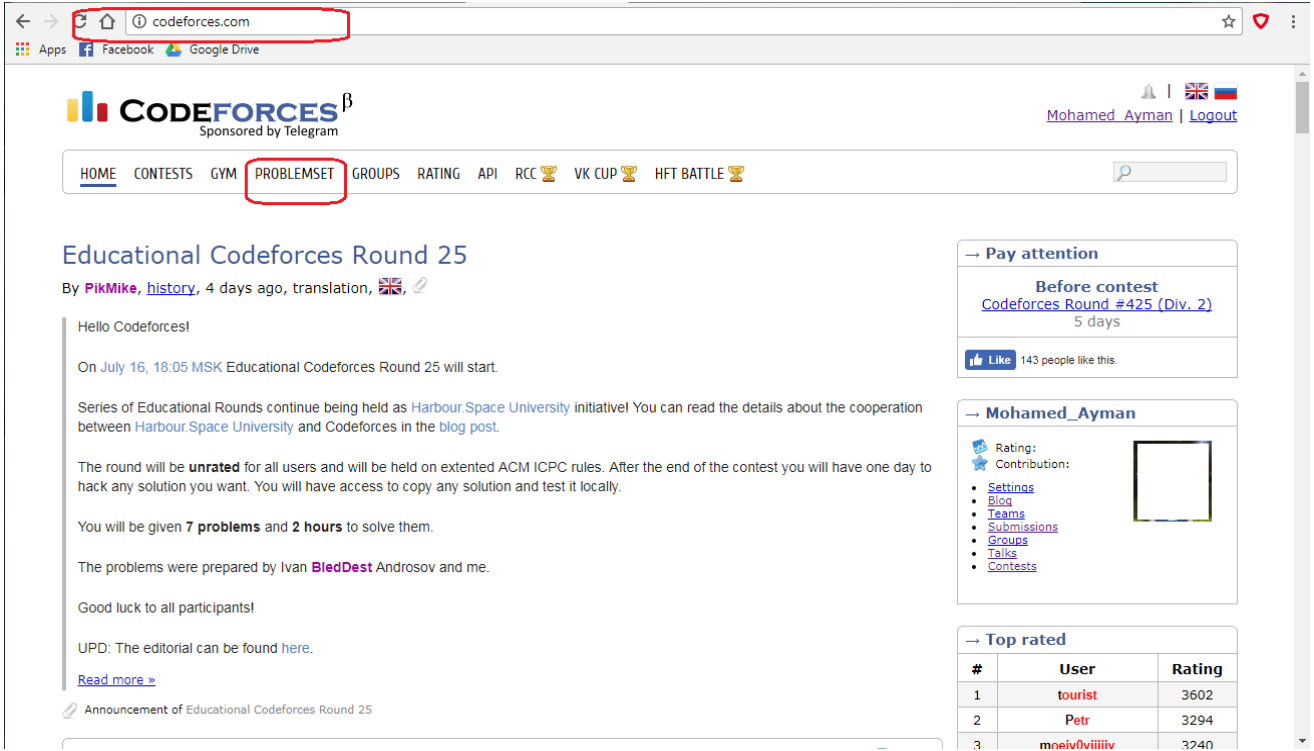
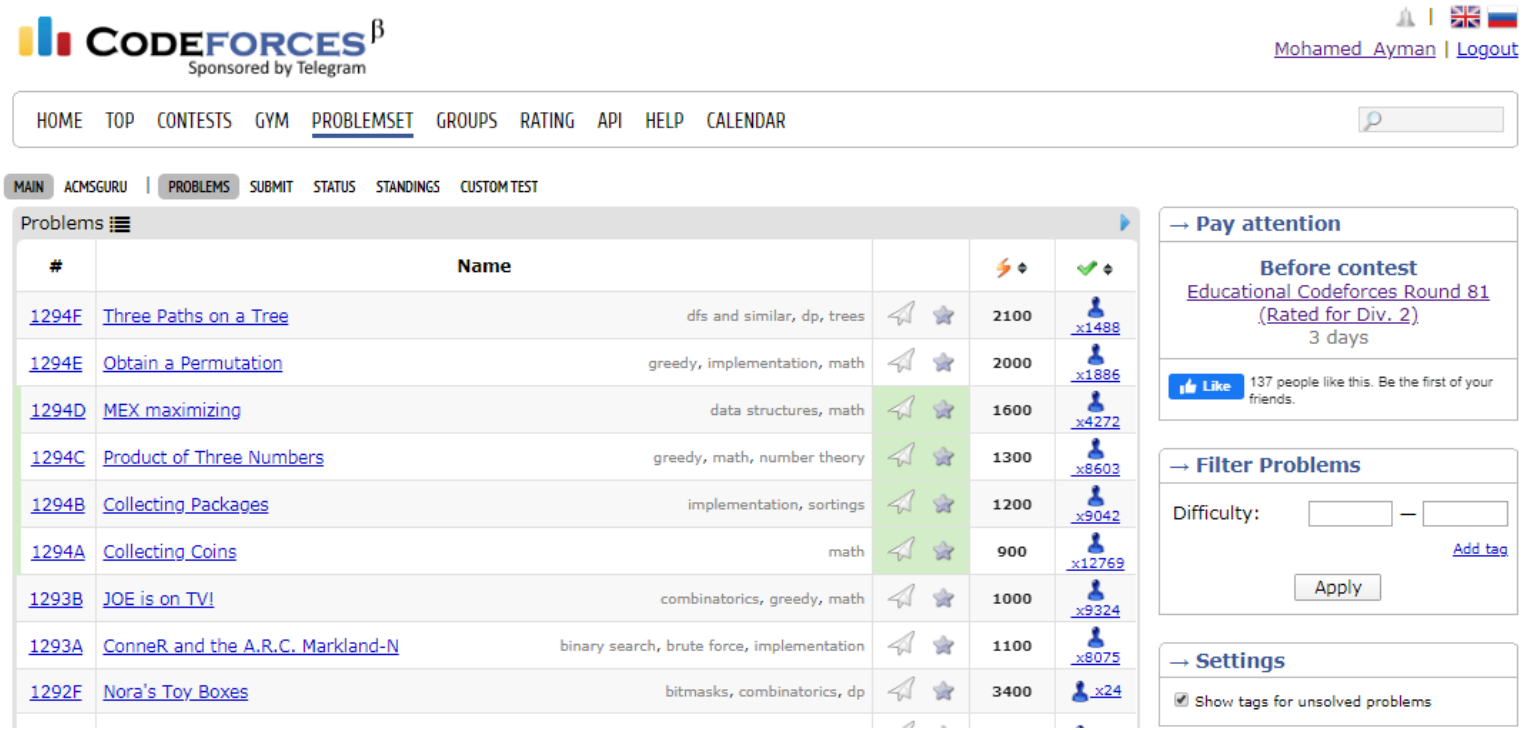
# Codeforces Wall

Select Problemset Tab to get all problems in codeforces



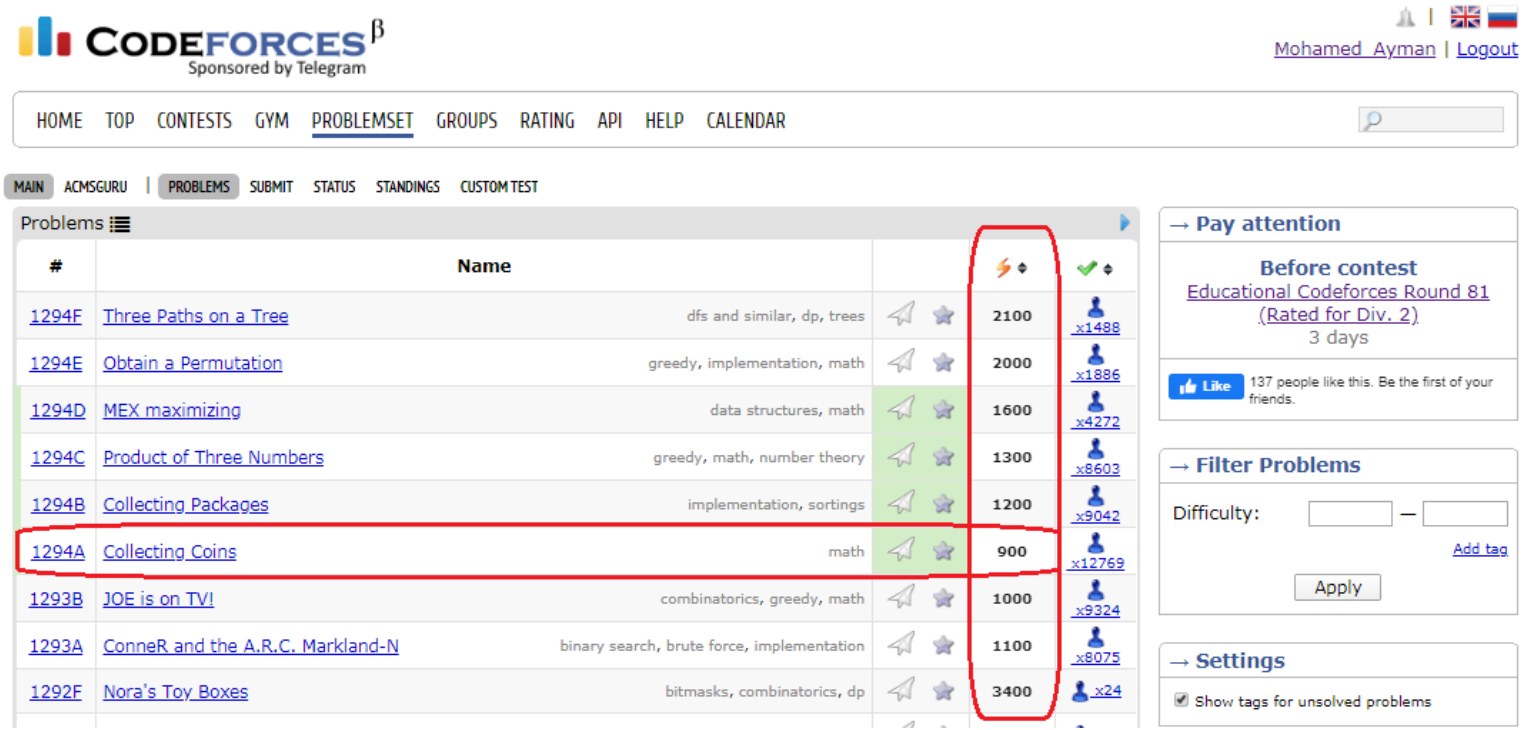
# Problem Set Tab

Any problem has an ID, name, difficulty degree and number of users who solved it.



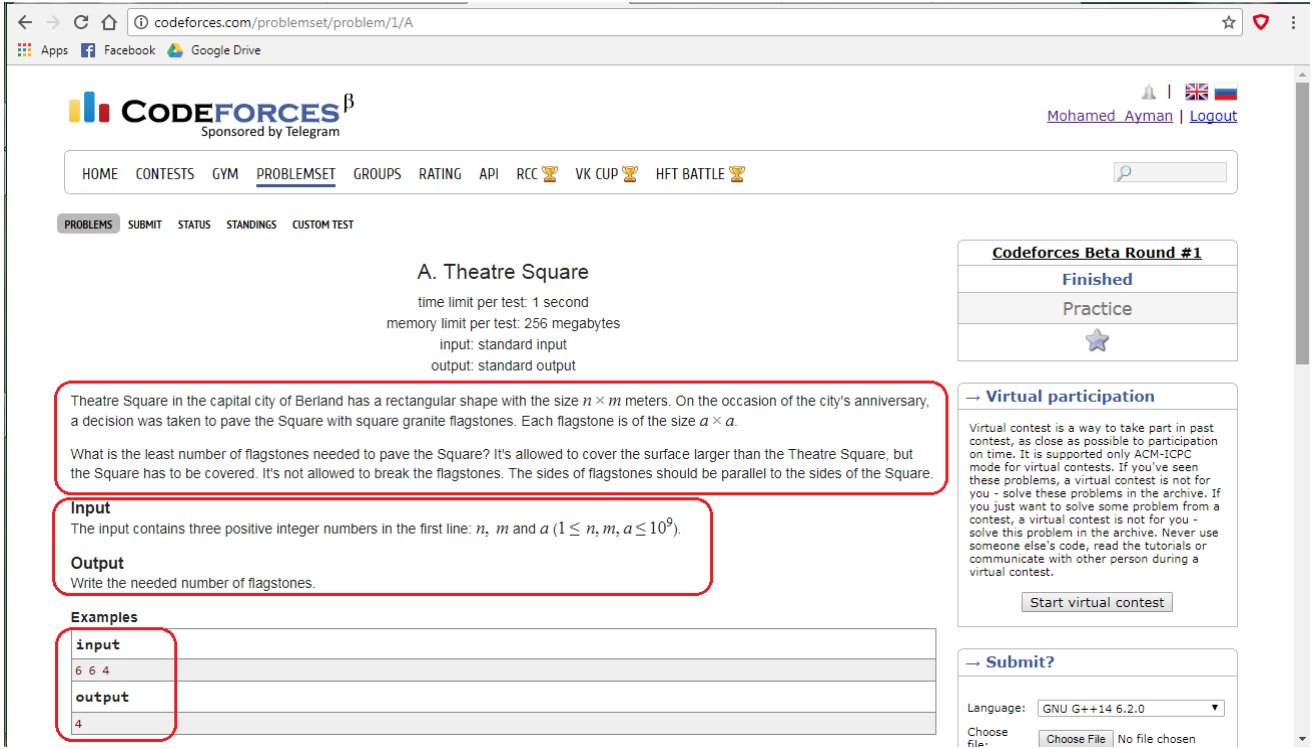
# Problem Set Tab

When you select [difficulty degree] the problems will be sorted according to it's difficulty

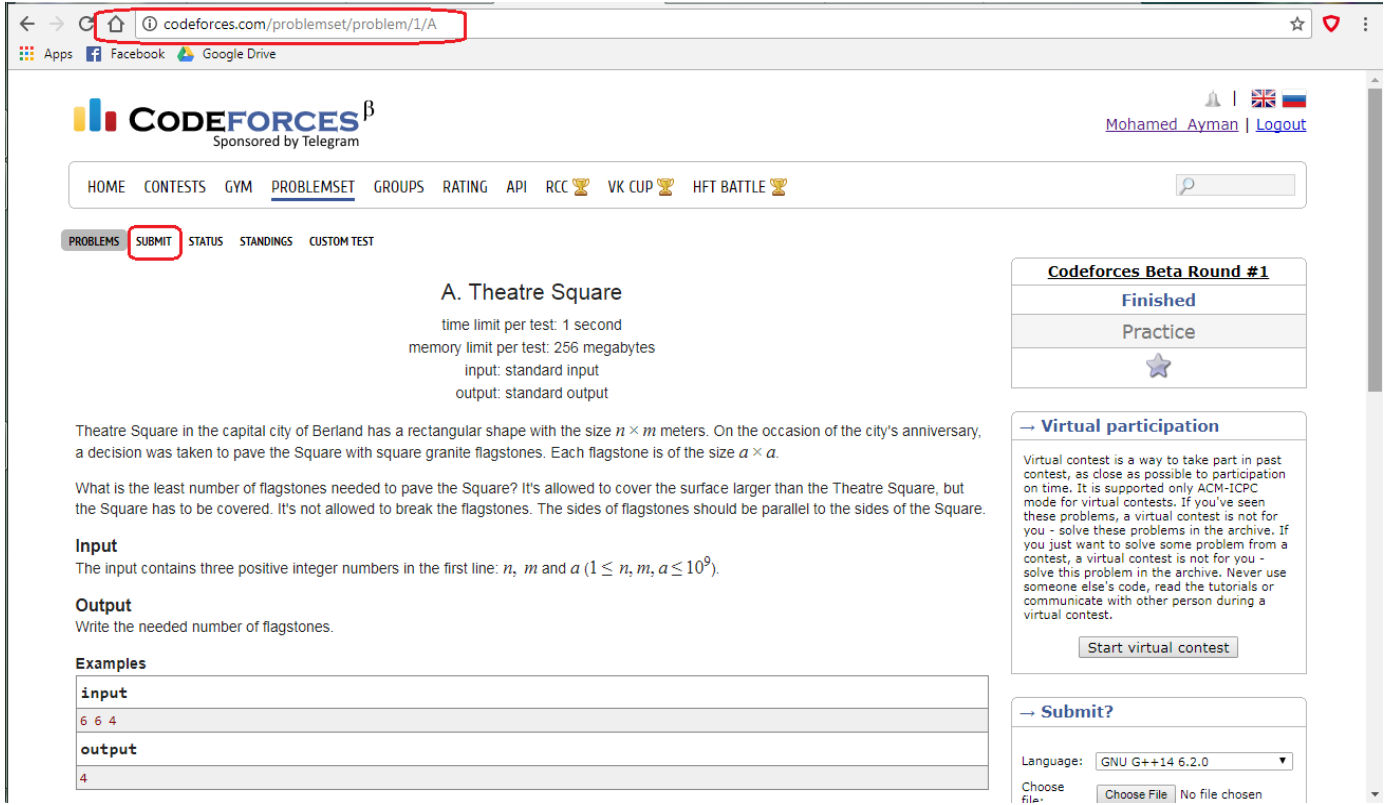


# Problem Body

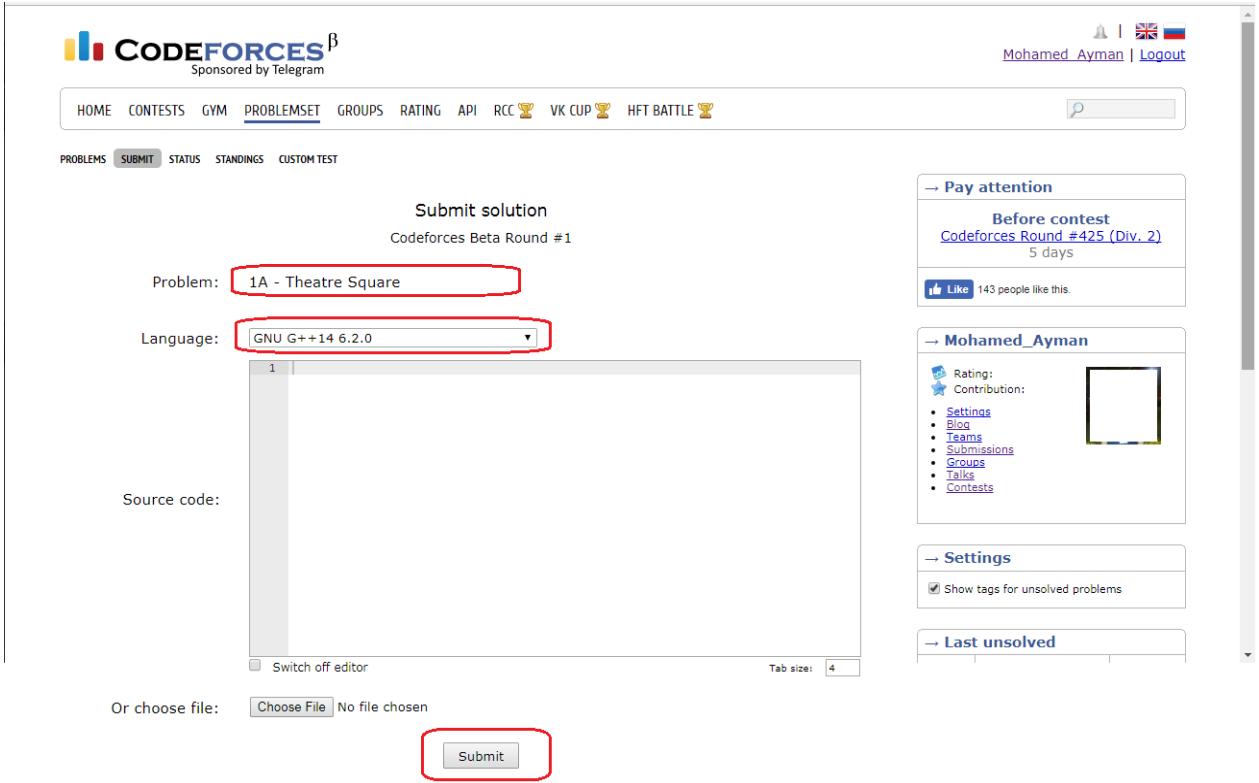
Any problem has a body description and input-output constraint and test case(s)



# Submitting Problem

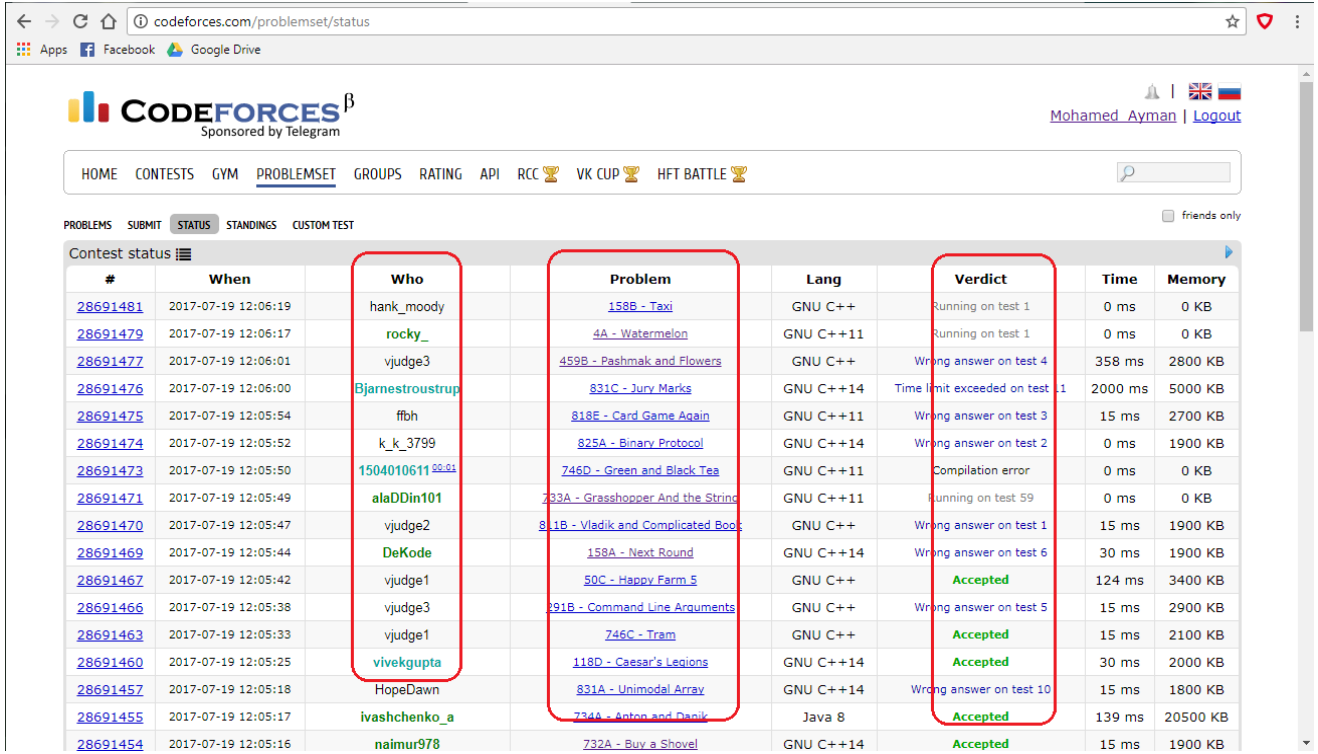


# Submitting Problem



# Problem Verdict

## Your submitted algorithm will be accepted or fail in specific test case



codeforces.com/problemset/status

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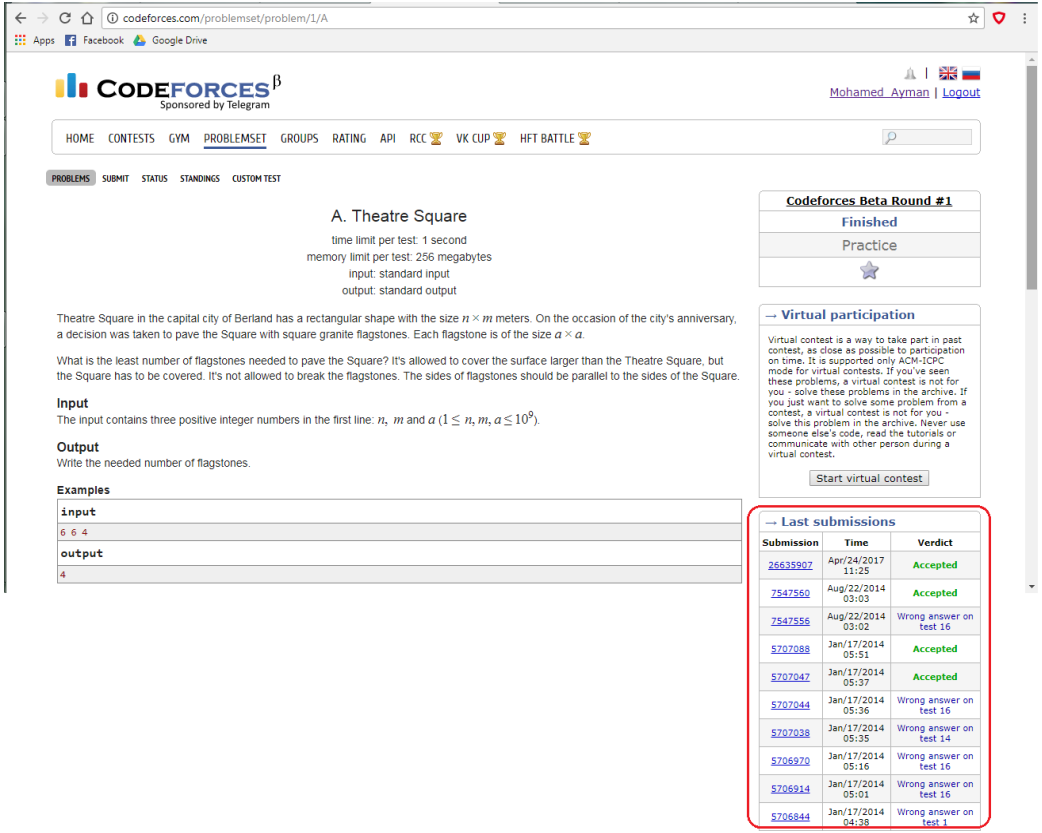
PROBLEMS SUBMIT STATUS STANDINGS CUSTOM TEST

friends only

Contest status

| # | When | Who | Problem | Lang | Verdict | Time | Memory |
|---|---|---|---|---|---|---|---|
| 28691481 | 2017-07-19 12:06:19 | hank_moody | 158B - Taxi | GNU C++ | Running on test 1 | 0 ms | 0 KB |
| 28691479 | 2017-07-19 12:06:17 | rocky_ | 4A - Watermelon | GNU C++11 | Running on test 1 | 0 ms | 0 KB |
| 28691477 | 2017-07-19 12:06:01 | vjudge3 | 459B - Pashmak and Flowers | GNU C++ | Wrong answer on test 4 | 358 ms | 2800 KB |
| 28691476 | 2017-07-19 12:06:00 | Bjarnestroustrup | 831C - Jury Marks | GNU C++14 | Time limit exceeded on test 11 | 2000 ms | 5000 KB |
| 28691475 | 2017-07-19 12:05:54 | ffbh | 818E - Card Game Again | GNU C++11 | Wrong answer on test 3 | 15 ms | 2700 KB |
| 28691474 | 2017-07-19 12:05:52 | k_k_3799 | 825A - Binary Protocol | GNU C++14 | Wrong answer on test 2 | 0 ms | 1900 KB |
| 28691473 | 2017-07-19 12:05:50 | 1504010611 | 746D - Green and Black Tea | GNU C++11 | Compilation error | 0 ms | 0 KB |
| 28691471 | 2017-07-19 12:05:49 | alaDDin101 | 733A - Grasshopper And the String | GNU C++11 | Running on test 59 | 0 ms | 0 KB |
| 28691470 | 2017-07-19 12:05:47 | vjudge2 | 811B - Vladik and Complicated Book | GNU C++ | Wrong answer on test 1 | 15 ms | 1900 KB |
| 28691469 | 2017-07-19 12:05:44 | DeKode | 158A - Next Round | GNU C++14 | Wrong answer on test 6 | 30 ms | 1900 KB |
| 28691467 | 2017-07-19 12:05:42 | vjudge1 | 50C - Happy Farm 5 | GNU C++ | Accepted | 124 ms | 3400 KB |
| 28691466 | 2017-07-19 12:05:38 | vjudge3 | 291B - Command Line Arguments | GNU C++ | Wrong answer on test 5 | 15 ms | 2900 KB |
| 28691463 | 2017-07-19 12:05:33 | vjudge1 | 746C - Tram | GNU C++ | Accepted | 15 ms | 2100 KB |
| 28691460 | 2017-07-19 12:05:25 | vivekgupta | 118D - Caesar's Legions | GNU C++14 | Accepted | 30 ms | 2000 KB |
| 28691457 | 2017-07-19 12:05:18 | HopeDawn | 831A - Unimodal Array | GNU C++14 | Wrong answer on test 10 | 15 ms | 1800 KB |
| 28691455 | 2017-07-19 12:05:17 | ivashchenko_a | 734A - Anton and Danik | Java 8 | Accepted | 139 ms | 20500 KB |
| 28691454 | 2017-07-19 12:05:16 | naimur978 | 732A - Buy a Shovel | GNU C++14 | Accepted | 15 ms | 1900 KB |

# History of Problem Submission




Any Problem has a list of your submissions with it's judge.

- Accepted
- Wrong Answer
- Time Limit Exceeded
- Memory Limit Exceeded
- Compilation error

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# Lecture Agenda

- ✔ Section 1: Codeforces Online Judge
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# How to Learn from Other Solutions

1- Go To Round Problems

2- Go To Status Tab

3- Put You Criteria to Filter Submissions

4- Applying Your Filter

5- Show Your Target Solution

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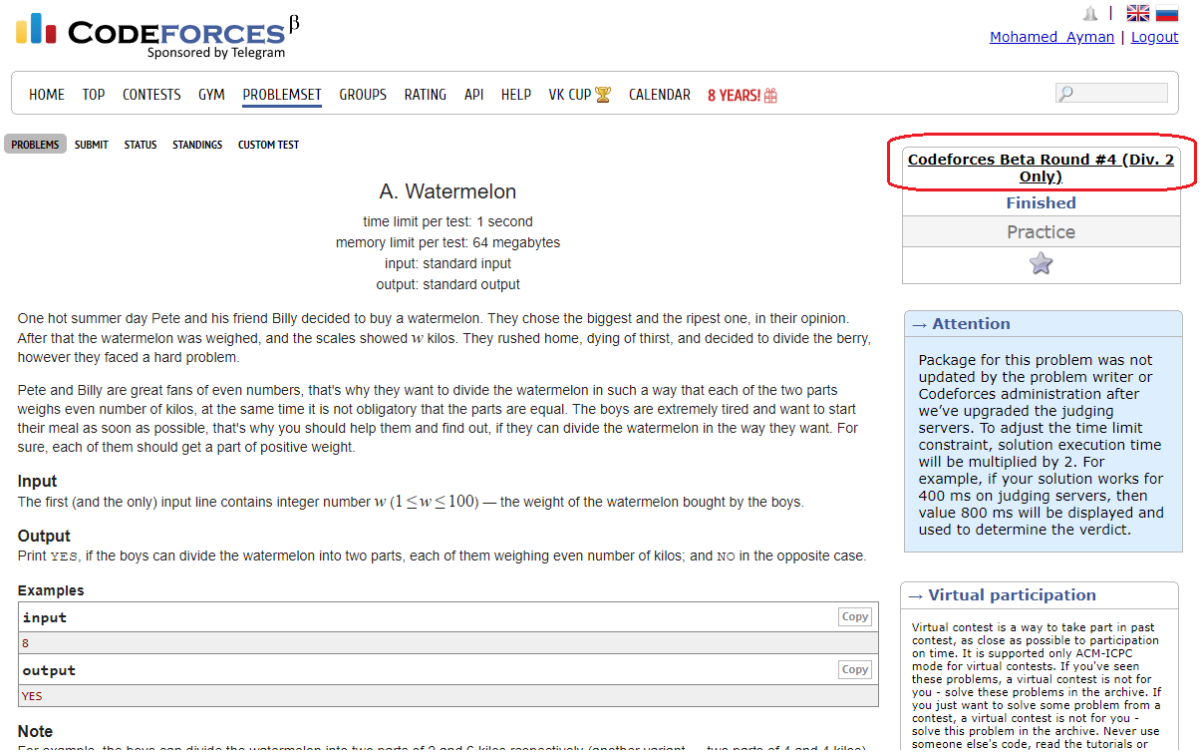
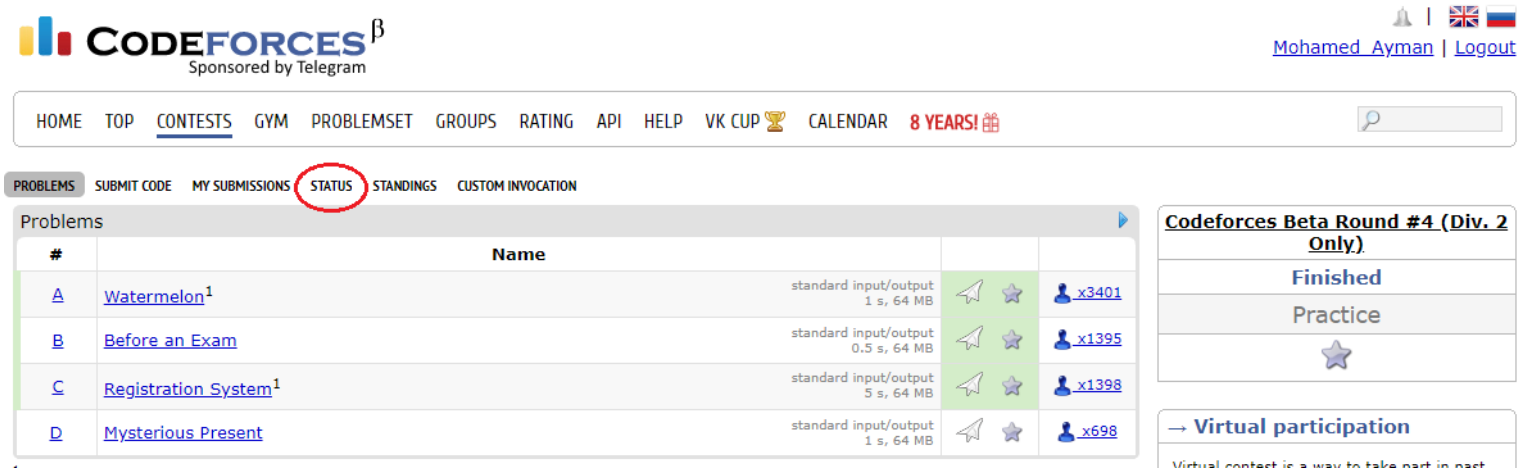
# Round Number in Problem Body

Any problem has a round number at the top of right side, click it



# Problems of The Round

## Select STATUS tab



# Status of The Round

This page will show all results of round for all languages and all verdicts and all round problems

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PROBLEMS SUBMIT CODE MY SUBMISSIONS STATUS STANDINGS CUSTOM INVOCATION

Status filter is used, click here to reset

Contest status

| # | When | Who | Problem | Lang | Verdict | Time | Memory |
|---|---|---|---|---|---|---|---|
| 41932551 | 2018-08-21 14:05:35 | luogu_bot2 | A - Watermelon | GNU C++ | Accepted | 62 ms | 0 KB |
| 41932498 | 2018-08-21 14:03:25 | luogu_bot4 | A - Watermelon | GNU C++ | Wrong answer on test 5 | 60 ms | 0 KB |
| 41932252 | 2018-08-21 13:53:17 | bharath_kns | A - Watermelon | GNU C | Accepted | 62 ms | 0 KB |
| 41932248 | 2018-08-21 13:53:16 | struggling_student | A - Watermelon | Java 8 | Accepted | 310 ms | 3600 KB |
| 41932232 | 2018-08-21 13:52:28 | bharath_kns | A - Watermelon | GNU C | Compilation error | 0 ms | 0 KB |
| 41932179 | 2018-08-21 13:50:39 | bharath_kns | A - Watermelon | GNU C | Wrong answer on test 5 | 30 ms | 0 KB |
| 41932110 | 2018-08-21 13:47:51 | Thyroid | A - Watermelon | GNU C++ | Accepted | 60 ms | 0 KB |
| 41932087 | 2018-08-21 13:46:58 | Thyroid | A - Watermelon | GNU C++ | Wrong answer on test 5 | 62 ms | 0 KB |
| 41932081 | 2018-08-21 13:46:48 | bharath_kns | A - Watermelon | GNU C | Wrong answer on test 5 | 30 ms | 0 KB |
| 41931956 | 2018-08-21 13:42:45 | Thyroid | A - Watermelon | GNU C++ | Wrong answer on test 5 | 30 ms | 0 KB |
| 41931677 | 2018-08-21 13:32:46 | eduardonunes2525 | A - Watermelon | GNU C++11 | Accepted | 60 ms | 0 KB |
| 41931532 | 2018-08-21 13:27:48 | eduardonunes2525 | A - Watermelon | GNU C++11 | Wrong answer on test 2 | 30 ms | 0 KB |
| 41931369 | 2018-08-21 13:22:49 | eduardonunes2525 | A - Watermelon | GNU C++11 | Wrong answer on test 2 | 30 ms | 0 KB |

Codeforces Beta Round #4 (Div. 2 Only)

Finished

Practice

→ Virtual participation

Virtual contest is a way to take part in past contest, as close as possible to participation on time. It is supported only ACM-ICPC mode for virtual contests. If you've seen these problems, a virtual contest is not for you - solve these problems in the archive. If you just want to solve some problem from a contest, a virtual contest is not for you - solve this problem in the archive. Never use someone else's code, read the tutorials or communicate with other person during a virtual contest.

Start virtual contest

→ Practice

You are registered for practice. You can solve problems unofficially. Results can be found in the contest status and in the bottom of standings.

# Filtration of The Round Status

## You can filter results for specific problem and specific language and specific verdict

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 41932179 | 2018-08-21 13:50:39 | bharath_kns | A - Watermelon | GNU C | Wrong answer on test 5 | 30 ms | 0 KB |
| 41932110 | 2018-08-21 13:47:51 | Thyroid | A - Watermelon | GNU C++ | Accepted | 60 ms | 0 KB |
| 41932087 | 2018-08-21 13:46:58 | Thyroid | A - Watermelon | GNU C++ | Wrong answer on test 5 | 62 ms | 0 KB |
| 41932081 | 2018-08-21 13:46:48 | bharath_kns | A - Watermelon | GNU C | Wrong answer on test 5 | 30 ms | 0 KB |
| 41931956 | 2018-08-21 13:42:45 | Thyroid | A - Watermelon | GNU C++ | Wrong answer on test 5 | 30 ms | 0 KB |
| 41931677 | 2018-08-21 13:32:46 | eduardonunes2525 | A - Watermelon | GNU C++11 | Accepted | 60 ms | 0 KB |
| 41931532 | 2018-08-21 13:27:48 | eduardonunes2525 | A - Watermelon | GNU C++11 | Wrong answer on test 2 | 30 ms | 0 KB |
| 41931369 | 2018-08-21 13:22:49 | eduardonunes2525 | A - Watermelon | GNU C++11 | Wrong answer on test 2 | 30 ms | 0 KB |
| 41930949 | 2018-08-21 13:09:52 | MayFloweryy | A - Watermelon | GNU C++14 | Wrong answer on test 5 | 30 ms | 0 KB |
| 41930872 | 2018-08-21 13:07:08 | MayFloweryy | A - Watermelon | GNU C++14 | Accepted | 30 ms | 0 KB |
| 41930580 | 2018-08-21 12:57:52 | bqx | C - Registration System | GNU C++11 | Accepted | 1682 ms | 800 KB |
| 41930538 | 2018-08-21 12:55:45 | luogu_bot2 | A - Watermelon | GNU C++ | Accepted | 62 ms | 0 KB |
| 41929696 | 2018-08-21 12:23:54 | FAYJUL | C - Registration System | GNU C++11 | Time limit exceeded on test 1 | 5000 ms | 14100 KB |
| 41929373 | 2018-08-21 12:12:54 | CtrlCV | A - Watermelon | GNU C++17 | Accepted | 62 ms | 0 KB |
| 41929198 | 2018-08-21 12:05:50 | rubiks_spiedy | A - Watermelon | GNU C++14 | Accepted | 62 ms | 0 KB |
| 41929158 | 2018-08-21 12:04:24 | rubiks_spiedy | A - Watermelon | GNU C++14 | Compilation error | 0 ms | 0 KB |
| 41929116 | 2018-08-21 12:03:06 | jarvis307 | A - Watermelon | Java 8 | Accepted | 248 ms | 3600 KB |

on time. It is supported only ACM-ICPC mode for virtual contests. If you've seen these problems, a virtual contest is not for you - solve these problems in the archive. If you just want to solve some problem from a contest, a virtual contest is not for you - solve this problem in the archive. Never use someone else's code, read the tutorials or communicate with other person during a virtual contest.

Start virtual contest

→ Practice

You are registered for practice. You can solve problems unofficially. Results can be found in the contest status and in the bottom of standings.

→ Clone Contest to Mashup

You can clone this contest to a mashup.

Clone Contest

→ Status filter

Problem: A - Watermelon

Verdict: Accepted

Language: Python 3

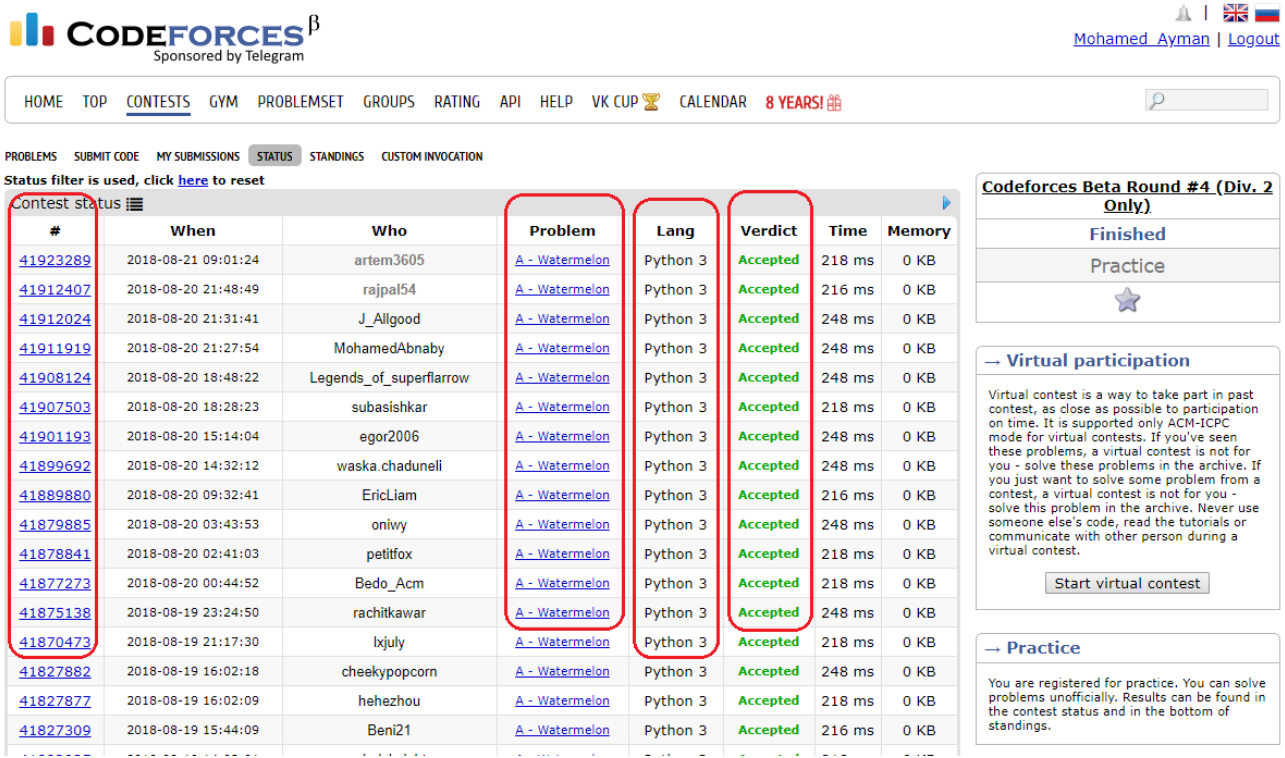
Test: Not used

Apply Reset

→ Contest materials

# Appling Filtration

After applying a filter results will be like that



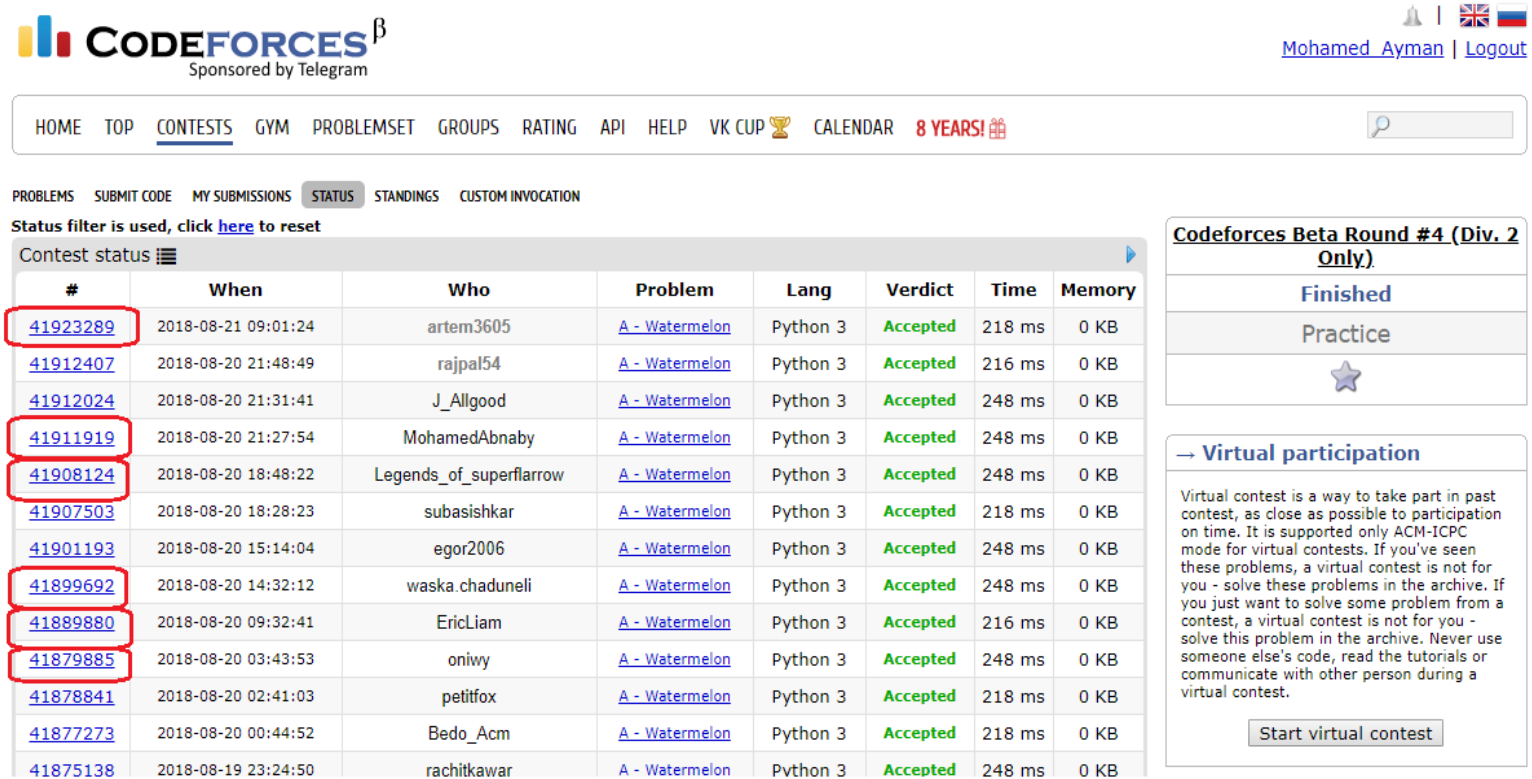

This filter about:

Verdict : Accepted

Problem : A

Language : Python 3

# Solutions of The Others



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PROBLEMS SUBMIT CODE MY SUBMISSIONS STATUS STANDINGS CUSTOM INVOCATION

**Status filter is used, click here to reset**

Contest status

| # | When | Who | Problem | Lang | Verdict | Time | Memory |
|---|---|---|---|---|---|---|---|
| 41923289 | 2018-08-21 09:01:24 | artem3605 | A - Watermelon | Python 3 | Accepted | 218 ms | 0 KB |
| 41912407 | 2018-08-20 21:48:49 | rajpal54 | A - Watermelon | Python 3 | Accepted | 216 ms | 0 KB |
| 41912024 | 2018-08-20 21:31:41 | J_Allgood | A - Watermelon | Python 3 | Accepted | 248 ms | 0 KB |
| 41911919 | 2018-08-20 21:27:54 | MohamedAbnaby | A - Watermelon | Python 3 | Accepted | 248 ms | 0 KB |
| 41908124 | 2018-08-20 18:48:22 | Legends_of_superflarrow | A - Watermelon | Python 3 | Accepted | 248 ms | 0 KB |
| 41907503 | 2018-08-20 18:28:23 | subasishkar | A - Watermelon | Python 3 | Accepted | 218 ms | 0 KB |
| 41901193 | 2018-08-20 15:14:04 | egor2006 | A - Watermelon | Python 3 | Accepted | 248 ms | 0 KB |
| 41899692 | 2018-08-20 14:32:12 | waska.chaduneli | A - Watermelon | Python 3 | Accepted | 248 ms | 0 KB |
| 41889880 | 2018-08-20 09:32:41 | EricLiam | A - Watermelon | Python 3 | Accepted | 216 ms | 0 KB |
| 41879885 | 2018-08-20 03:43:53 | oniwy | A - Watermelon | Python 3 | Accepted | 248 ms | 0 KB |
| 41878841 | 2018-08-20 02:41:03 | petitfox | A - Watermelon | Python 3 | Accepted | 218 ms | 0 KB |
| 41877273 | 2018-08-20 00:44:52 | Bedo_Acm | A - Watermelon | Python 3 | Accepted | 218 ms | 0 KB |
| 41875138 | 2018-08-19 23:24:50 | rachitkawar | A - Watermelon | Python 3 | Accepted | 248 ms | 0 KB |

Codeforces Beta Round #4 (Div. 2 Only)

Finished

Practice

→ Virtual participation

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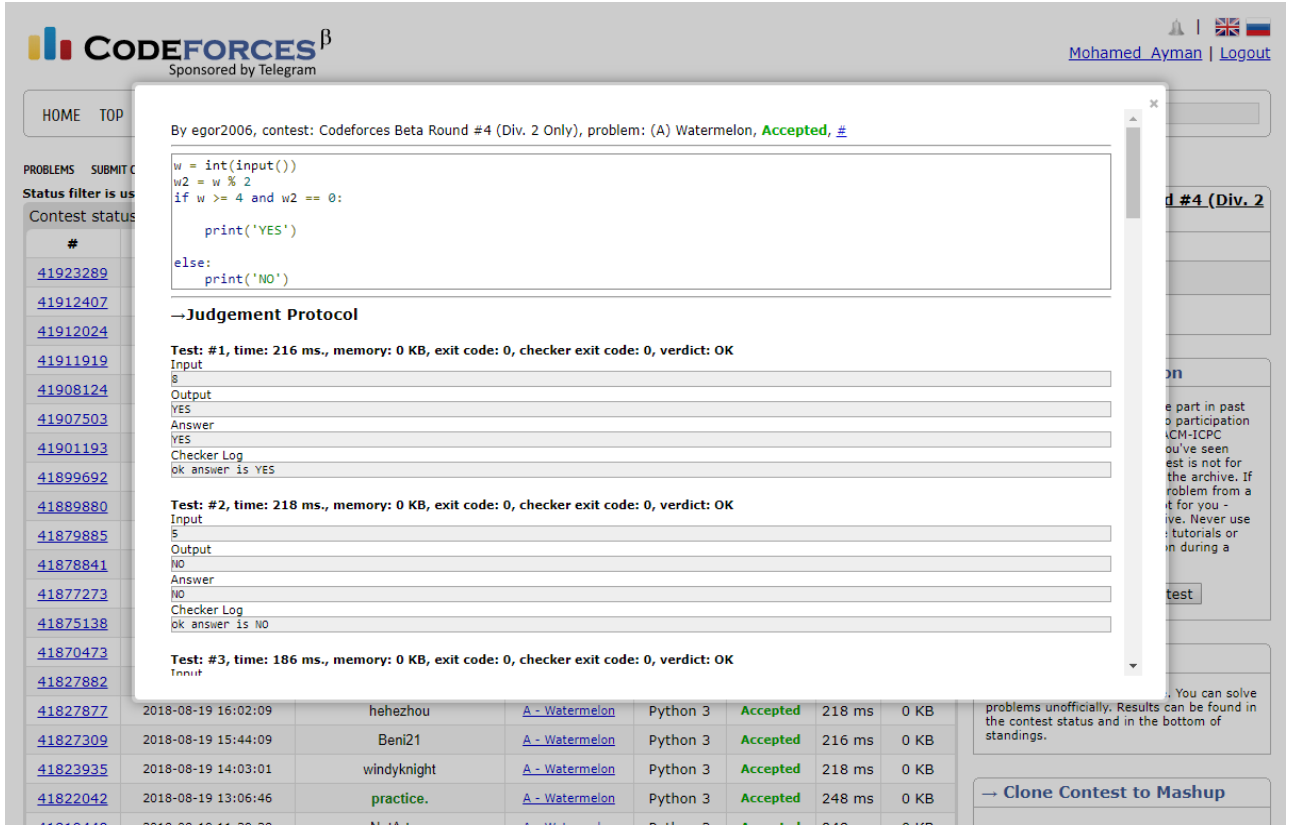
Start virtual contest

# Show Solutions of The Others



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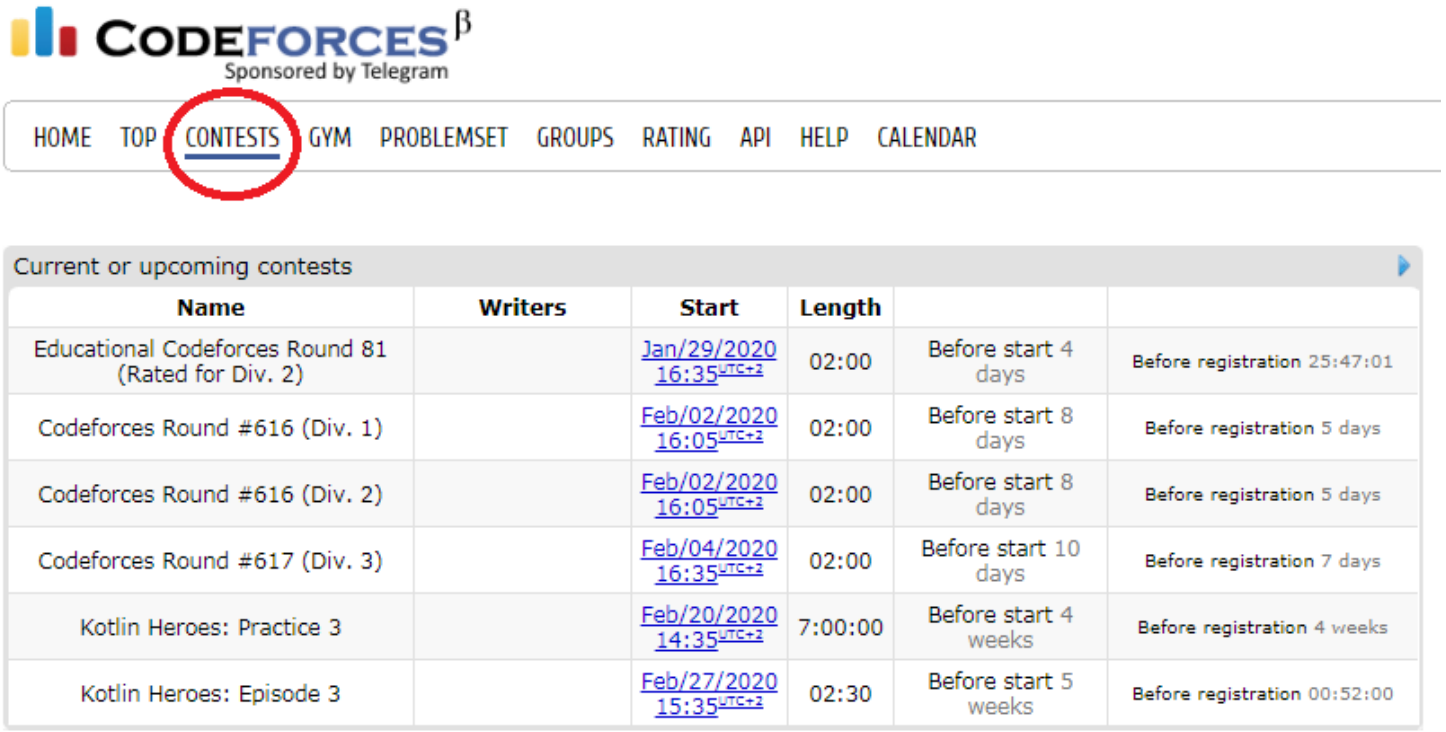
# Register in Previous Contest

Select CONTEST Tab



# Register in New Contest

## Register The Contest from Register now » link

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Current or upcoming contests

| Name | Writers | Start | Length | | |
|---|---|---|---|---|---|
| Educational Codeforces Round 81 (Rated for Div. 2) | | Jan/29/2020 16:35 UTC+2 | 02:00 | Before start 4 days | Before registration 25:31:22 |
| Codeforces Round #616 (Div. 1) | | Feb/02/2020 16:05 UTC+2 | 02:00 | Before start 8 days | Before registration 5 days |
| Codeforces Round #616 (Div. 2) | | Feb/02/2020 16:05 UTC+2 | 02:00 | Before start 8 days | Before registration 5 days |
| Codeforces Round #617 (Div. 3) | | Feb/04/2020 16:35 UTC+2 | 02:00 | Before start 10 days | Before registration 7 days |
| Kotlin Heroes: Practice 3 | | Feb/20/2020 14:35 UTC+2 | 7:00:00 | Before start 4 weeks | Before registration 4 weeks |
| Kotlin Heroes: Episode 3 | | Feb/27/2020 15:35 UTC+2 | 02:30 | Before start 5 weeks | Before registration 00:36:22 |

→ Pay attention

Before contest
Educational Codeforces Round 81 (Rated for Div. 2)
00:49:39
Register now »

Like 133 people like this. Be the first of your friends.

Contest history

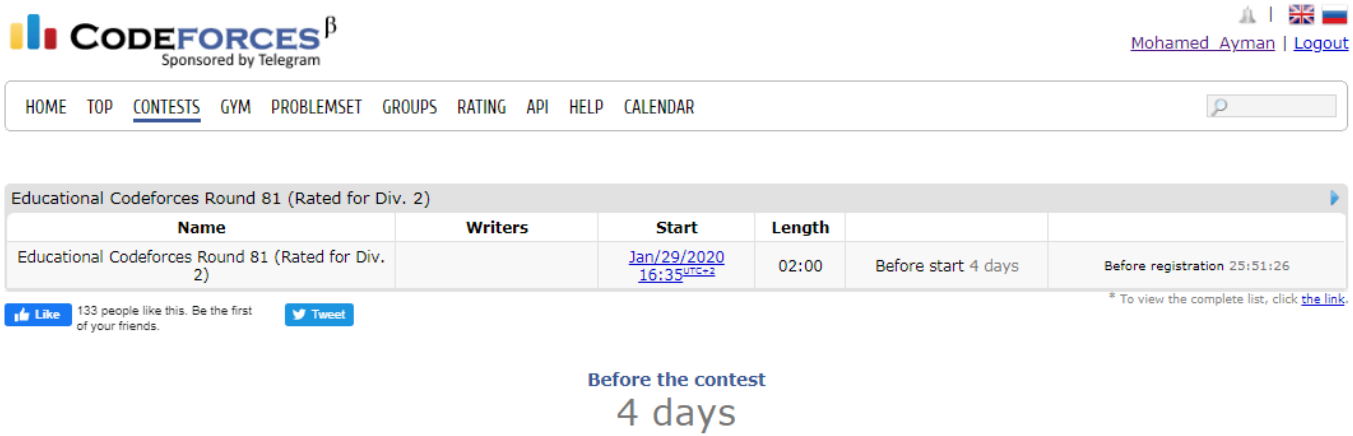
Past contests

| Name | Writers | Start | Length | | |
|---|---|---|---|---|---|
| Codeforces Round #615 (Div. 3) Enter » Virtual participation » | MikeMirzayanov vovuh | Jan/22/2020 16:35 UTC+2 | 02:10 | Final standings Solved: 4 out of 6 | x17661 |

# Register in New Contest

Register The Contest from Register link

# Register in New Contest



# Register in Previous Contest

## You Can Compete in Previous Contests

Contest history

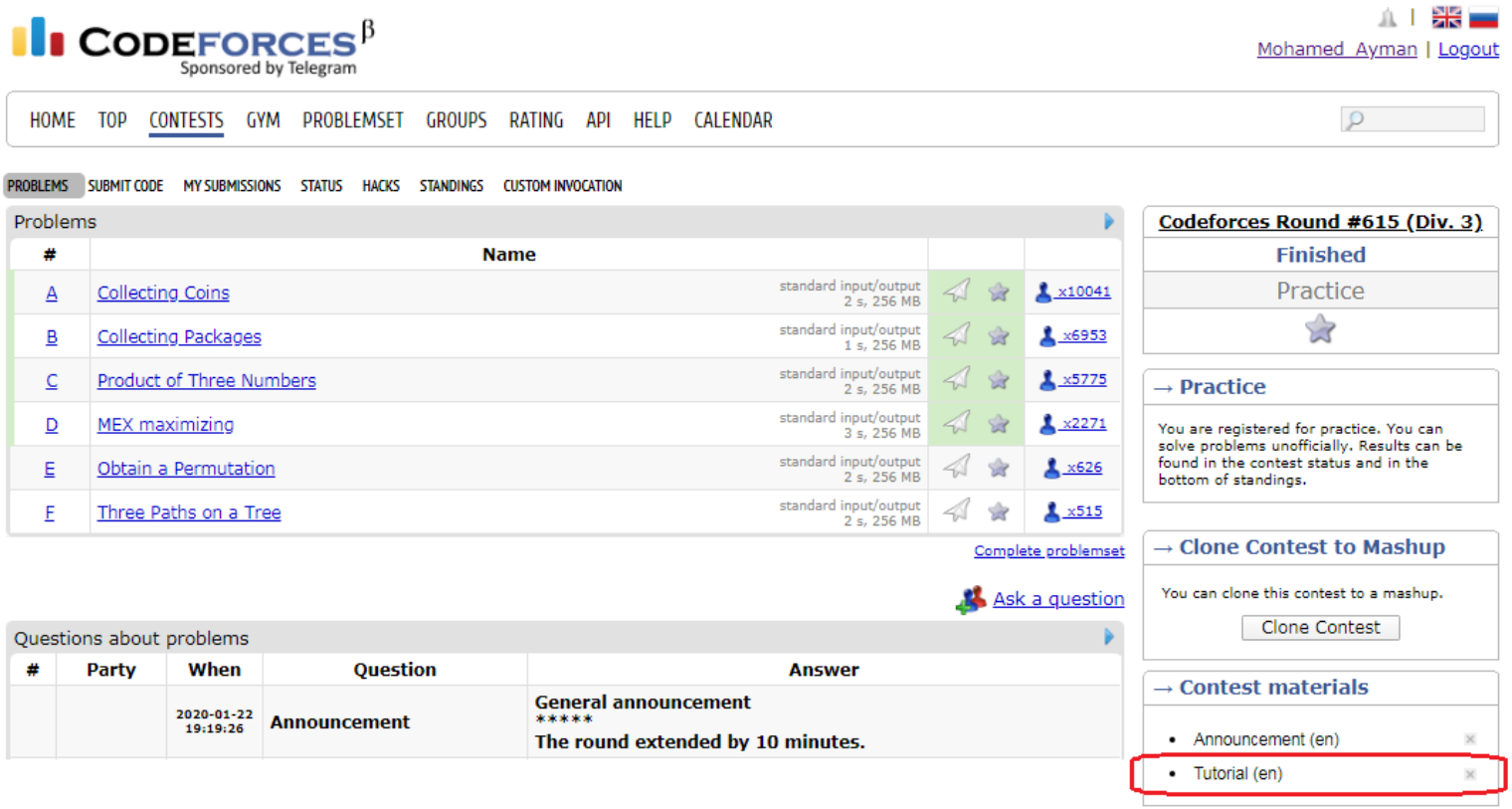
Past contests

| Name | Writers | Start | Length | | |
|---|---|---|---|---|---|
| Codeforces Round #615 (Div. 3)<br>Enter »<br>Virtual participation » | MikeMirzayanov<br>vovuh | Jan/22/2020<br>16:35 UTC+2 | 02:10 | Final standings<br>Solved: 4 out of 6 | x17661 |
| Codeforces Round #614 (Div. 1)<br>Enter »<br>Virtual participation » | Akikaze<br>low_<br>xuanquang1999 | Jan/19/2020<br>15:35 UTC+2 | 02:00 | Final standings | x1391 |
| Codeforces Round #614 (Div. 2)<br>Enter »<br>Virtual participation » | Akikaze<br>low_<br>xuanquang1999 | Jan/19/2020<br>15:35 UTC+2 | 02:00 | Final standings | x13746 |

# Lecture Agenda

- ✔ Section 1: Codeforces Online Judge
- ✔ Section 2: How to Create an Account
- ✔ Section 3: How to Solve a Problem
- ✔ Section 4: How to Learn from Other Solutions
- ✔ Section 5: How to Compete in Contest
- **Section 6: How to Learn from Contest Tutorial**

# How to Learn from Contest Tutorial



# How to Learn from Contest Tutorial

- In Tutorial Section for each contest in codeforces there is a blog which explain the idea of the problems in this round with a solution example.

## Codeforces Round #615 (Div. 3) Editorial

By vovuh, history, 2 days ago,

Thanks to Rox and _overrated_ for help with problem ideas and preparation!

1294A - Collecting Coins

Idea: **MikeMirzayanov**

Tutorial

### 1294A - Collecting Coins

Suppose $a \le b \le c$. If it isn't true then let's rearrange our variables. Then we need at least $2c - b - a$ coins to make $a$, $b$ and $c$ equal. So if $n < 2c - b - a$ then the answer is "NO". Otherwise, the answer if "YES" if the number $n - (2c - b - a)$ is divisible by $3$. This is true because after making $a, b$ and $c$ equal we need to distribute all remaining candies between three sisters.

Solution

1294B - Collecting Packages

Idea: **MikeMirzayanov**

Tutorial

### 1294B - Collecting Packages

It is obvious that if there is a pair of points $(x_i, y_i)$ and $(x_j, y_j)$ such that $x_i < x_j$ and $y_i > y_j$ then the answer is "NO". It means that if the answer is "YES" then there is some ordering of points such that $x_{i_1} \le x_{i_2} \le \cdots \le x_{i_n}$ and $y_{i_1} \le y_{i_2} \le \cdots \le y_{i_n}$ because we can only move right or up. But what is this ordering? it is just sorted order of points (firstly by $x_i$ then by $y_i$).

So we can sort all points, check if this ordering is valid and traverse among all these points. For each $k$ from $2$ to $n$ firstly do $x_{i_k} - x_{i_{k-1}}$ moves to the right then do $y_{i_k} - y_{i_{k-1}}$ moves to the up (because this order minimizing the answer lexicographically).

Time complexity: $O(n \log n)$ or $O(n^2)$.

Solution

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