

# GIỚI THIỆU CODEFORCES & HACKERRANK




# Tổng quan

- Codeforces và Hackerrank là 2 trang chấm bài tự động (Online Judge – OJ) phổ biến
- Phục vụ mục đích chính là Lập trình thi đấu (Competitive Programming) và một số chủ đề khác trong Khoa học máy tính
- Có rất nhiều bài tập ở nhiều mức độ để luyện tập

# Codeforces


Codeforces

codeforces.com



 **CODEFORCES**<sup>β</sup>  
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Thanh menu

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## Educational Codeforces Round 33 [Rated for Div. 2]

By [BledDest](#), [history](#), 21 hour(s) ago, translation,  

Hello Codeforces!

On [November 23, 18:05 MSK](#) Educational Codeforces Round 33 will start.

Series of Educational Rounds continue being held as [Harbour.Space University](#) initiative! You can read the details about the cooperation between [Harbour.Space University](#) and Codeforces in the [blog post](#).

As an experiment, the round will be **rated for Div. 2**. It will be held on extended ACM ICPC rules. After the end of the contest you will have one day to hack any solution you want. You will have access to copy any solution and test it locally.

You will be given **6 problems** and **2 hours** to solve them.

The problems were prepared by Mikhail [PikMike](#) Piklyaev, Vladimir [On25](#) Petrov and me.

Good luck to all participants!

I also have a message from our partners, [Harbour.Space University](#):


Be sure to join these courses to sharpen your programming and data analysis skills:

Combinatorics and graphs with [Sergey Nikolenko](#), Researcher, Steklov Mathematical Institute at St. Petersburg. He is a computer scientist and a mathematician. He is interested in machine learning and data analysis, algorithms design and analysis, theoretical computer science, and algebra.

### Thông báo


→ Pay attention

Before contest  
[Educational Codeforces Round 33 \(Rated for Div. 2\)](#)  
01:04:05  
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Rating: **1246**  
Contribution: 0

  
[bao](#)

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### Thông tin tài khoản

→ Top rated

#	User	Rating
1	<a href="#">tourist</a>	3496
2	<a href="#">moejy0viiiiv</a>	3288

# Codeforces – Register

Register - Codeforces x

Not secure | codeforces.com/register

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Enter [Register](#)

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Fill in the form to register in Codeforces.  
You can skip this step and login with your [OpenID](#), [Gmail](#) or [Facebook](#) account.

### Register in Codeforces

Handle   
This means your username (nickname) on Codeforces. Be careful you will be able to change it only once in the first 7 days after registration.

Email

Password   
Password should contain at least five characters

Confirm Password

[Re-send Confirmation Email](#)

[Use OpenID](#) | [Use Gmail](#) | [Use Facebook](#)

# Codeforces – Contest

**Các kì thi sắp diễn ra:** bạn có thể đăng ký tham dự tùy theo mức độ hiện tại của mình (div 1 hay div 2).

**Các kì thi đã diễn ra:** bạn có thể xem bài tập theo từng kì thi

Trong mỗi kì thi, mức độ khó của mỗi bài **thường** được xác định bằng chữ cái (A: dễ nhất, B: khó hơn A,...)

# Codeforces – Problem set

Problemset - Codef x

codeforces.com/problemset

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## Danh sách tất cả bài tập

All problems

#	Name		Solved
<a href="#">894E</a>	<a href="#">Ralph and Mushrooms</a>	dp, graphs	<a href="#">x367</a>
<a href="#">894D</a>	<a href="#">Ralph And His Tour in Binary Country</a>	data structures, trees	<a href="#">x450</a>
<a href="#">894C</a>	<a href="#">Marco and GCD Sequence</a>	constructive algorithms, math	<a href="#">x1833</a>
<a href="#">894B</a>	<a href="#">Ralph And His Magic Field</a>	combinatorics, math, number theory	<a href="#">x1897</a>
<a href="#">894A</a>	<a href="#">QAO</a>	brute force, dp	<a href="#">x5469</a>
<a href="#">892B</a>	<a href="#">Wrath</a>	implementation, two pointers	<a href="#">x3663</a>
<a href="#">892A</a>	<a href="#">Greed</a>	implementation	<a href="#">x5175</a>
<a href="#">891E</a>	<a href="#">Lust</a>	combinatorics, math	<a href="#">x50</a>
<a href="#">891D</a>	<a href="#">Sloth</a>	dfs and similar, dp, graph matchings, trees	<a href="#">x23</a>
<a href="#">891C</a>	<a href="#">Envy</a>	data structures, dsu, graphs	<a href="#">x381</a>
<a href="#">891B</a>	<a href="#">Gluttony</a>	constructive algorithms	<a href="#">x1236</a>
<a href="#">891A</a>	<a href="#">Pride</a>	brute force, dp, greedy, math, number theory	<a href="#">x2897</a>
<a href="#">889E</a>	<a href="#">Mod Mod Mod</a>	binary search, dp, math	<a href="#">x28</a>

Pay attention

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(Rated for Div. 2)  
00:22:22  
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☒ Show tags for unsolved problems

Last unsolved

# Codeforces – Problem

Problem - 894A - Co x

codeforces.com/problemset/problem/894/A

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A. QAQ

time limit per test: 1 second

memory limit per test: 256 megabytes

input: standard input

output: standard output

Để bài

"QAQ" is a word to denote an expression of crying. Imagine "Q" as eyes with tears and "A" as a mouth.

Now Diamond has given Bort a string consisting of only uppercase English letters of length  $n$ . There is a great number of "QAQ" in the string (Diamond is so cute!).




illustration by 猫屋 <https://twitter.com/hekoyaliu>

Codeforces Round #447 (Div. 2)

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

→ Submit?

Language: GNU G++ 5.1.0

Choose file: Choose File No file chosen

Be careful: there is 50 points penalty for submission which fails the pretests or resubmission (except

# Codeforces - Problem

Problem - 894A - Co x

codeforces.com/problemset/problem/894/A




illustration by 猫屋 https://twitter.com/nekoaliu

Bort wants to know how many subsequences "QAQ" are in the string Diamond has given. Note that the letters "QAQ" don't have to be consecutive, but the order of letters should be exact.

**Input**

The only line contains a string of length  $n$  ( $1 \leq n \leq 100$ ). It's guaranteed that the string only contains uppercase English letters.

**Output**

Print a single integer — the number of subsequences "QAQ" in the string.

**Examples**

<b>input</b>
QAQAQYSYIOIWIN
<b>output</b>
4

<b>input</b>
QAQQZZYNOIWIN
<b>output</b>
3

**Note**

In the first example there are 4 subsequences "QAQ": "QAQAQYSYIOIWIN", "QAQAQYSYIOIWIN", "QAQAQYSYIOIWIN", "QAQAQYSYIOIWIN".

Language: GNU G++ 5.1.0

Choose file: Choose File No file chosen

Be careful: there is 50 points penalty for submission which fails the pretests or resubmission (except failure on the first test, denial of judgement or similar verdicts). "Passed pretests" submission verdict doesn't guarantee that the solution is absolutely correct and it will pass system tests.

Submit

**Phân dạng bài tập**

→ Problem tags

brute force dp

No tag edit access

→ Contest materials

- Announcement
- Tutorial** Lời giải

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# Codeforces - Submission

Personal submission x

Bảo

codeforces.com/submissions/bao



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bao submissions

bao submissions

#	When	Who	Problem	Lang	Verdict	Time	Memory
<a href="#">13679148</a>	2015-10-17 11:23:41	<a href="#">Po Po: bao</a>	<a href="#">589I - Lottery</a>	GNU C++	Accepted	31 ms	0 KB
<a href="#">8880693</a>	2014-11-28 19:00:00	<a href="#">bao</a>	<a href="#">217A - Ice Skating</a>	GNU C++	Accepted	374 ms	0 KB
<a href="#">8880675</a>	2014-11-28 19:07:36	<a href="#">bao</a>	<a href="#">217A - Ice Skating</a>	GNU C++	Runtime error on test 1	248 ms	262100 KB
<a href="#">8880666</a>	2014-11-28 19:07:01	<a href="#">bao</a>	<a href="#">277A - Learning Languages</a>	GNU C++	Runtime error on test 1	248 ms	262100 KB
<a href="#">8880626</a>	2014-11-28 19:03:14	<a href="#">bao</a>	<a href="#">217A - Ice Skating</a>	GNU C++	Wrong answer on test 12	122 ms	0 KB
<a href="#">8880572</a>	2014-11-28 18:58:53	<a href="#">bao</a>	<a href="#">217A - Ice Skating</a>	GNU C++	Wrong answer on test 2	30 ms	0 KB
<a href="#">8880564</a>	2014-11-28 18:57:15	<a href="#">bao</a>	<a href="#">217A - Ice Skating</a>	GNU C++	Wrong answer on test 1	0 ms	0 KB
<a href="#">8227779</a>	2014-10-14 16:58:20	<a href="#">bao</a>	<a href="#">363B - Fence</a>	GNU C++	Accepted	93 ms	600 KB
<a href="#">8227745</a>	2014-10-14 16:55:25	<a href="#">bao</a>	<a href="#">363B - Fence</a>	GNU C++	Wrong answer on test 5	46 ms	400 KB
<a href="#">8227729</a>	2014-10-14 16:53:52	<a href="#">bao</a>	<a href="#">363B - Fence</a>	GNU C++	Wrong answer on test 4	31 ms	400 KB

Pay attention

Contest is running  
[Educational Codeforces Round 33 \(Rated for Div. 2\)](#)  
01:53:31  
[Register now »](#)

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Top rated

#	User	Rating
1	<a href="#">tourist</a>	3496
2	<a href="#">moejy0viiiiv</a>	3288

Xem lại bài nộp

# Codeforces - Submission

Personal submission x

codeforces.com/submissions/bao

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bao submission:

#
<a href="#">13679148</a>
<a href="#">8880693</a>
<a href="#">8880675</a>
<a href="#">8880666</a>
<a href="#">8880626</a>
<a href="#">8880572</a>
<a href="#">8880564</a>
<a href="#">8227779</a>
<a href="#">8227745</a>
<a href="#">8227729</a>

```
scanf("%d",&n,&a,&b);
ddx[a]=ddy[b]=1;
for(int i=2;i<=n;i++)
{
    scanf("%d%d",&a,&b);
    if(!ddx[a]&&!ddy[b]) res++;
    ddx[a]=ddy[b]=1;
}
printf("%d",res);
```

→ Judgement Protocol

Test: #1, time: 30 ms., memory: 12 KB, exit code: 0, checker exit code: 0, verdict: OK

Input

```
2
2 1
1 2
```

Output

```
1
```

Answer

```
1
```

Checker Log

```
ok 1 number(s): "1"
```

Test: #2, time: 30 ms., memory: 4 KB, exit code: 0, checker exit code: 1, verdict: WRONG\_ANSWER

Input

```
2
2 1
4 1
```

Output

```
1
```

Answer

```
0
```

Checker Log

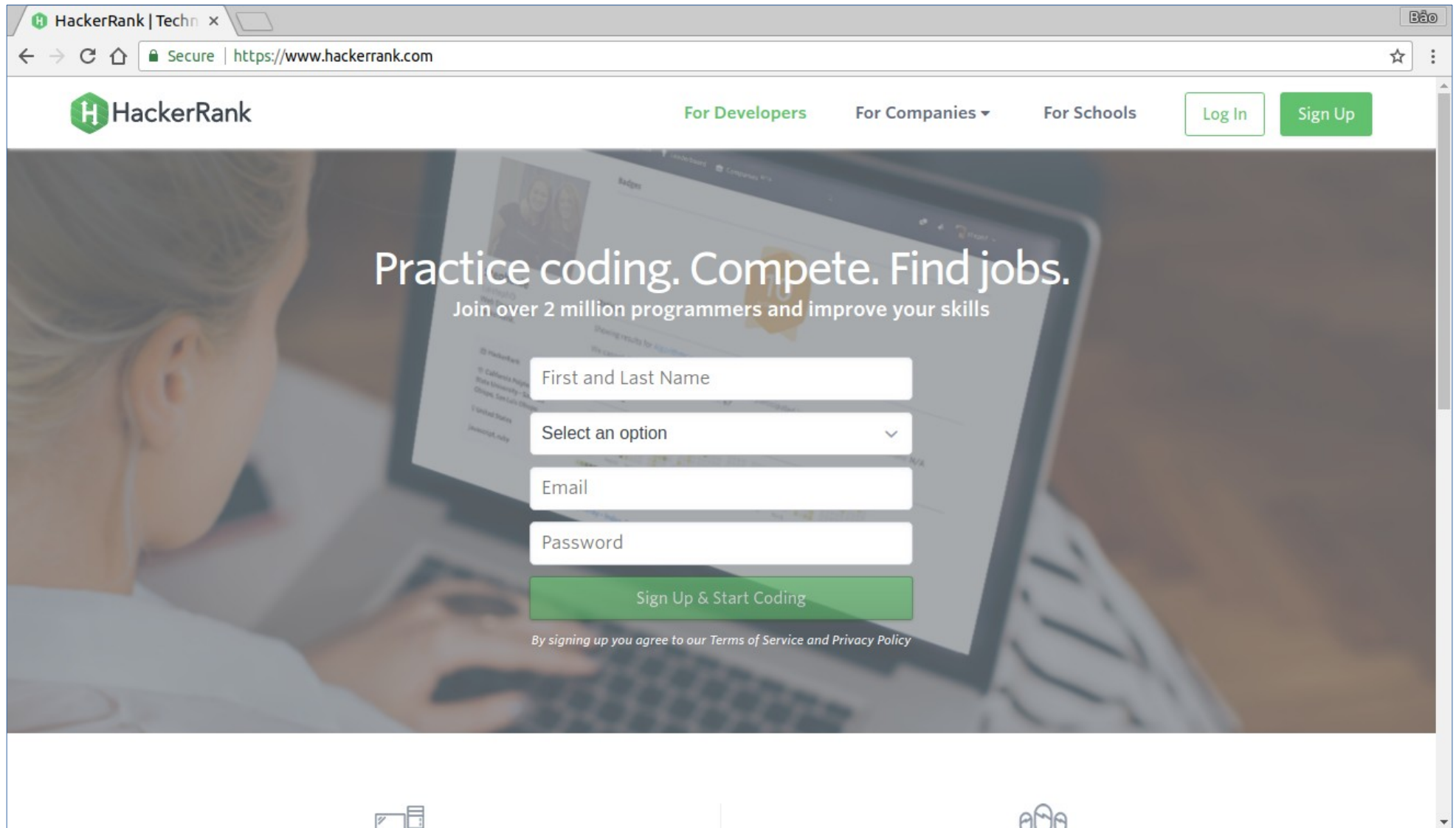
```
wrong answer 1st numbers differ - expected: '0', found: '1'
```

Xem test sai

Rating

1	tourist	3496
2	moejy0viiiiv	3288

# Hackerrank – Sign up

A screenshot of the Hackerrank website's sign-up page. The browser's address bar shows the URL https://www.hackerrank.com. The page features the Hackerrank logo and navigation links for Developers, Companies, and Schools. A central banner with a background image of a person coding contains the text 'Practice coding. Compete. Find jobs.' and 'Join over 2 million programmers and improve your skills'. Below this is a sign-up form with fields for 'First and Last Name', a dropdown menu 'Select an option', 'Email', and 'Password'. A green 'Sign Up & Start Coding' button is at the bottom of the form, followed by a link to the Terms of Service and Privacy Policy. The footer includes a mobile app icon and a logo.

# Hackerrank - Practice

The screenshot shows the Hackerrank dashboard. The top navigation bar includes links for Practice, Compete, Jobs, Rank, and Leaderboard. The 'Practice' link is highlighted with a red box. Below the navigation bar, the dashboard is divided into sections. The 'RECENT TRACKS' section shows three tracks: Algorithms (7 Challenges Solved), Regex (1 Challenge Solved), and Data Structures (11 Challenges Solved). The 'ALL TRACKS' section is divided into four columns: CORE CS, TUTORIALS, SPECIALIZED SKILLS, and LANGUAGES. The 'CORE CS' column lists Algorithms, Data Structures, and Mathematics. The 'TUTORIALS' column lists 30 Days of Code, Cracking the Coding Interview, 10 Days of Statistics, and 10 Days of Javascript. The 'SPECIALIZED SKILLS' column lists Artificial Intelligence, SQL, Databases, Distributed Systems, Regex, and Security. The 'LANGUAGES' column lists C++, Java, Python, Ruby, Linux Shell, and Functional Programming. A red box highlights the 'RECENT TRACKS' and 'ALL TRACKS' sections.

Dashboard | Hacker x

Secure | <https://www.hackerrank.com/dashboard>

Practice Compete Jobs Rank Leaderboard

Dashboard

Các chủ đề luyện tập

RECENT TRACKS No Saved Challenges

- Algorithms 7 Challenges Solved
- Regex 1 Challenge Solved
- Data Structures 11 Challenges Solved

ALL TRACKS Recommended Tracks ^

CORE CS	TUTORIALS	SPECIALIZED SKILLS	LANGUAGES
Algorithms	30 Days of Code	Artificial Intelligence	C++
Data Structures	Cracking the Coding Interview	SQL	Java
Mathematics	10 Days of Statistics	Databases	Python
	10 Days of Javascript	Distributed Systems	Ruby
		Regex	Linux Shell
		Security	Functional Programming

SOCIAL

# Hackerrank - Compete

Dashboard | Hacker x

Secure | <https://www.hackerrank.com/contests>

Practice **Compete** Jobs Rank Leaderboard

All Competitions

## Các kì thi

### Active Competitions

ProjectEuler+	Open Indefinitely	<a href="#">View Details</a>	Enter
Codiva	Nov 25th, 5:30 pm +07	<a href="#">View Details</a>	Sign Up
101 Hack 52	Dec 3rd, 10:00 pm +07	<a href="#">View Details</a>	Sign Up
World CodeSprint 12	Dec 14th, 11:00 pm +07	<a href="#">View Details</a>	Sign Up

### Archived Competitions

Week of Code 35	Nov 13th, 2:00 pm +07	Ended	<a href="#">View Challenges</a>
Morgan Stanley Campus Codeathon 2017	Nov 11th, 7:30 pm +07	Ended	<a href="#">View Challenges</a>
HourRank 24	Nov 2nd, 10:00 pm +07	Ended	<a href="#">View Challenges</a>
Women's CodeSprint 4	Oct 27th, 11:00 pm +07	Ended	<a href="#">View Challenges</a>
Moody's Analytics Fall University CodeSp...	Oct 12th, 11:00 pm +07	Ended	<a href="#">View Challenges</a>

### Administration

[Create Competitions](#)  
[Manage Competitions](#)

### Filter

- ☐ Rated
- ☐ Tutorials
- ☐ Algorithms
- ☐ Data Structures
- ☐ Mathematics
- ☐ Artificial Intelligence
- ☐ C++
- ☐ Java
- ☐ Python
- ☐ Ruby
- ☐ SQL
- ☐ Databases
- ☐ Distributed Systems
- ☐ Linux Shell
- ☐ Functional Programming
- ☐ Regex
- ☐ General Programming
- ☐ Security

### Quick Links

[Archived Competitions](#)

Lọc chủ đề thi

# Hackerrank - Problem

HackerRank

Secure | https://www.hackerrank.com/challenges/contacts/problem

## Contacts

by [dcod5](#)

Thảo luận

Lời giải

Problem

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Leaderboard

Discussions

Editorial

### Đề bài

We're going to make our own *Contacts* application! The application must perform two types of operations:

1. `add name`, where *name* is a string denoting a contact name. This must store *name* as a new contact in the application.
2. `find partial`, where *partial* is a string denoting a partial name to search the application for. It must count the number of contacts starting with *partial* and print the count on a new line.

Given *n* sequential *add* and *find* operations, perform each operation in order.

#### Input Format

The first line contains a single integer, *n*, denoting the number of operations to perform.  
Each line *i* of the *n* subsequent lines contains an operation in one of the two forms defined above.

#### Constraints

- $1 \leq n \leq 10^5$
- $1 \leq |name| \leq 21$

f

t

in

Submissions: [7961](#)

Max Score: 40

Difficulty: Medium

Rate This Challenge:  
☆☆☆☆☆  
[More](#)

Mức độ khó

# Hackerrank - Problem

HackerRank

Secure | <https://www.hackerrank.com/challenges/contacts/problem>

1. Add a contact named `hack`.
2. Add a contact named `hackerrank`.
3. Find and print the number of contact names beginning with `hac`. There are currently two contact names in the application and both of them start with `hac`, so we print 2 on a new line.
4. Find and print the number of contact names beginning with `hak`. There are currently two contact names in the application but neither of them start with `hak`, so we print 0 on a new line.

Khung code

Current Buffer (saved locally, editable) Python 3

```
1 |
```

Line: 1 Col: 1

[Upload Code as File](#) ☐ Test against custom input

Chạy thử Run Code Submit Code Nộp

# Hackerrank - Submission

HackerRank

Secure | <https://www.hackerrank.com/challenges/contacts/submissions>

Practice | Compete | Jobs | Rank | Leaderboard

Dashboard > Data Structures > Trie > Contacts

Points: 155 Rank: 57931

## Contacts

by dcod5

Problem | **Submissions** | Leaderboard | Discussions | Editorial

Problem	Language	Time	Result	Score
<a href="#">Contacts</a>	C++14	5 days ago	Accepted ✓	

Xem lại bài làm

**View Results**

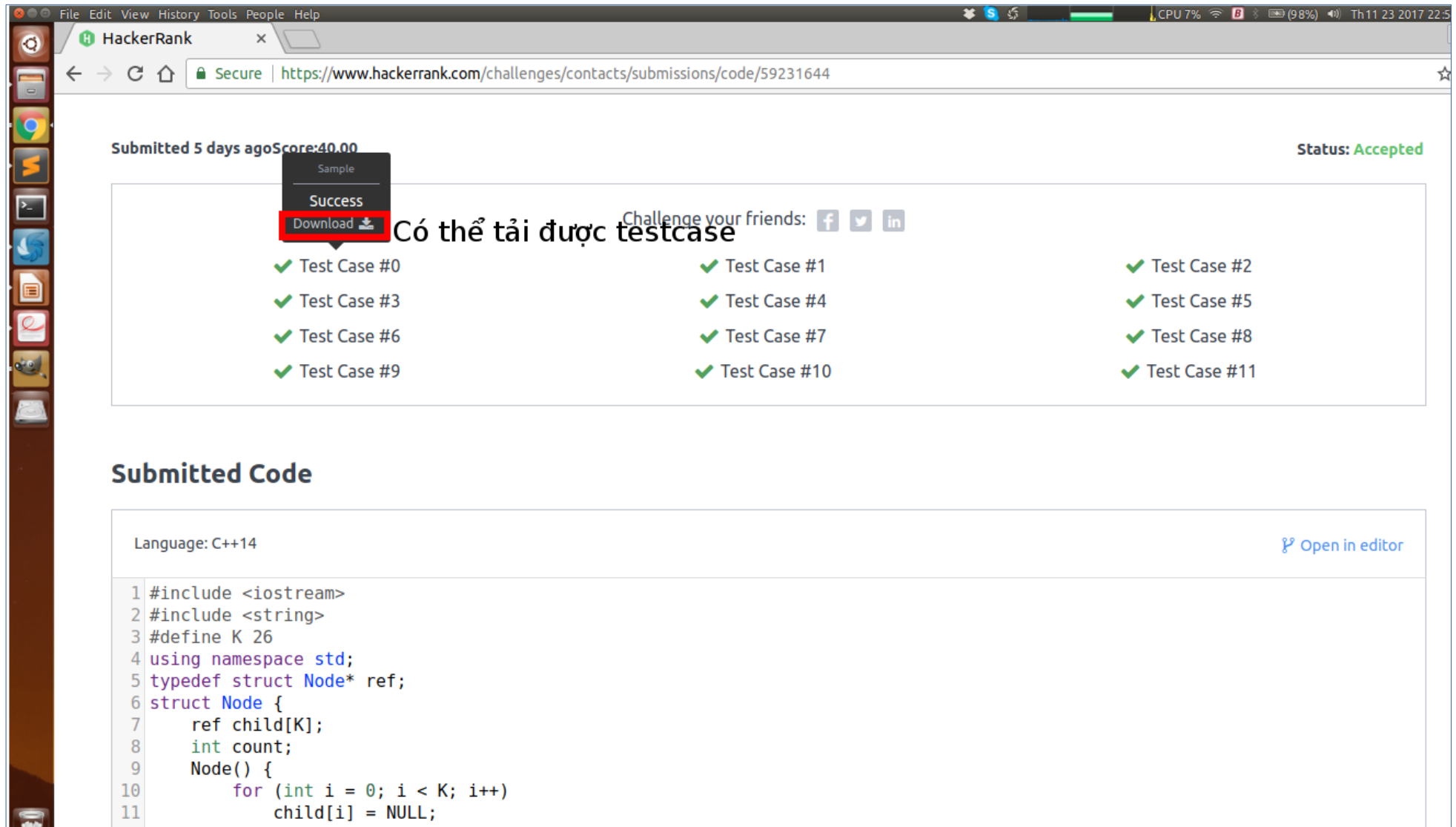
1

Join us on IRC at [#hackerrank](#) on freenode for hugs or bugs.

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# Hackerrank - Submission



The screenshot shows a web browser window with the Hackerrank website. The URL is <https://www.hackerrank.com/challenges/contacts/submissions/code/59231644>. The submission status is "Accepted" with a score of 40.00. A tooltip is visible over the "Download" button, indicating that the test case can be downloaded. The page also displays a list of 11 test cases, all of which were passed successfully. Below the test cases, the submitted code is shown, which is a C++14 program for a contact list problem.

Submitted 5 days ago Score: 40.00 Status: Accepted

Success  
Download

Có thể tải được testcase

Challenge your friends: f t in

- ✓ Test Case #0
- ✓ Test Case #1
- ✓ Test Case #2
- ✓ Test Case #3
- ✓ Test Case #4
- ✓ Test Case #5
- ✓ Test Case #6
- ✓ Test Case #7
- ✓ Test Case #8
- ✓ Test Case #9
- ✓ Test Case #10
- ✓ Test Case #11

### Submitted Code

Language: C++14 [Open in editor](#)

```
1 #include <iostream>
2 #include <string>
3 #define K 26
4 using namespace std;
5 typedef struct Node* ref;
6 struct Node {
7     ref child[K];
8     int count;
9     Node() {
10         for (int i = 0; i < K; i++)
11             child[i] = NULL;
```