



MAC0499 - Trabalho de Formatura Supervisionado

Aplicação web para organizar o estudo para programação competitiva



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Supervisor: Carlos Eduardo Ferreira

- 
- 
1. Programação competitiva
 2. Codeforces
 3. Motivação
 4. Arquitetura da aplicação
 5. Aplicação desenvolvida
 6. Considerações finais

Programação competitiva



Principais competições



Competições online



Plataformas de estudio





Codeforces



 |  
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Codeforces Round #837 (Div. 2)

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

Hello, Codeforces!

I am glad to invite everyone to participate in [Codeforces Round #837 \(Div. 2\)](#) , which will be held on [Sunday, December 11, 2022 at 12:35^{UTC-3}](#)

The round will be **rated for participants of Division 2 with a rating lower than 2100**. Division 1 participants can participate unofficially in the round.

You will be given 6 problems and 2 hours to solve them. This round was prepared by me and [4qqqq](#).



I'd especially like to thank:

- [Aleks5d](#) for awesome coordination of our round.
- [The organizers](#) for the amazing Codeforces and Belarus platforms

→ [Pay attention](#)

Before contest
[Codeforces Round #837 \(Div. 2\)](#)
3 days

→ [gustavo_m32](#)

 Rating: **1698**
 Contribution: 0

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Competições internas



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Current or upcoming contests

Name	Writers	Start	Length		
Codeforces Round #837 (Div. 2)	4qqqq _HossamYehia_	Dec/11/2022 12:35^{UTC-3}	02:00	Before start 3 days	Before registration 24:11:50
Educational Codeforces Round 139 (Rated for Div. 2)	BledDest Neon adedalic awoo vovuh	Dec/12/2022 11:35^{UTC-3}	02:00	Before start 4 days	Before registration 2 days
Codeforces Round #838 (Div. 2)	amurto satyam_343	Dec/15/2022 11:35^{UTC-3}	02:30	Before start 7 days	Before registration 5 days
Educational Codeforces Round 140 (Rated for Div. 2)	BledDest Neon adedalic awoo vovuh	Dec/16/2022 11:35^{UTC-3}	02:00	Before start 8 days	Before registration 6 days
Codeforces Round (Div. 1 + Div. 2)		Dec/17/2022 11:35^{UTC-3}	02:30	Before start 9 days	Before registration 7 days
Codeforces Round (Div. 3)		Dec/18/2022 11:35^{UTC-3}	02:15	Before start 10 days	Before registration 7 days

→ Pay attention

Before contest
[Codeforces Round #837 \(Div. 2\)](#)
3 days

→ Recent virt. contests

Contest	Time	
Codeforces Round #836 (Div. 2) Enter »	Dec/08/2022 01:03^{UTC-3}	✖
Educational Codeforces Round 135 (Rated for Div. 2) Enter »	Dec/02/2022 23:25^{UTC-3}	✖
Educational Codeforces Round 137 (Rated for Div. 2) Enter »	Dec/02/2022 01:00^{UTC-3}	✖

Problemas de uma competição

PROBLEMS SUBMIT CODE MY SUBMISSIONS STATUS HACKS ROOM STANDINGS CUSTOM INVOCATION

Problems				
#	Name			
A	Direction Change	standard input/output 1 s, 256 MB		x15156
B	Social Distance	standard input/output 1.5 s, 256 MB		x14321
C	Make it Increasing	standard input/output 2 s, 256 MB		x8716
D	Optimal Partition	standard input/output 4 s, 256 MB		x1393
E	Half Queen Cover	standard input/output 1 s, 256 MB		x336
F	Edge Elimination	standard input/output 2 s, 256 MB		x66

[Complete problemset](#)

Questions about problems

#	Party	When	Question	Answer
No items				

Codeforces Round #783 (Div. 2)

Finished

→ Practice?

Want to solve the contest problems after the official contest ends? Just register for practice and you will be able to submit solutions.

Register for 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 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

→ Contest materials

Problema

PROBLEMS SUBMIT CODE MY SUBMISSIONS STATUS HACKS ROOM STANDINGS CUSTOM INVOCATION

A. Direction Change

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

You are given a grid with n rows and m columns. Rows and columns are numbered from 1 to n , and from 1 to m . The intersection of the a -th row and b -th column is denoted by (a, b) .

Initially, you are standing in the top left corner $(1, 1)$. Your goal is to reach the bottom right corner (n, m) .

You can move in four directions from (a, b) : up to $(a - 1, b)$, down to $(a + 1, b)$, left to $(a, b - 1)$ or right to $(a, b + 1)$.

You cannot move in the same direction in two consecutive moves, and you cannot leave the grid. What is the minimum number of moves to reach (n, m) ?

Input

The input consists of multiple test cases. The first line contains a single integer t ($1 \leq t \leq 10^3$) — the number of the test cases. The description of the test cases follows.

The first line of each test case contains two integers n and m ($1 \leq n, m \leq 10^9$) — the size of the grid.

Output

For each test case, print a single integer: -1 if it is impossible to reach (n, m) under the given conditions, otherwise the minimum number of moves.

Example

```
input
6
1 1
2 1
1 3
4 2
4 6
10 5
output
0
1
-1
6
10
17
```

Codeforces Round #783 (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 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

→ Submit?

Language: GNU G++20 11.2.0 (64 bit, winlibc)

Choose file: Choose file No file chosen

Submit

→ Last submissions

Sistema de pontuação

Codeforces Round #783 (Div. 2)








#	Who	=	Δ ↕	Rating	
1	HenHenHenAAAAAAAAAAAA	3968	+394	1724 → 2118	Became Master
2	QiangBro_ShuDe	3939	+814	100 → 914	
3	MarioPariona117	3923	+280	1792 → 2072	Became Candidate Master
4	Moomer	3849	+490	1311 → 1801	Became Expert
5	SpadeA261	3733	+237	1828 → 2065	Became Candidate Master
6	beidiaodadejht	3600	+252	1748 → 2000	Became Candidate Master
7	jakber	3478	+198	1898 → 2096	Became Candidate Master
8	nianheng233	3127	+226	1782 → 2008	Became Candidate Master
9	zech	2925	+213	1804 → 2017	Became Candidate Master
10	leoxhim	2922	+533	1024 → 1557	Became Specialist
11	Abdulrahman27	2898	+234	1705 → 1939	Became Candidate Master
12	srijon51	2892	+197	1807 → 2004	Became Candidate Master
13	iHateCandyOreOmO	2861	+484	1129 → 1613	Became Expert
14	clause	2852	+189	1807 → 1996	Became Candidate Master
15	SmolBrain	2849	+170	1859 → 2029	Became Candidate Master
16	Je-O	2841	+159	1886 → 2045	Became Candidate Master
17	Duy_e	2825	+182	1796 → 1978	Became Candidate Master

Resultado de uma competição

Codeforces Round #783 (Div. 2)

Final standings

You may double click into cells (or ctrl+click) to view the submissions history or hack the solution

#	Who	=	*	<u>A</u> 500	<u>B</u> 500	<u>C</u> 750	<u>D</u> 1500	<u>E</u> 2000	<u>F</u> 2500
1	 HenHenHenAAAAAAAAAAAA	3968		492 00:04	480 00:10	702 00:16	1118 00:47	1176 01:43	
2	 QiangBro_ShuDe	3939		484 00:08	468 00:16	675 00:25	892 01:08		1420 01:48
3	 MarioPariona117	3923		490 00:05	464 00:18	711 00:13	1122 01:03	1136 01:48	
4	Moomer	3849		496 00:02	426 00:12	687 00:21	968 01:12	1272 01:31	
5	 SpadeA261	3733		486 00:07	468 00:16	589 00:37	816 01:54	1374 01:12	
6	beidiaodadejht	3600		462 00:19	448 00:26	636 00:38	942 01:33	1112 01:51	
7	 jakber	3478		486 00:07	468 00:16	684 00:22			1840 01:06
8	 nianheng233	3127		480 00:10	462 00:19	675 00:25			1510 01:34
9	 zech	2925		490 00:05	476 00:12	699 00:17	1260 00:40	-4	
10	leoxhim	2922		478 00:11	464 00:18	616 00:28		1364 01:07	

Competições da Gym



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HOME TOP CATALOG CONTESTS GYM PROBLEMSSET GROUPS RATING EDU API CALENDAR HELP

GYM MASHUPS

Trainings

Name	Start	Length		
2022-2023 ICPC Brazil Subregional Programming Contest Enter » Virtual participation »	-	05:00	Final standings	Prepared by paulocez Official ICPC Contest South America/Brazil Region Brazil, 2022-2023 Statements: in English, IN PORTUGUESE, in Spanish Has description
2021-2022 ACM-ICPC Brazil Subregional Programming Contest Enter » Virtual participation »	-	05:00	Final standings	Prepared by paulocez Official ICPC Contest South America/Brazil Region Brazil, 2021-2022 Statements: in English, IN PORTUGUESE Has description
2020-2021 ACM-ICPC Brazil				Prepared by Nson Official ICPC Contest

→ Training filter

Season:
from to

Contest type:

Contest format:

Duration, hours:
from to

Difficulty:
from [Reset](#)
to [Reset](#)

Order by:
 creation time (desc.)

API

INTRODUCTION METHODS RETURN OBJECTS

Introduction

With Codeforces API you can get access to some of our data in machine-readable JSON format.

To access the data you just send a HTTP-request to address

`https://codeforces.com/api/{methodName}` with method-specific parameters. Each method description has an example URL.

Each method call returns a JSON-object with three possible fields: status, comment and result.

- Status is either "OK" or "FAILED".
- If status is "FAILED" then comment contains the reason why the request failed. If status is "OK", then there is no comment.
- If status is "OK" then result contains method-dependent JSON-element which will be described for each method separately. If status is "FAILED", then there is no result.

API may be requested at most 1 time per two seconds. If you send more requests, you will receive a response with "FAILED" status and "Call limit exceeded" comment.

Language-depended fields like names or descriptions will be returned in the default language. Also, you can pass additional parameter `lang` with values `en` and `ru` to select the language of the result.

→ API

- Introduction

Methods

- `blogEntry.comments`
- `blogEntry.view`
- `contest.hacks`
- `contest.list`
- `contest.ratingChanges`
- `contest standings`
- `contest.status`
- `problemset.problems`
- `problemset.recentStatus`
- `recentActions`
- `user.blogEntries`
- `user.friends`
- `user.info`
- `user.ratedList`

Motivação



Planilhas e programas em Python

	A	B	C	D	E	F	G
1	Problema	S	M	O que fazer	Descrição	O que fazer para melhorar	E
16	1543D1	AC	W	XOR	Eu conseguiria fazer mais rápido se estivesse bem definidas as propriedades do XOR	Estudar bem as propriedades do XOR	E
17	1543D2	AC	T	XOR	Problema usou uma versão geral de XOR para qualquer base numérica	Estudar conversão de base de números	E
18	1479B1	AC	E	Greedy	Fiz o guloso errado	Estudar guloso	
19	1270D	AC	W	Atenção	Só enrei uma variável	Ser mais metódico na criação de variáveis	
20	1268A	AC	W	Atenção	No loop reverso eu esqueci de colocar -- ao invés de ++	Ter mais atenção/Procurar outra forma de fazer um for reverso	
21	1546C	AC	W	Atenção	Printei na ordem errada	Aprender a ler melhor o enunciado	
22	1548D	AC	T	Binômio de Newton	Faltou saber generalizar o binômio de newton	Estudar propriedades do binômio de newton	
23	1527B2	AC	T	Jogos	Faltou mais habilidade sobre jogos entre duas pessoas	Estudar jogos	
24	1506F	AC	W	Atenção	Faltou uma parte do raciocínio pra resolver o problema	Aprender a ler melhor o enunciado	

	A	B	C	D	E	F	G	H	I
1	trees								
2	0								
3	graphs	Shortest trees	OK	Exact path	P				
4	5	4	https://icpc.google.com	1	https://icpc.google.com				
5	strings	Suffix Automata	OK	Aho-Corasick	F				
6	6	4	https://icp-algorithms.com	2	https://icpc.google.com				
7	geometry	Shamos-Hoej	OK	Delaunay/Voronoi	F				
8	7	5	https://icpc.google.com	2	https://icpc.google.com				
9	flows	Trabalencia 1.0	OK	Trabalencia 2.0 - min cost flow	P	Trabalencia 2.0 - hungaro	OK	Latan Regional 2019 - problema A	OK
10	17	8	https://icpc.google.com	2	https://icpc.google.com	6	https://icpc.google.com	1	https://codeforces.com
11	2-sat	Trabalencia 1.0	P						
12	0	0	https://icpc.google.com						
13									


```

gustavo@nitrobook:~/Dropbox/Maratona/CodeForces/data$ python3 selectGym.py
/home/gustavo/.local/lib/python3.8/site-packages/requests/_internal.py:89: RequestsDependencyWarning: urllib3
3 (1.26.9) or chardet (3.0.4) doesn't match a supported version!
  warnings.warn("urllib3 ({}) or chardet ({}) doesn't match a supported "
Digite parte do nome: ICPC
Got 'contest.list?gym=true' from cache!
Got 'user.status?handle=gustavo_m32' from cache!
gustavo_m32: 326
fetching (1) 'https://codeforces.com/api/user.status?handle=Byakko'... Success!
Byakko: 442
fetching (1) 'https://codeforces.com/api/user.status?handle=nathan_luiz'... Success!
nathan_luiz: 666
union: 969
fetching (1) 'https://codeforces.com/api/contest.standings?contestId=102862&from=1&count=1'... Success!
fetching (1) 'https://codeforces.com/api/contest.standings?contestId=102279&from=1&count=1'... Success!
fetching (1) 'https://codeforces.com/api/contest.standings?contestId=104018&from=1&count=1'... Success!
(****) 05:00 2004-2005 ACM-ICPC East Central North America Regional Contest (ECNA 2004)
(****) 05:00 2008-2009 ACM-ICPC, NEERC, Northern Subregional Contest
(****) 05:00 2009-2010 ACM-ICPC Southwestern European Regional Programming Contest (SWERC 2009)
(****) 05:00 2010-2011 ACM-ICPC, NEERC, Northern Subregional Contest
(****) 05:00 2012, Samara SAU ACM-ICPC Quarterfinal Qualification Contest
(****) 05:00 2013 KTU ACM-ICPC Qualification Round
(****) 05:00 2013, Samara SAU ACM-ICPC Quarterfinal Qualification Contest
(****) 05:00 2013-2014 CT 501E10: 2013 ACM-ICPC Egyptian Collegiate Programming Contest (ECPC 2013)
(****) 05:00 2014 KTU ACM-ICPC Qualification Round
(****) 05:00 2014, Samara SAU ACM-ICPC Quarterfinal Qualification Contest
(****) 05:00 2015, Samara SAU ACM-ICPC Quarterfinal Qualification Contest
    
```

Estratégias

Leitura do editorial

Codeforces Round #834 (Div. 3) Editorial

By [Vladosiya](#), [history](#), 3 weeks ago, 

1759A - Yes-Yes?

Idea: [MikeMirzayanov](#)

[Tutorial](#)

1759A - Yes-Yes?

Note that it is enough to consider the string `full = YesYes...Yes`, where `Yes` is a substring `s` has size $|s| \leq 50$.

Then we just use the built-in function `find` to find out if our string `s` is a substring of `t`

[Solution](#)

```
full = 'Yes' * 18
t = int(input())
for _ in range(t):
    if full.find(input()) >= 0:
        print('YES')
    else:
        print('NO')
```

Fazer o *upsolving*

What is upsolving?

By [_Muhammad](#), [history](#), 5 years ago, 

What is upsolving really means? Is it means solving all problem of that contest that I havn't solved.Or it means solving those problems that I can solve but didn't solved in the contest.

 +3  

 [_Muhammad](#)  5 years ago  5



Comments (3)

Show archived | [Write comment?](#)

5 years ago, # | ☆

← Rev. 2  0 



[OneClickAC](#)

It is basically trying to solve (by yourself or reading the editorial) the easiest or maybe 2 easiest questions which you were not able to solve in the given time limit.

Basically if you were able to solve A and B during the contest, trying C after the contest means that you are "upsolving" C.

→ [Reply](#)

Arquitetura da aplicação



Servidor (back end)

 Kotlin

 spring®

 mongoDB®

{ REST }

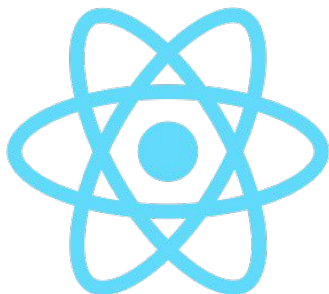
 spring
boot

Cliente (*front end*)

TS TypeScript



React Query



React JS



Create React App

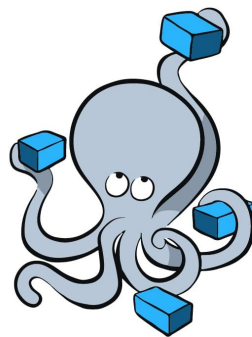
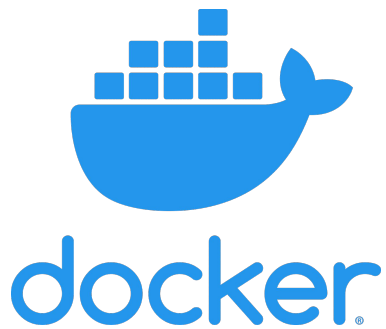


Bootstrap



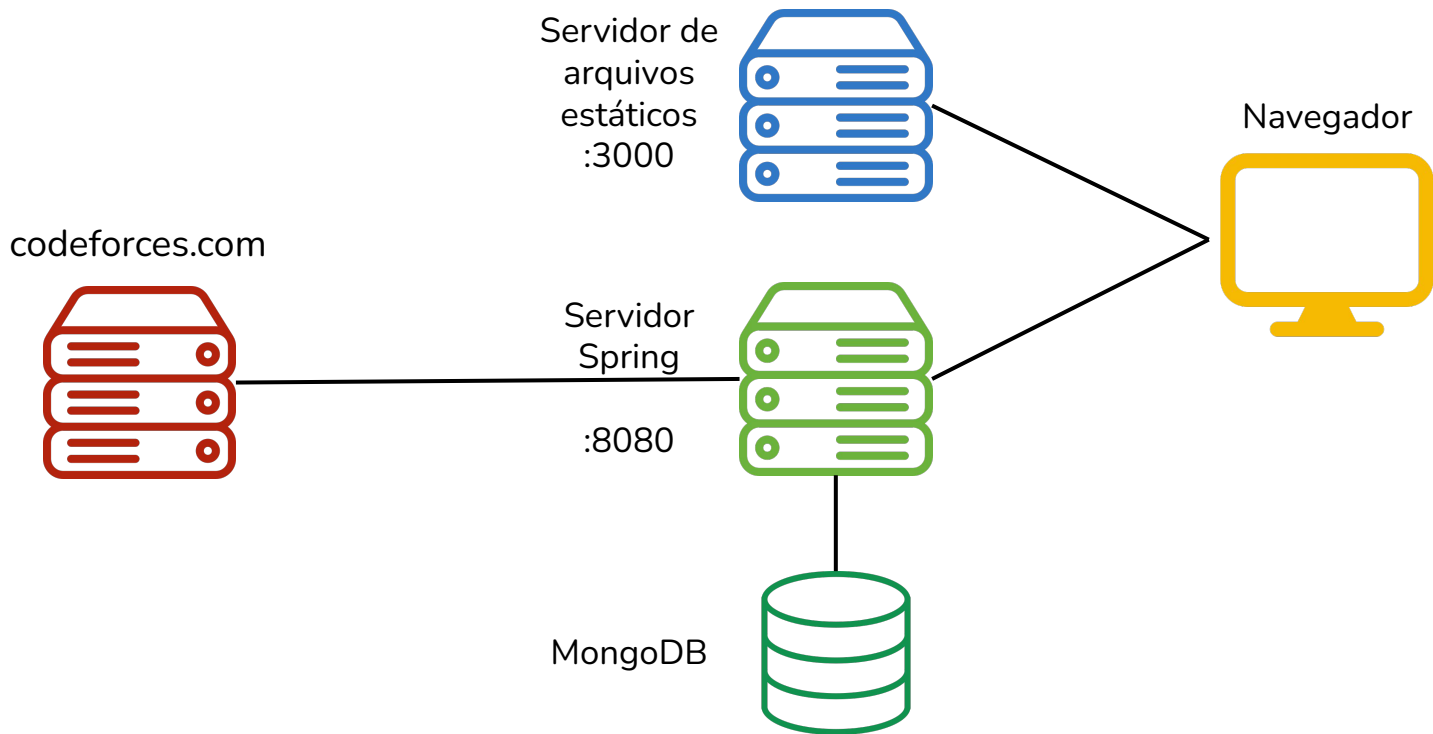
Material-UI

Docker

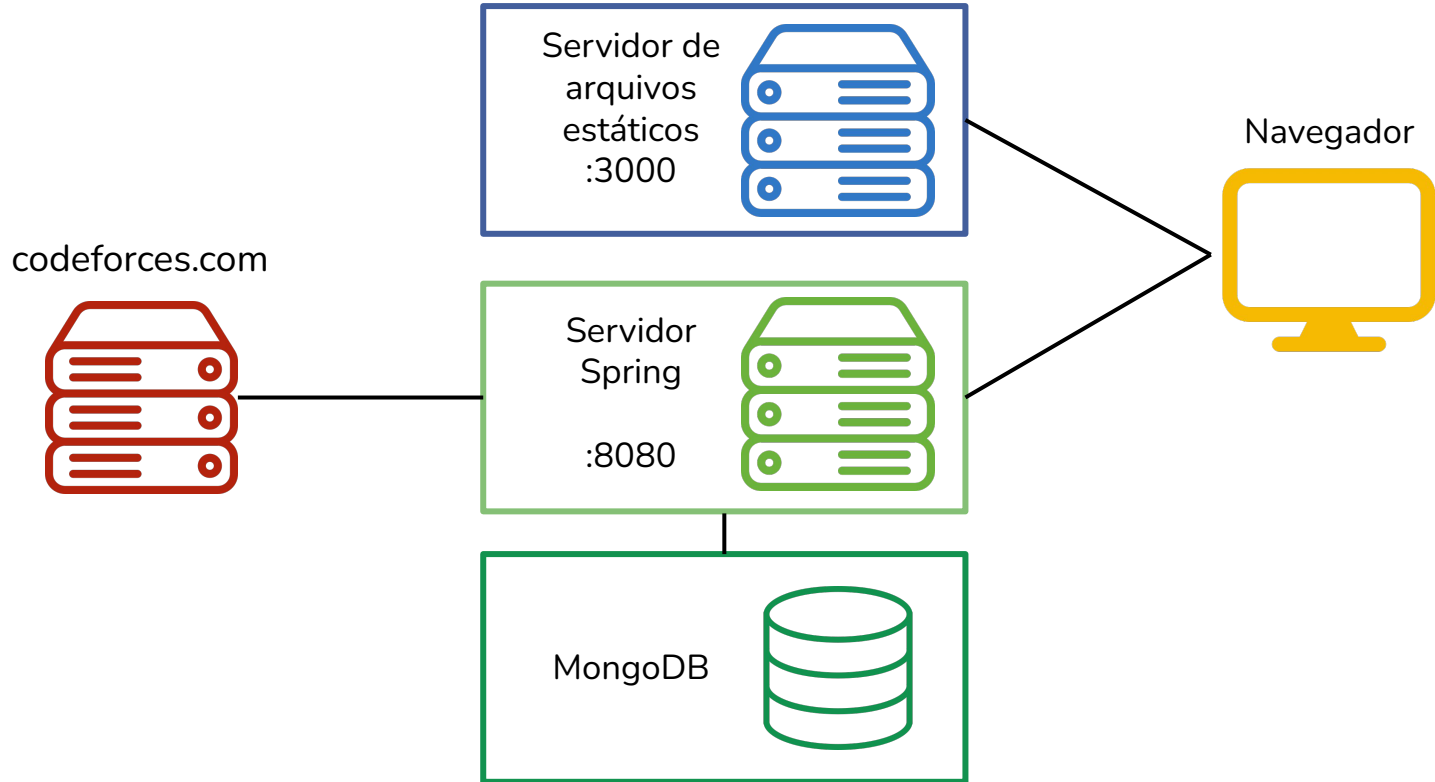


docker
Compose

Arquitetura da aplicação

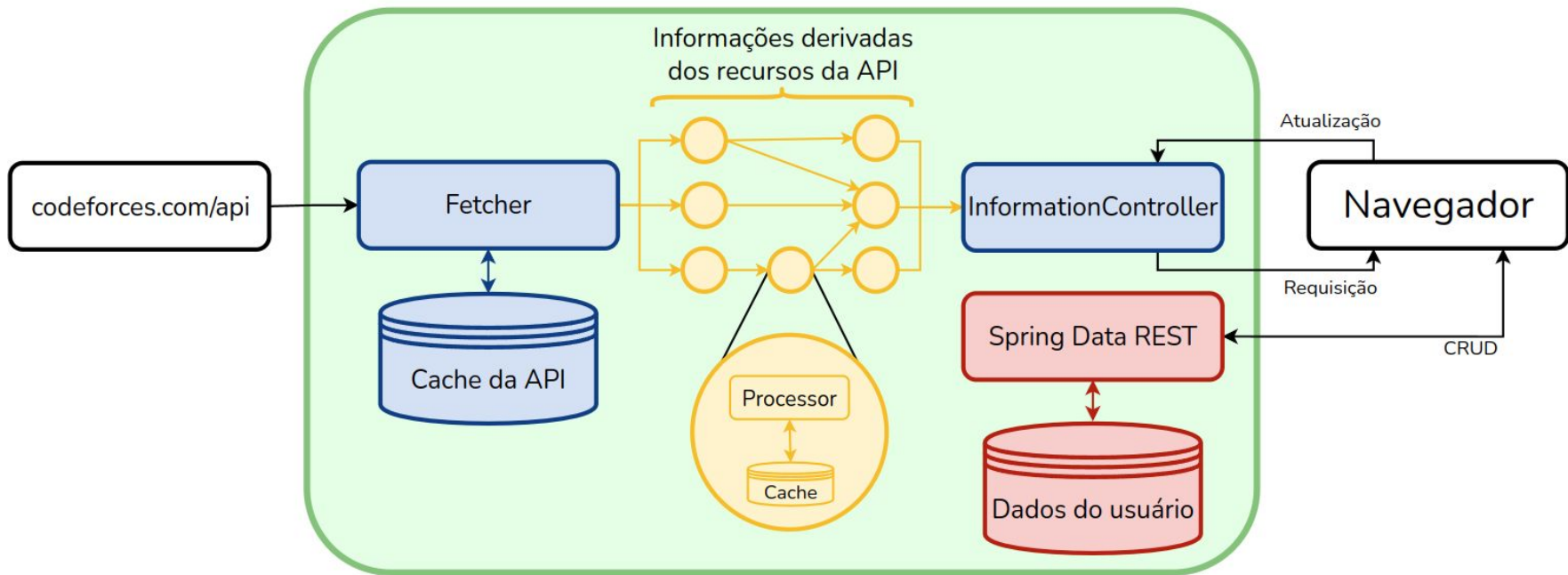


Contêineres do Docker

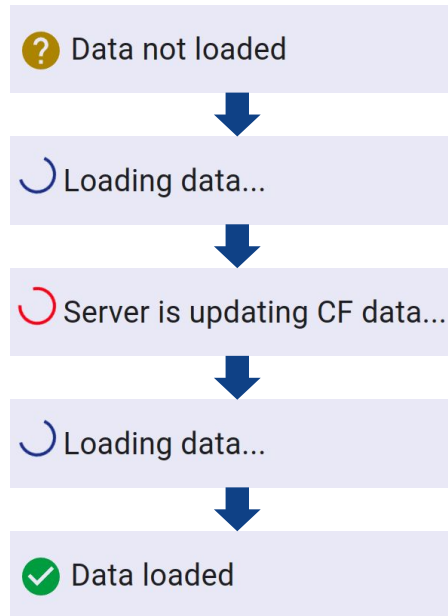


Arquitetura do servidor principal

Servidor Spring



Requisição dos dados pelo cliente



Aplicação desenvolvida



Página inicial

The screenshot shows a web application interface with a dark blue header and a light blue sidebar. The header contains a hamburger menu icon and the text "Home". The sidebar contains a home icon, a "CF" button, a grid icon, a trophy icon, a key icon, a "My" button, a document icon, and another hamburger menu icon. The main content area has a title "Competitive Programming Web App", followed by "Current Codeforces handle: [Carlos_Eduardo_Ferreira](#)" and "Rating: 2200 (max 2200)". Below this is a text input field labeled "CF user name" and two buttons labeled "UNSET" and "SET".

Home

Competitive Programming Web App

Current Codeforces handle: [Carlos_Eduardo_Ferreira](#)

Rating: 2200 (max 2200)

[UNSET](#) [SET](#)

Página de problemas do Codeforces

CF Problems

Problem name: Matrix

Contest status: Clean, Tried, Completed

Problem status: Wrong answer, Accepted

Rating 0 - 4000

has

UPDATE DATA ✔ Data loaded

Code	Rating	Name
1689D	1900	Lena and Matrix
1475F	1900	Unusual Matrix
1422B	1300	Nice Matrix
1332D	1700	Walk on Matrix

Página de competições internas do Codeforces

CF Contests

Contest name

Contest status: Tried

Duration between 1h and 7h

UPDATE DATA ✔ Data loaded

Id	Start time	Duration	Name
1771	11/12/2022, 12:35	2h00	Codeforces Round #837 (Div. 2)
1758	25/11/2022, 12:35	2h00	Codeforces Round #836 (Div. 2)
1753	23/10/2022, 04:50	2h00	Codeforces Round #829 (Div. 1)
1754	23/10/2022, 04:50	2h00	Codeforces Round #829 (Div. 2)
1749	20/10/2022, 11:35	2h00	Educational Codeforces Round 138 (Rated for Div. 2)

Página de competições da Gym do Codeforces

CF Gym

Contest name

Duration between 4h and 5h

Difficulty 2 - 4

has

Contest type
Official ICPC Contest

ICPC region

Country
Brazil

Data loaded

Id	Start time	Duration	Difficulty	Name
103960	No date	5h00	★★★	2022-2023 ICPC Brazil Subregional Programming Contest
103640	No date	5h00	★★★★★	2021-2022 ACM-ICPC Latin American Regional Programming Con...
103388	No date	5h00	★★★★★	2021-2022 ACM-ICPC Brazil Subregional Programming Contest

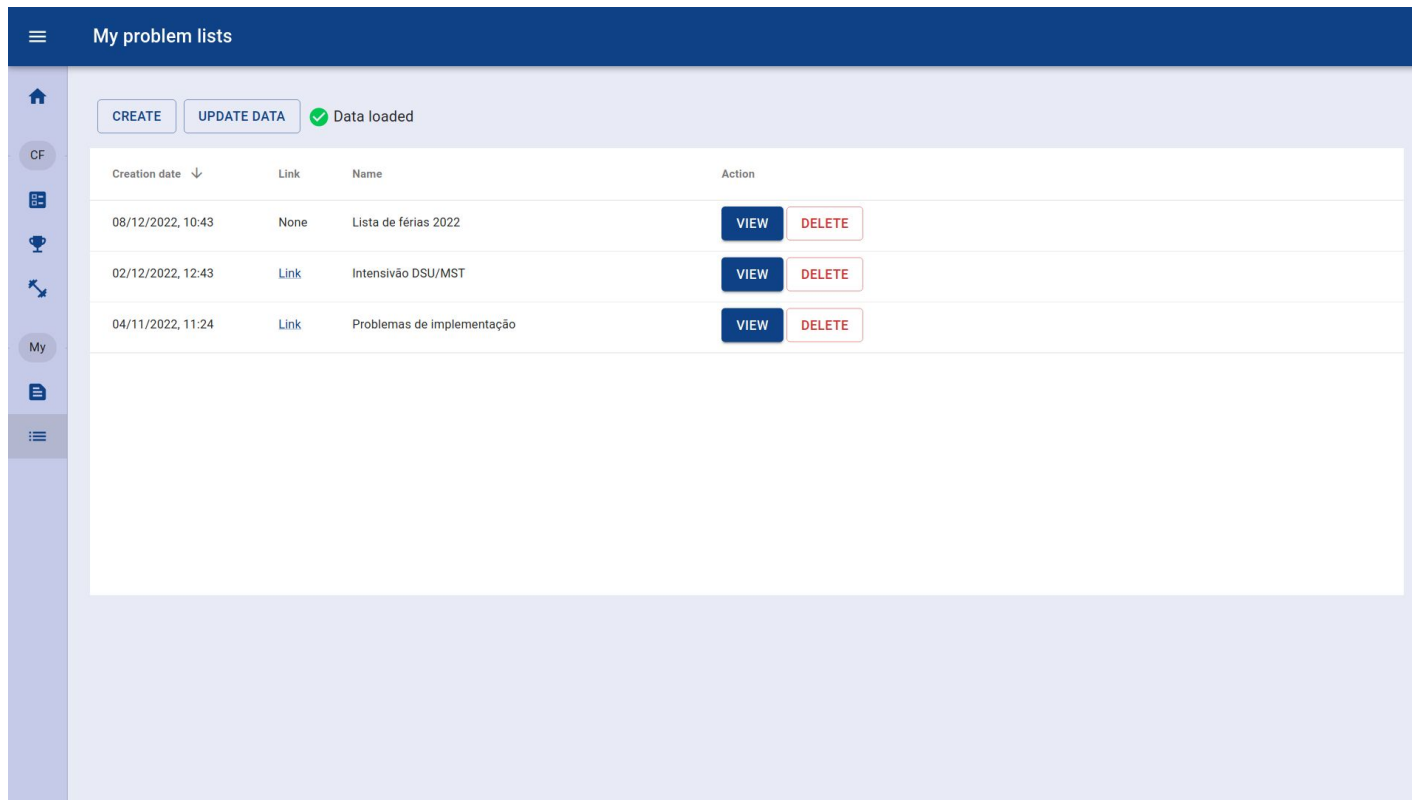
Página de problemas do usuário

My problems

[CREATE](#) [UPDATE DATA](#) ✔ Data loaded

Addition date ↓	Link	Name	Status	Editorial	Comments	Action
06/12/2022, 10:32	Link	Transform the Expression	Accepted	Not read	Problema de implementação que envolve transform...	EDIT DELETE
05/12/2022, 13:13	Link	Helga Hufflepuffs Cup	Read	Not read	Problema de implementação que precisa ser muito ...	EDIT DELETE
04/12/2022, 10:56	Link	Remove Directed Edges	Wrong answer	Read before AC	Problema de grafos. Fiquei um bom tempo pensan...	EDIT DELETE
03/12/2022, 11:21	Link	UN Finals	Accepted	Read after AC	Problema de fluxo com a solução bem direta. Usei ...	EDIT DELETE
02/12/2022, 10:43	Link	AquaMoon and Chess	Accepted	Read after AC	Faltou generalizar o binômio de Newton. Estudar m...	EDIT DELETE

Página de listas de problemas do usuário



The screenshot displays a web interface for managing user problem lists. At the top, a dark blue header contains a hamburger menu icon and the text 'My problem lists'. Below the header, a light blue sidebar on the left features a home icon, a 'CF' label, and several other icons. The main content area has a white background and includes a 'CREATE' button, an 'UPDATE DATA' button, and a green checkmark with the text 'Data loaded'. A table with three columns is shown: 'Creation date' (with a downward arrow), 'Link', and 'Name'. The 'Action' column contains 'VIEW' and 'DELETE' buttons for each row. The table lists three items: 'Lista de férias 2022' (created 08/12/2022, 10:43), 'Intensivão DSU/MST' (created 02/12/2022, 12:43), and 'Problemas de implementação' (created 04/11/2022, 11:24).

Creation date ↓	Link	Name	Action
08/12/2022, 10:43	None	Lista de férias 2022	VIEW DELETE
02/12/2022, 12:43	Link	Intensivão DSU/MST	VIEW DELETE
04/11/2022, 11:24	Link	Problemas de implementação	VIEW DELETE

Página de uma lista de problemas

☰ Problem list

🏠 Lista de férias 2022

Tentar resolver durante as férias

CF

📅 Problems 3/4

ADD PROBLEM CREATE AND ADD EDIT DELETE PROBLEM LIST UPDATE DATA ✔ Data loaded

Addition date ↓	Link	Name	Status	Editorial	Comments	Action
06/12/2022, 10:32	Link	Transform the Expression	Accepted	Not read	Problema de implementação que e...	EDIT REMOVE DELETE
04/12/2022, 10:56	Link	Remove Directed Edges	Wrong answer	Read before AC	Problema de grafos. Fiquei um bo...	EDIT REMOVE DELETE
03/12/2022, 11:21	Link	UN Finals	Accepted	Read after AC	Problema de fluxo com a solução ...	EDIT REMOVE DELETE
02/12/2022, 10:43	Link	AquaMoon and Chess	Accepted	Read after AC	Faltou generalizar o binômio de Ne...	EDIT REMOVE DELETE

Considerações finais



Proposta inicial

- ✓ Histórico de problemas
- ✓ Listas de problemas
- ✓ Problemas do *Codeforces*
- ✓ Competições internas do *Codeforces*
- ✓ Competições da *Gym* do *Codeforces*
- ✗ Recomendação de problemas
- ✗ Funcionalidades de time
- ✗ Estatísticas



Agradecimentos



Carlinhos

João Francisco Daniel

maraton
USP 



Perguntas?



Obrigado!



Referências

- Ícones do *Flaticon* (<https://www.flaticon.com/icons>)
- *Codeforces* (<https://codeforces.com>)
- *API do Codeforces* (<https://codeforces.com/apiHelp>)
- *ICPC* (<https://icpc.global>)
- Maratona SBC de Programação (<http://maratona.sbc.org.br>)