

Pro.io



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Introduction

The project consists of a web based game platform, where users can select one of the multiple games we will eventually propose and play with each other.

The idea came out because we wanted to create an online experience between users so they can interact and have fun!

We developed the game by following the SCRUM methodology.

Starting from the requirements we created the users stories and then, by collecting them, we created different sprints for the main features, as well as introducing Quality of Life improvement.

User Stories

User stories					
ID	Item	Description	Effort (1/5)	Priority (1/5)	Status
1	Website Access	As a user, I want to access the Pro.io website so that I can reach the application.	5	5	Completed
2	Account Registration	As a user, I want to register by creating an account so that I can enter in the application whenever I want.	2	5	Completed
3	Login	As a user, I want to login so that I can access and use the platform.	2	5	Completed
4	Profile Management	As a user, I want to manage my profile so that I can change my username and password.	3	3	Completed
5	Logout	As a user, I want to logout so that I can exit the application.	1	5	Completed
6	Delete Account	As a user, I want to delete my account so that I won't use the application anymore with that.	2	3	Completed
7	Personal Statistics	As a user, I want to check my scores so that I can analyze my games and improve myself.	2	2	Completed
8	See list of games	As a user, I want to see the entire list of games available so that I can choose what game I would play.	2	5	Completed
9	2FA with email	As a system admin, I want verify a user account with 2 factor authentication, so that no intruders can access the platform.	3	1	Completed
10	Play a game	As a user, I want to play a game so that I can have fun on the platform.	5	5	Completed
11	Add another game	As a system admin, I want to add another game so that the users can play different games.	5	4	Completed
12	Add friends	As a user, I want to add friends to my profile so that I can play with them.	2	1	Completed
13	Logger API	As a system admin, I want to check system activity so that I can monitor the entire system activity.	1	1	Completed
14	In game chat	As a user, I want to chat with my opponents during a game so that we can talk together.	3	2	Completed

Sprints

Sprint 1		
User stories ID	Title	Status
1	Website Access	Completed
2	Account Registration	Completed
3	Login	Completed
5	Logout	Completed
8	See list of games	Completed
10	Play a game	Completed

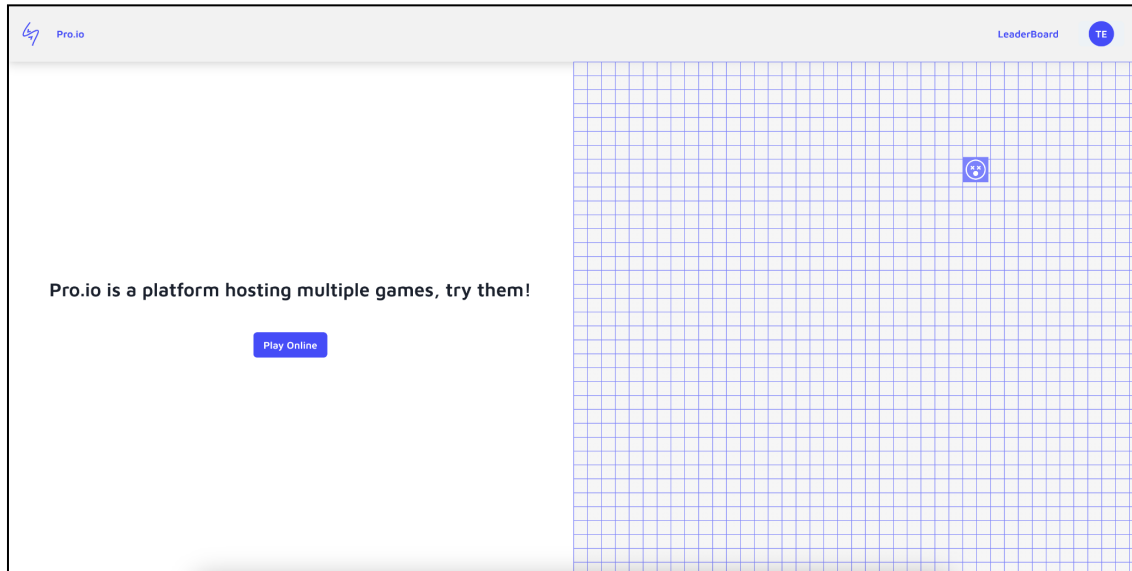
Sprint 2		
User stories ID	Title	Status
1	Website Access	Completed
4	Profile Management	Completed
6	Delete Account	Completed
11	Add another game	Completed

Sprint 3		
User stories ID	Title	Status
1	Website Access	Completed
11	Add another game	Completed
14	In game chat	Completed
7	Personal Statistics	Completed

Sprint 4		
User stories ID	Title	Status
13	Logger API	Completed
9	2FA with email	Completed
12	Add friends	Completed

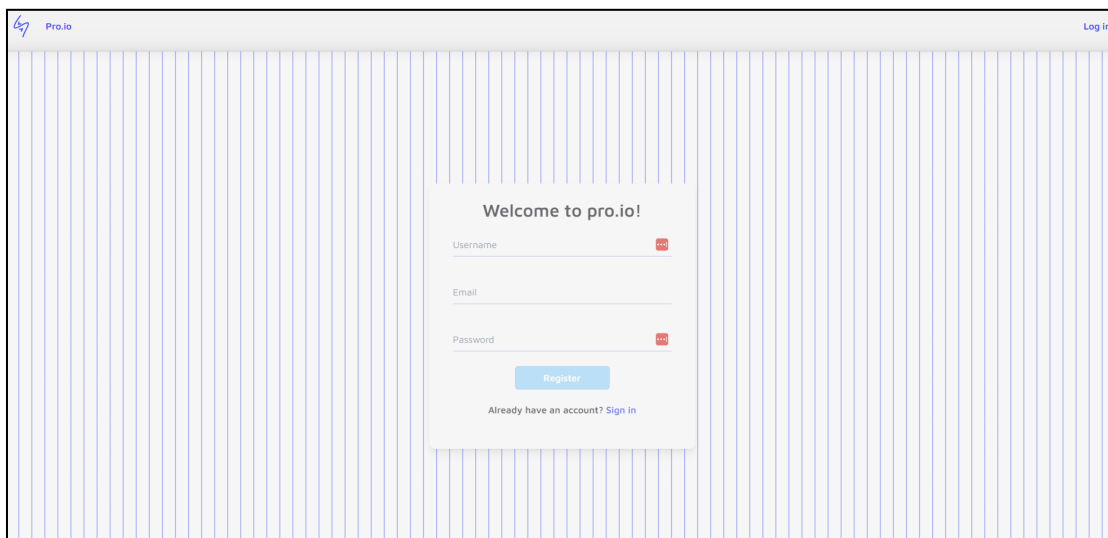
Features

Home Page



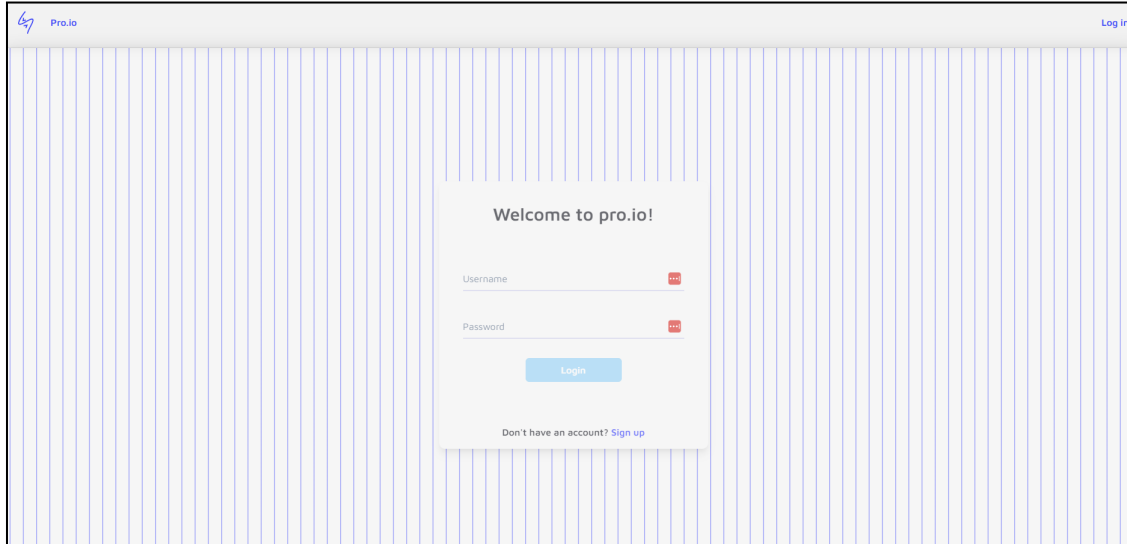
SignUp Page

In this page the user can register himself into the application by sending his username, email and password. Before creating a new user a check is performed to ensure that the username and email entered by the user are not already taken.



Login Page

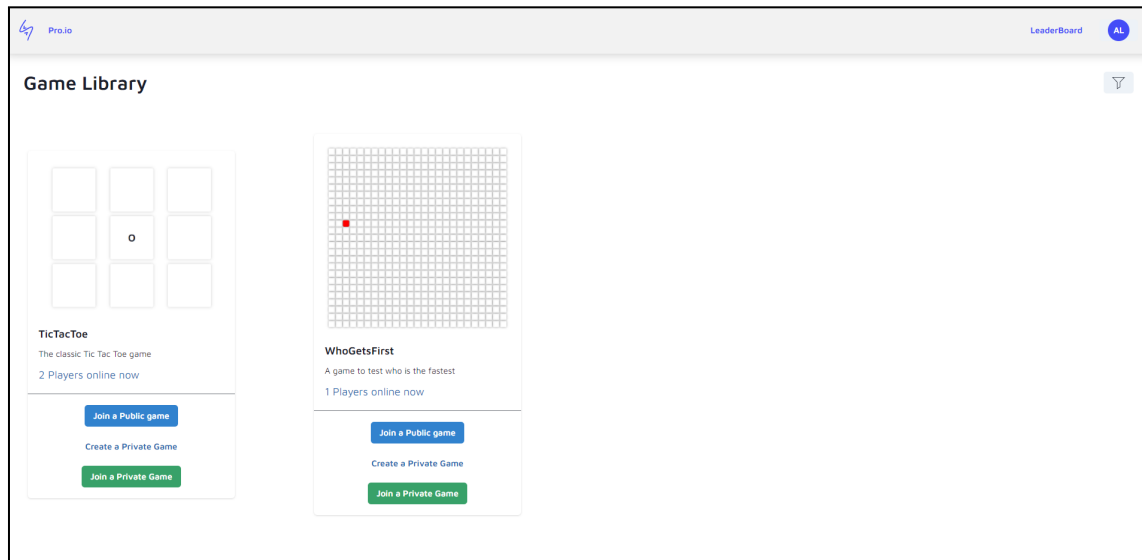
After the signup the user can access the game library and his profile section by logging in using its username and password chosen during the signup phase.



The screenshot shows a web browser window with a light gray header. On the left of the header is the Pro.io logo, and on the right is a "Log in" link. The main content area has a background of thin, vertical blue lines. In the center is a white login card. The card contains the text "Welcome to pro.io!" at the top. Below this are two input fields: "Username" and "Password". Each field has a red eye icon to its right for toggling visibility. A blue "Login" button is positioned below the password field. At the bottom of the card, it says "Don't have an account? [Sign up](#)".

Game Library

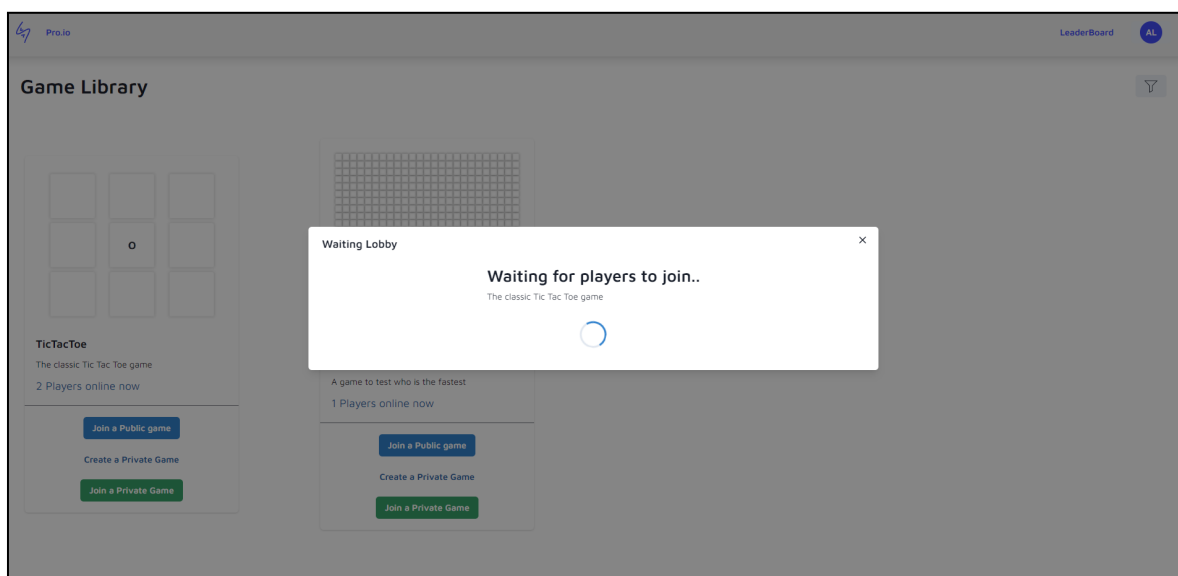
After the login, the user can reach the game library by clicking on the “Play online” button. Here the list of available games is shown to the user, together with an image highlighting the game, a short description and the number of current active players in that game.



Under the description we find three buttons:

- Join a Public Game;
- Create a Private Game;
- Join a Private Game.

By clicking on the first one the user can join a public match against a random user; if no matches available at the moment, the user will be placed in a queue, waiting for another user to join:



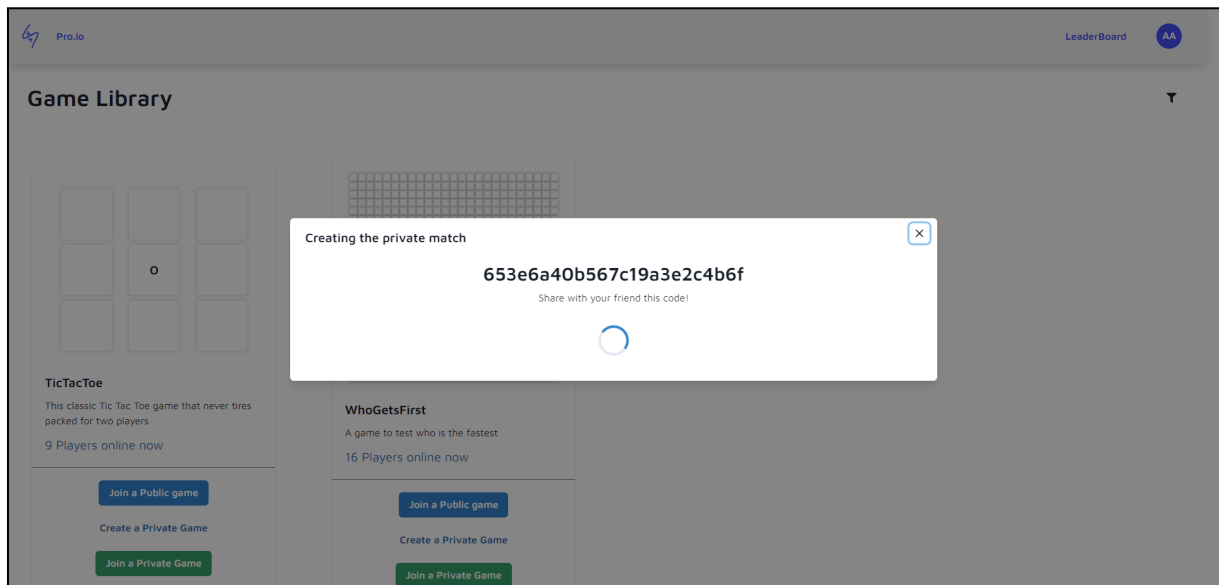
The second and third buttons allow the user to create and join public matches, respectively.

When creating a private match a unique code will be generated and shown on the screen.

Then this code can be shared and utilized by another user.

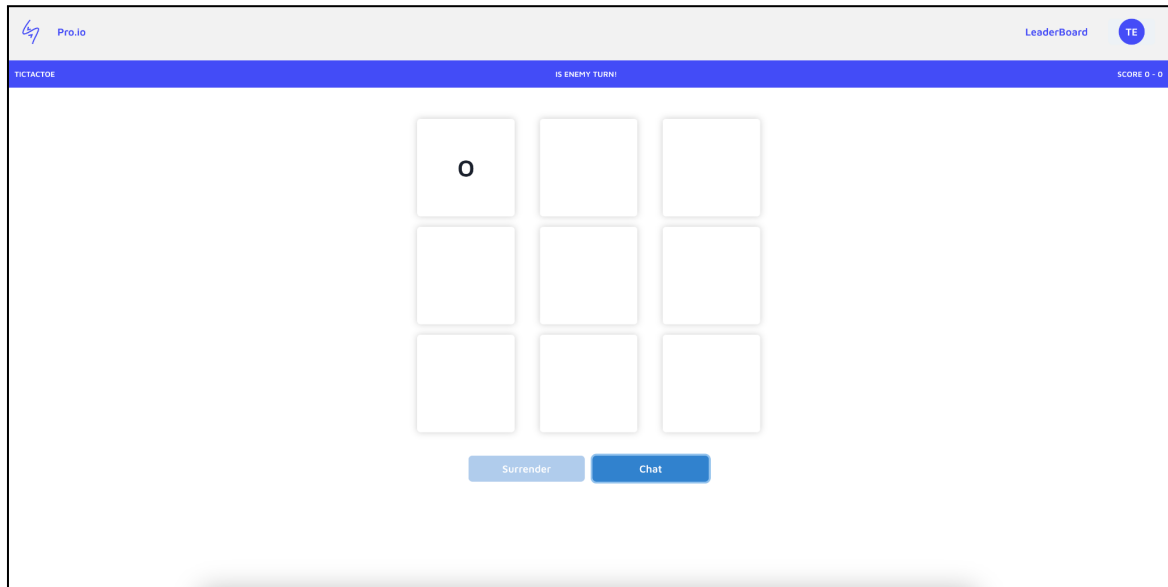
The “join private game” button opens a small modal which allows the user to insert a match code that was shared to them.

As soon as the second user inserts the code the match automatically starts.



Game Pages

The match starts as soon as all of the users have joined the match, and redirects them to the page corresponding to the game that they had chosen.



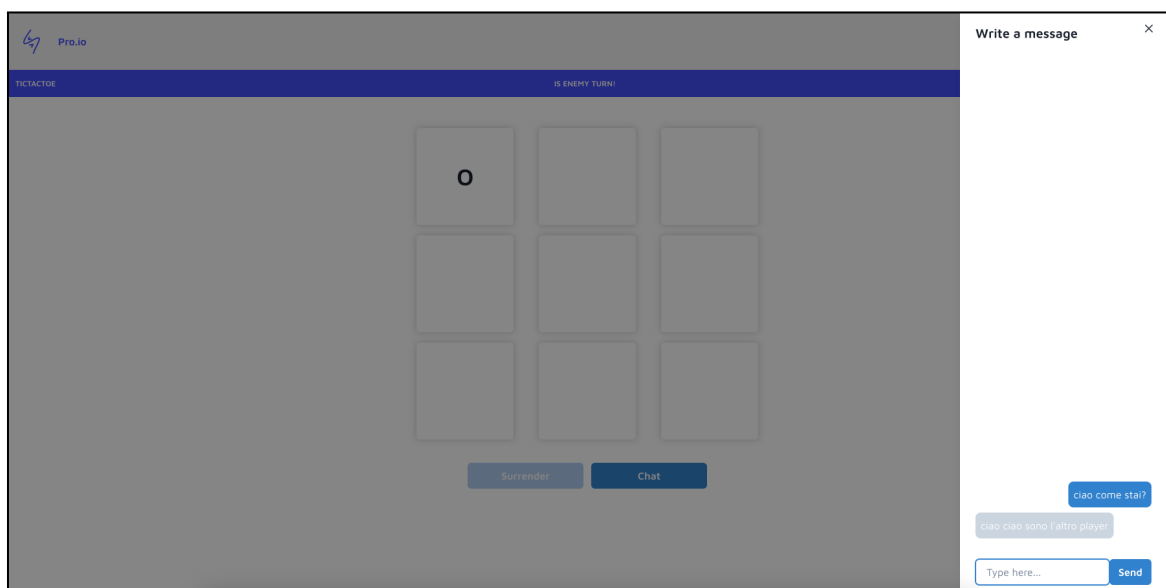
At the top of the page we find the name of the game, whether it is yours or your opponent's turn, and the current score.

At the bottom of the page we find two buttons:

- Surrender;
- Chat.

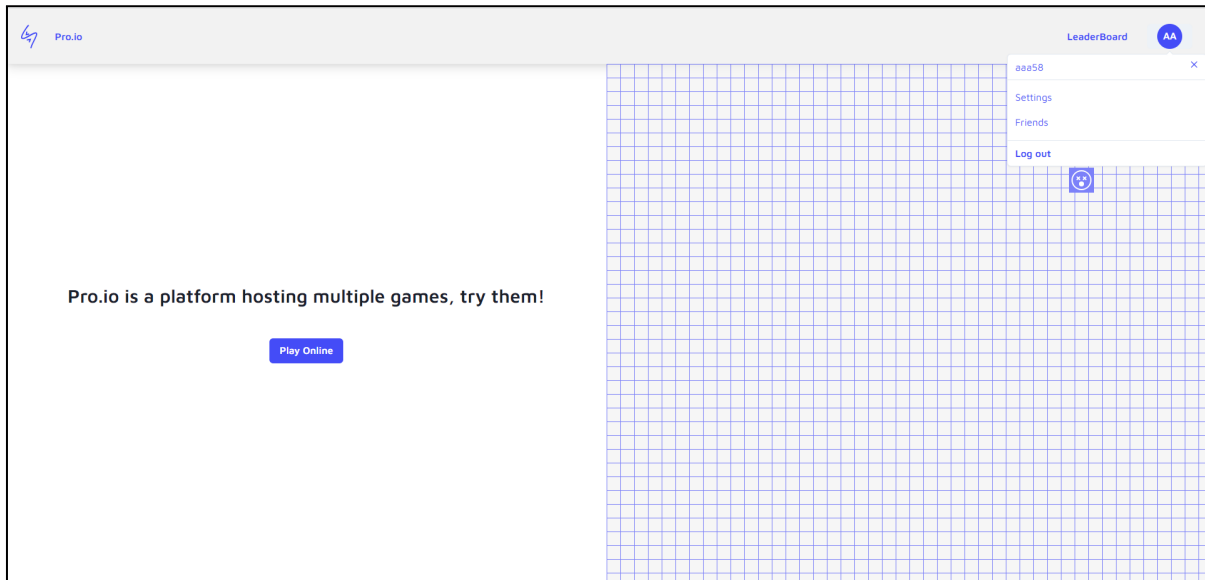
The first one can be clicked only during the user's turn and allow them to quit the game, giving the victory to the opponent.

The second button opens the chat where users can message each other.



Profile and Friends Pages

By clicking on the circle on the top right corner of the page the user can access its settings, its friends list or can logout of the application.



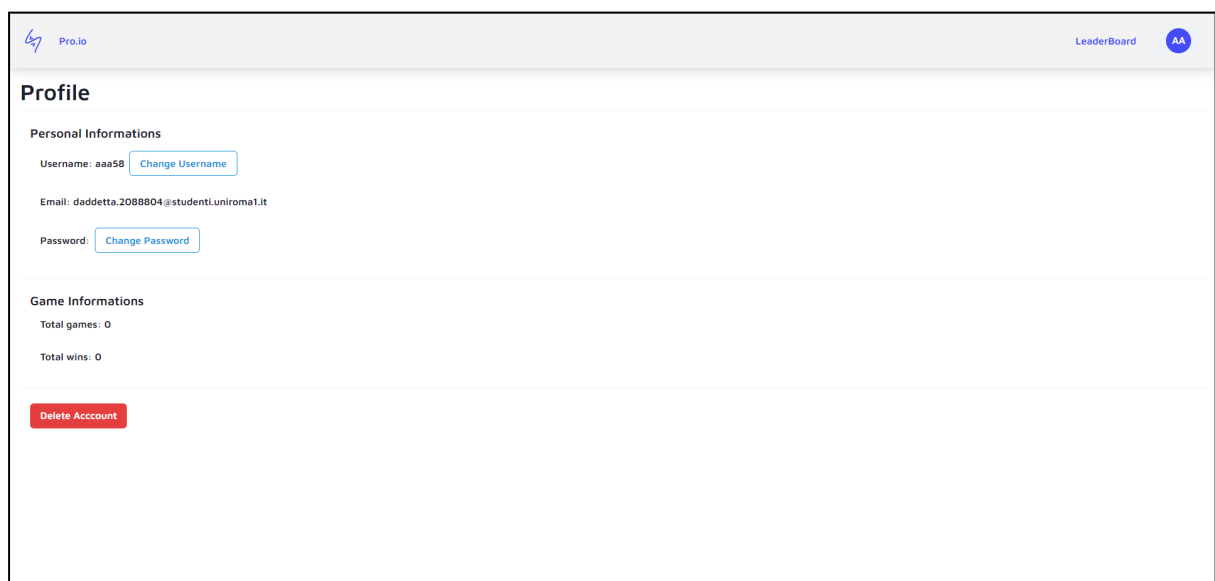
Profile Page

Clicking on the Settings button the user can reach its profile page that contains personal and game information.

In the personal section the user can see its current username and email; as well as being able to change its username and password.

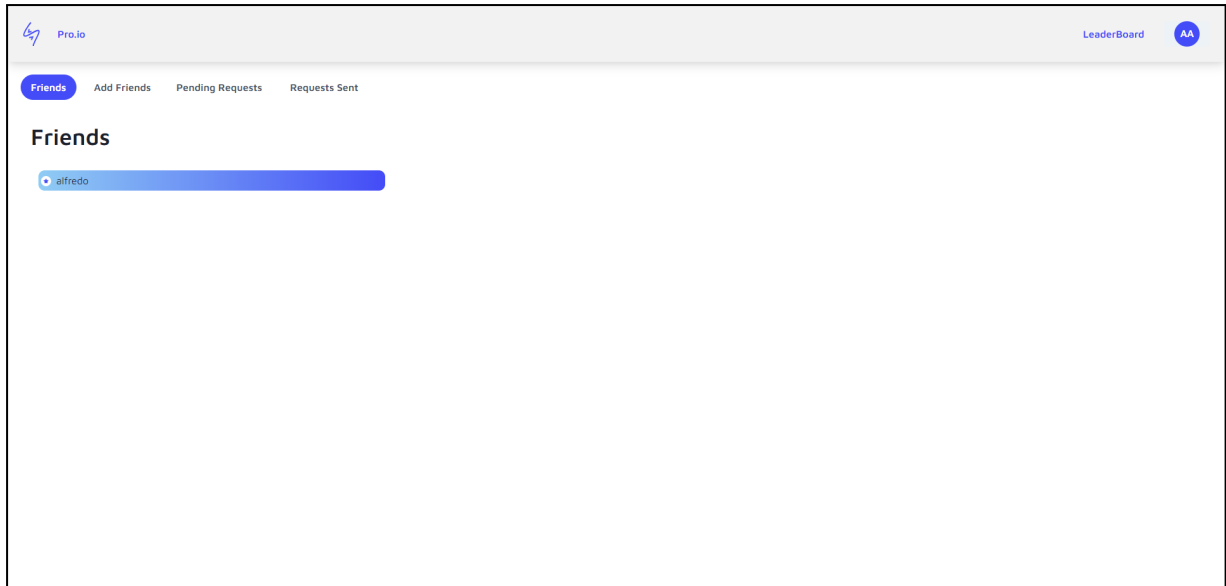
In the game section the user can view how many games they have played and also how many of them they have won.

Finally at the bottom there is a button that allows the user to delete their account.

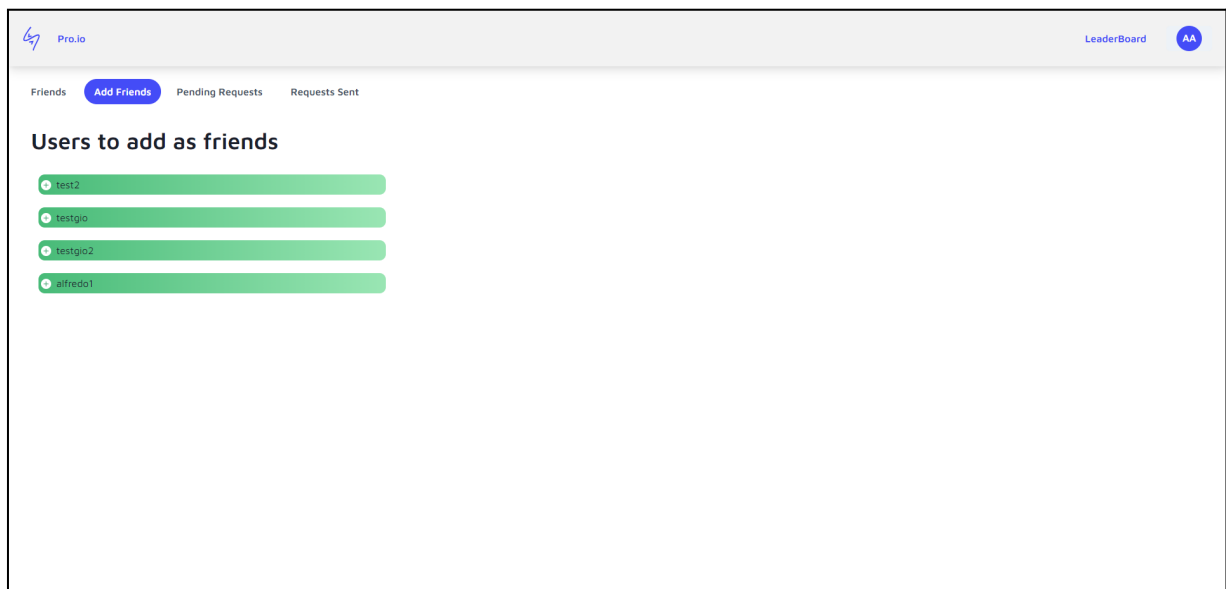



Friends Page


By clicking on the Friends button the user can view a page containing their friends list.



Here they can also find other sections used to send friend requests, review the ones sent to other players, as well as accept/reject incoming ones.




 Pro.io


LeaderBoard

FriendsAdd FriendsPending RequestsRequests Sent

Pending requests

 test4

 Pro.io

LeaderBoard

FriendsAdd FriendsPending RequestsRequests Sent

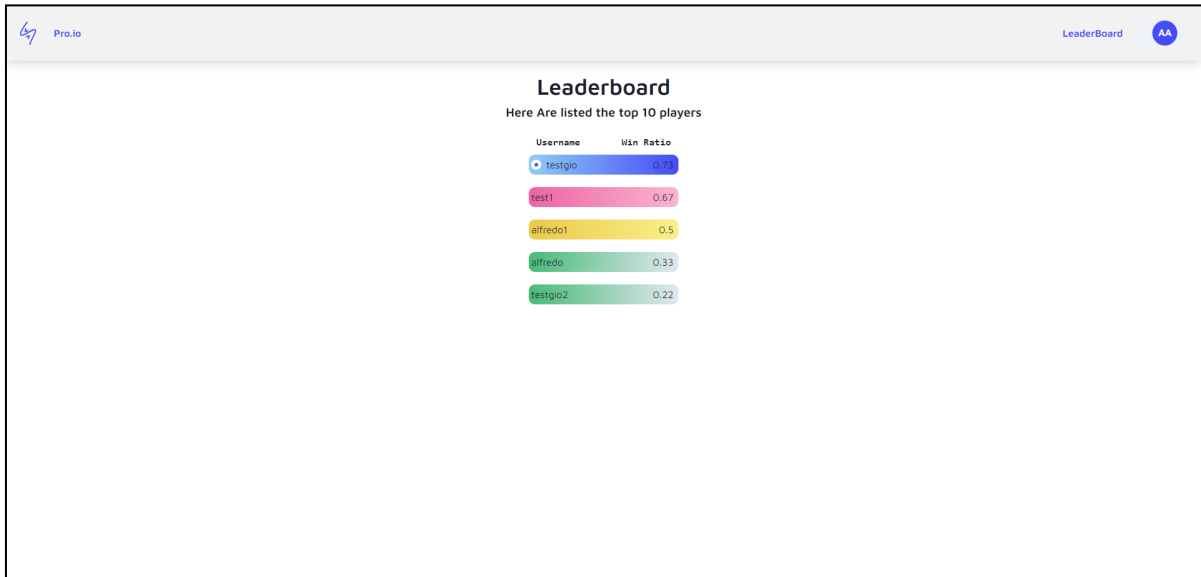
Requests sent

 test1

Leaderboard Page

The user can access the current global leaderboard composed of the top 10 players on the platform ranked on their win ratio.

This section can be accessed by clicking on the “Leaderboard” button in the nav bar, next to the profile button.



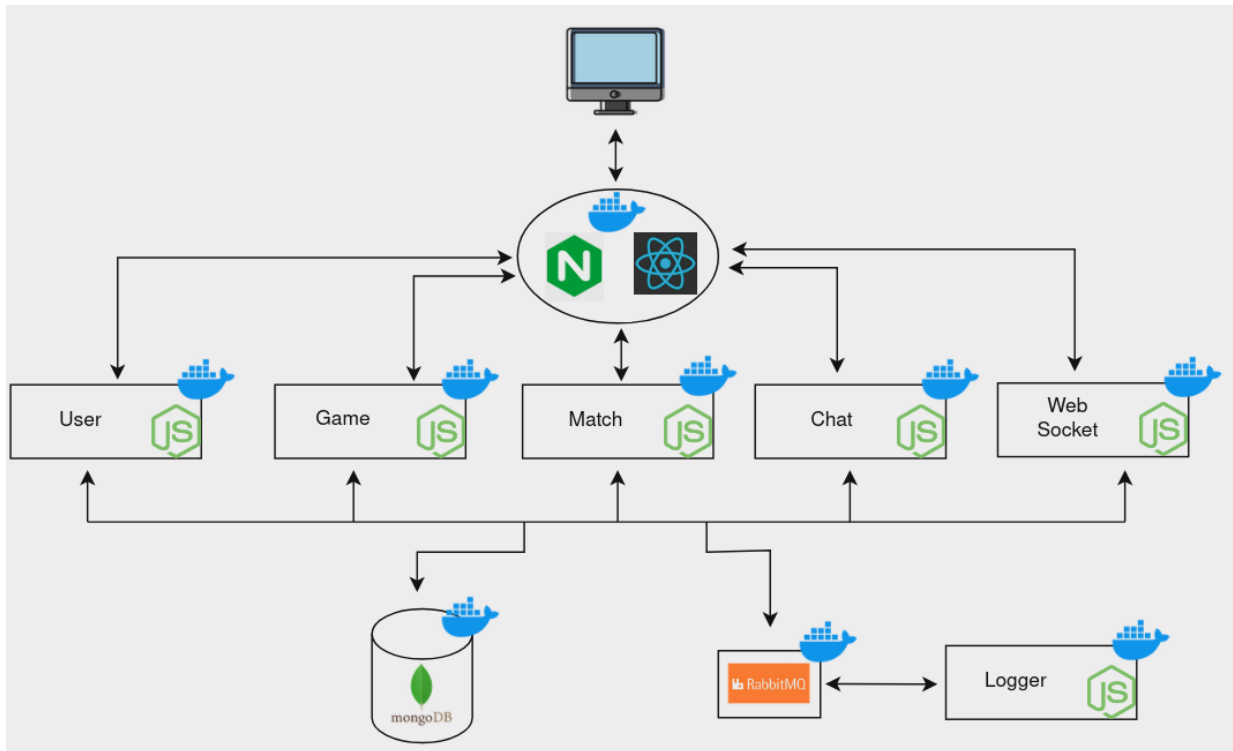
Username	Win Ratio
testgio	0.73
test1	0.67
alfredo1	0.5
alfredo	0.33
testgio2	0.22

Function Points

Adjusted FP **100,58**

								Unadjusted FP		94
No.	Module	Function Name	Description	Type	DET	RET / FTR	Complexity	FP	Adjust %	FP adjusted
1	User			ILF	7	1	Low	7		7
2	Match			ILF	4	1	Low	7		7
3	Play			ILF	2	1	Low	7		7
4	Game			EIF	1	1	Low	5		5
5	User		Create User	EI	10	1	Low	3		3
6	User		Update Username	EI	1	1	Low	3		3
7	User		Update Password	EI	1	1	Low	3		3
8	User		Send Friend Request	EI	2	1	Low	3		3
9	User		Accept Request	EI	3	1	Low	3		3
10	User		Delete	EI	1	2	Low	3		3
11	Match		Create Match	EI	5	1	Low	3		3
12	Match		Update Match	EI	5	1	Low	3		3
13	Match		Delete Match	EI	1	2	Low	3		3
14	Play		Create Play	EI	4	3	Average	4		4
15	Play		Update Play	EI	4	3	Average	4		4
16	Play		Delete Play	EI	1	1	Low	3		3
17	User		Login	EQ	2	1	Low	3		3
18	Game		Get Game List	EQ	1	2	Low	3		3
19	Game/match		Game data when playing	EQ	2	3	Low	3		3
20	Chat		Chat With Player	EQ	1	1	Low	3		3
21	User		Get Friends	EQ	1	1	Low	3		3
22	User		Add Friend	EQ	1	1	Low	3		3
23	User		Get Pending Friend Request	EQ	1	1	Low	3		3
24	User		Get Sent Friend Requests	EQ	1	1	Low	3		3
25	User		Get User Settings	EQ	2	1	Low	3		3
26	Game		Get Game Informations	EQ	2	2	Low	3		3

Architecture



Backend

The backend of the application is composed of multiple microservices each with their own function. We used the following technologies:

- NodeJS was employed as the runtime for all of the “logic” services
- Mongo DB was used as the persistence layer of the application
- Rabbit MQ handles asynchronous messaging such as log aggregation
- NGINX serves as a web server for the frontend, as well as a reverse proxy for the backend

Frontend

Pro.io is a single page web application created by combining React with other different libraries such as:

- Chakra Ui
- Vite
- Redux Toolkit

Infrastructure

Finally, to create a scalable and distributable system we used:

- Docker to build the single services within containers.
- Docker Compose to orchestrate the different services, creating a virtual network between them.