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MILANO 1863

SCUOLA DI INGEGNERIA INDUSTRIALE
E DELL'INFORMAZIONE

# Software Engineering 2
# Design Document

Author(s): **Filippo Balzarini - 10719101**
**Christian Biffi - 10787158**
**Michele Cavicchioli - 10706553**

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# 1 | Introduction

## 1.1. Purpose

This document contains the design description of the *CodeKataBattle* system. It includes the architectural design, the user interface design and the descrpition of all the operations that the system will perform. It also show how the requirements and use cases detailed in the RASD document are satisfied by the design of the system.

This document is intended to be read by the developers of the system, the testers and the project managers. It is also intended to be used as a reference for the future maintenance of the system.

## 1.2. Scope

The *CodeKataBattle* system is a web application that allows educators to create challenges for their students based on solving programming problems. In particular the system is based on the concept of *Code Kata* that is an exercise in programming which helps a programmer hone their skills through practice and repetition. The system will allow the educators to create competition and battle based on *Code Kata*. The students will be able to participate in the battles with a team or by themselves and solve the challenges in order to earn points. The system will also provide a leader board that will show the ranking of the students based on their scores.

A more detailed description of the system can be found in the RASD document, whilist in this document is provided a detailed description of the design of the system to implement the requirements and use cases described in the RASD document.

## 1.3. Definitions, Acronyms, Abbreviations

### 1.3.1. Definitions

| | |
|---|---|
| User | Anyone interacting with the system, it can be both a Student or an Educator |
| Manage | Create, supervise and edit a certain element of the application. |
| Code Kata | A challenge intended to improve programming abilities, including description, test cases and build automation scripts. |

Table 1.1: List of definitions

### 1.3.2. Acronyms

| | |
|---|---|
| ST | Student |
| ED | Educator |
| CKB | CodaKataBattle |
| RASD | Requirements Analysis and Specification Document |
| SAT | Static Analyzer Tool |
| T | Team |

Table 1.2: List of Acronyms

## 1.4. Revision history

## 1.5. Reference Documents

## 1.6. Document Structure

# 2 Architectural design

2.1. Overview: High-level components and their interaction

2.2. Component view

2.3. Deployment view

2.4. Runtime view

2.5. Component interfaces

2.6. Selected architectural styles and patterns

2.7. Other design decisions

# 3 | User interface design

In this section we will describe the user interface design of the system. We will provide a mockup of the main pages of the system and a description of the main functionalities of the system.

The user interface of the system is designed to be simple and intuitive. As the system is intended to be used with a desktop browser, the interfaces presented here are based on a desktop browser, but the interface is thought to be responsive and consequently usable also on mobile devices.

## Common Interfaces

Some pages of the platform are common, or very similar, for both ST and ED, so in this section we will show only once the mockup of the pages and we will describe the functionalities of the pages for both ST and ED.

## Login Page

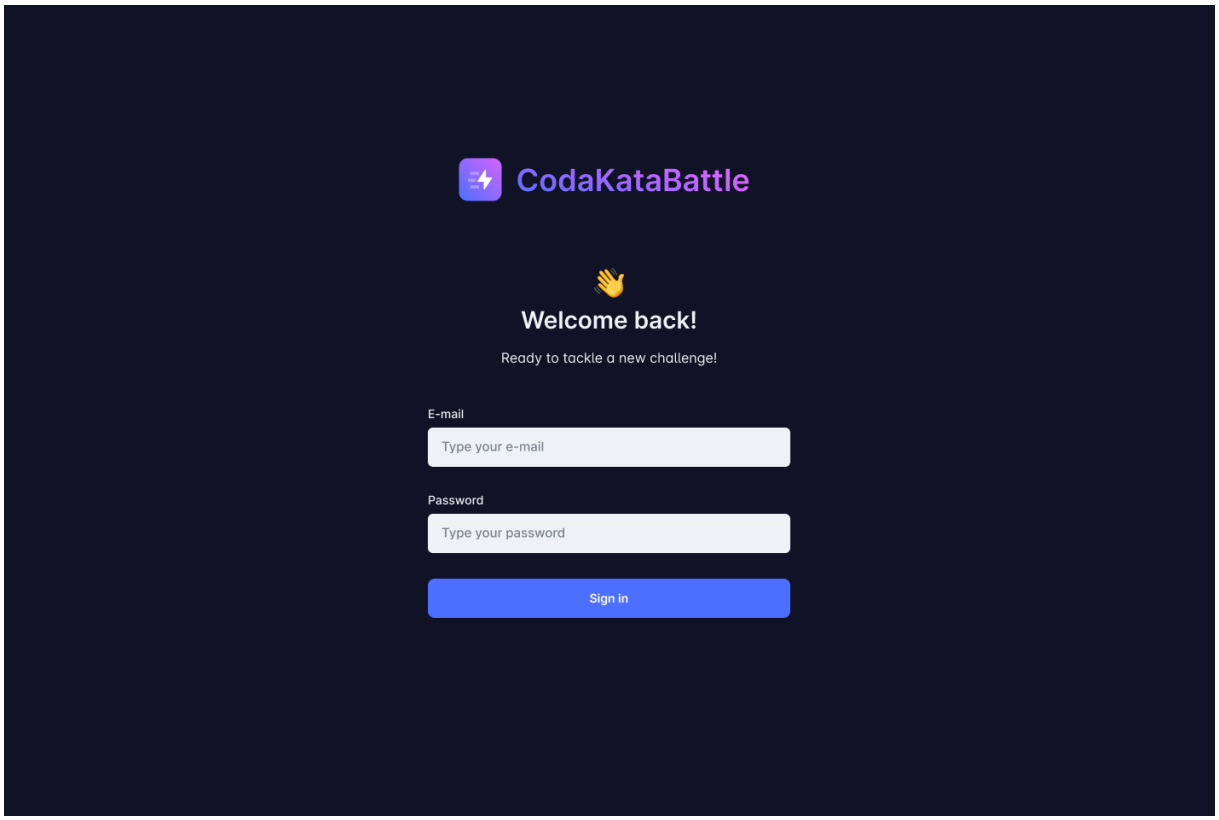


Figure 3.1: CKB login page

## Registration Page

Here for simplicity we show only the registration page for a ST, but the registration page for a ED is equal to this one with the only difference that the ED is required to insert also information about the institution he/she works for.

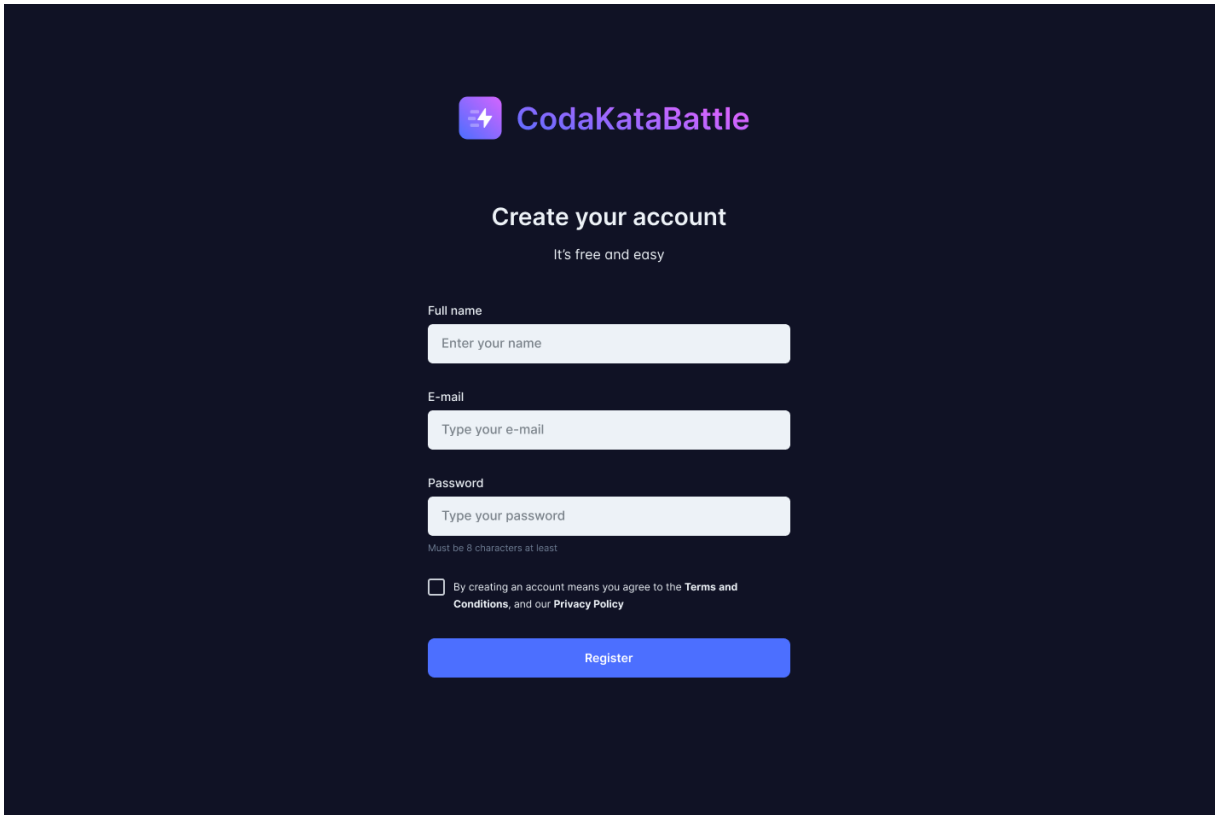


Figure 3.2: CKB registration page

## Home Page

This is a mockup of the homepage of a ST. ED would see a very similar home page with statistics about the competition and battle created.

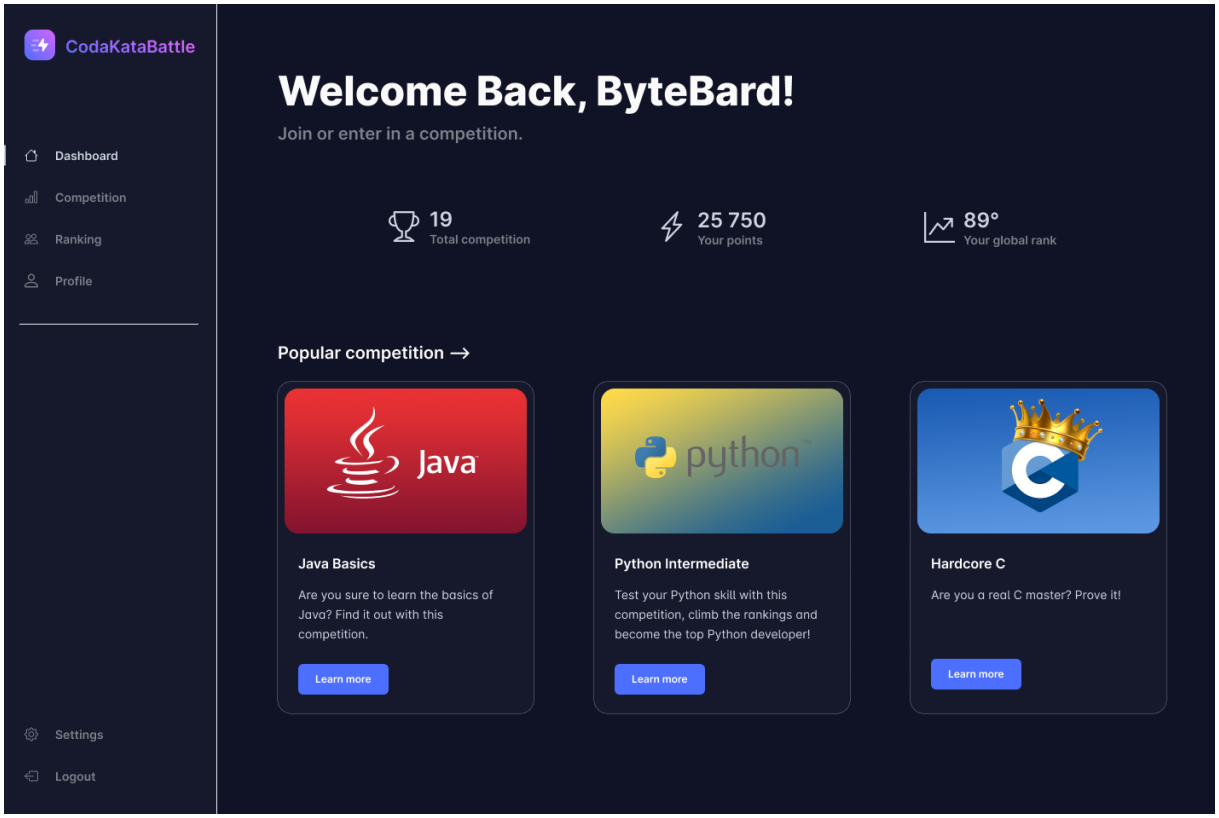


Figure 3.3: CKB student home page

## Competition Page

In this page the ST can see the list of all the competitions he/her is currently enrolled in. The ED can see the list of all the competitions he/her has created.

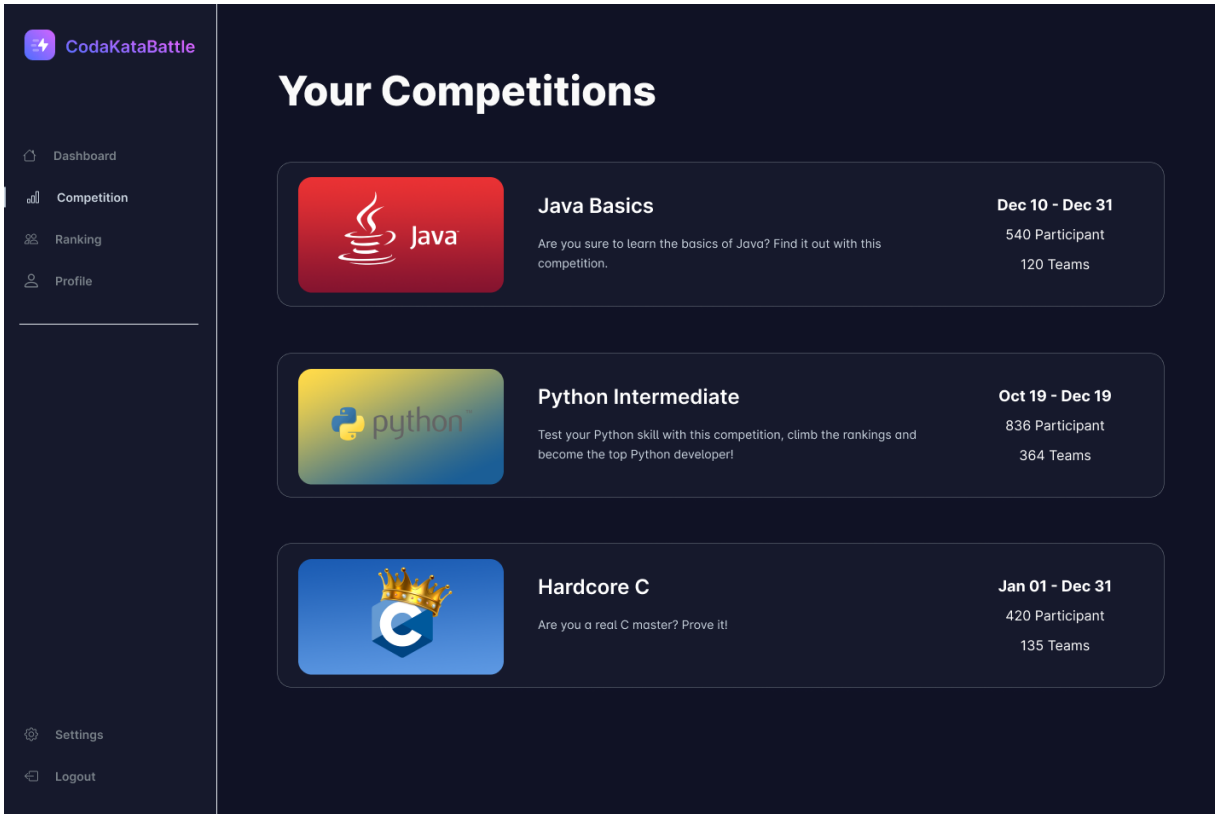


Figure 3.4: CKB competition page

## Ranking Page

This is a the mockup of all the rankings present in the system. In particular, this is equal for the global ranking, competition raning and battle ranking pages. Both the ST and the ED are presented with the same interface and functionalities when consulting the ranking pages.

Figure 3.5: CKB global ranking page

## ST Profile Page

Also this page is equal for both ST and ED. In particular in this page it is possible to see all the badges earned by the ST, other than the information about the competition he/her has partecipated in and their statistics.

Figure 3.6: CKB ST profile page

## ST Interfaces

Now are presented the interfaces that are specific for the ST, in particular are shown the pages relative to the join of a battle by the ST.

### Join Battle Pages

To create a more pleasant experience for the ST, the join battle pages are divided in different steps. In particular, the first step is to choose to join with a T or as a single ST. In the second step, if the ST has decided to join as a T he/her has to choose if he/her wants to create a new T or join an existing one. In case the ST has decided to create a new T is presented with the relative page, otherwise he/her is presented with the page to join an existing public T.

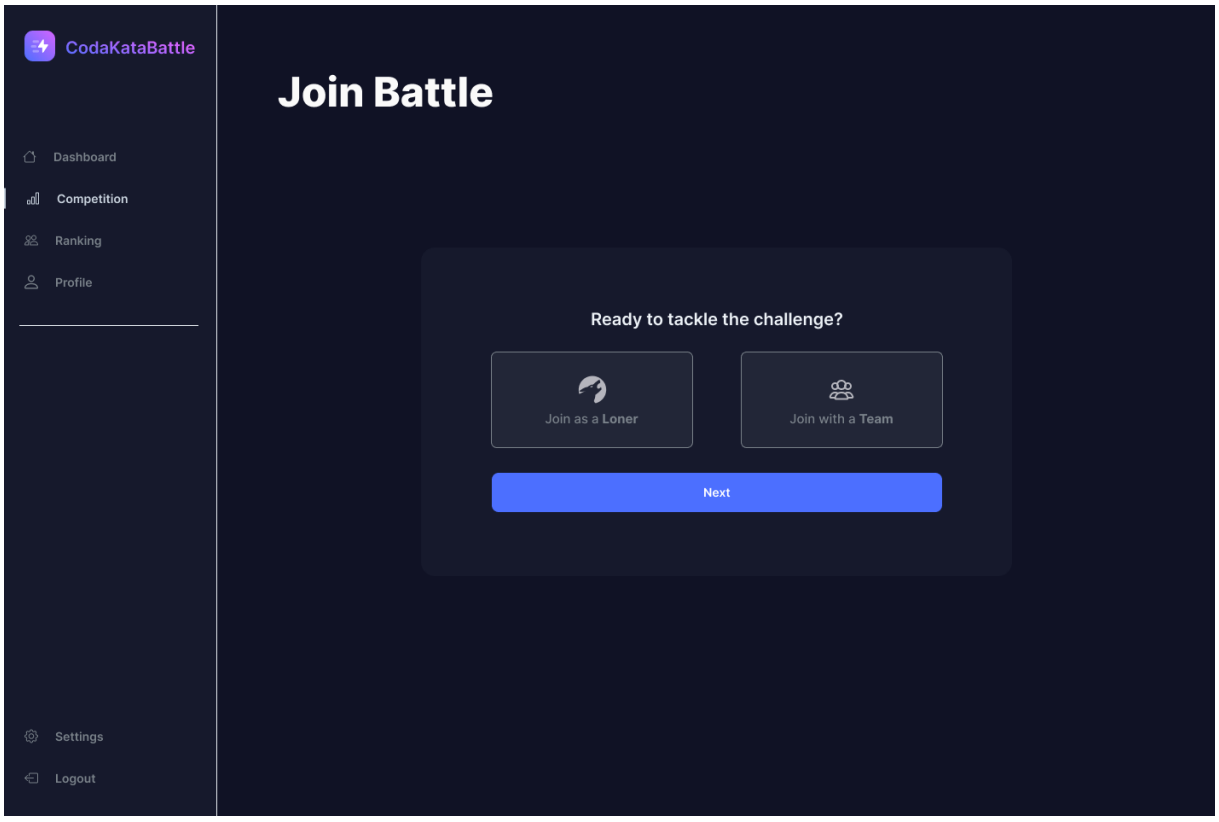


Figure 3.7: Join battle page - step 1

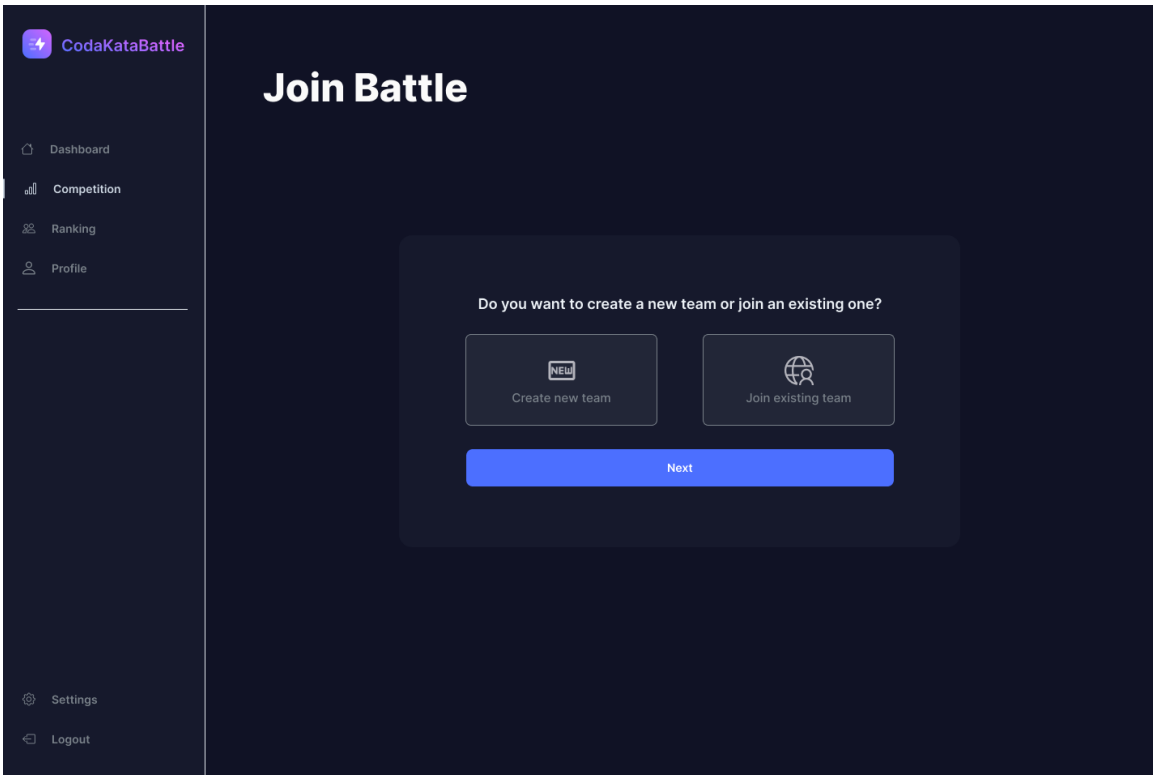


Figure 3.8: Join battle page - step 2

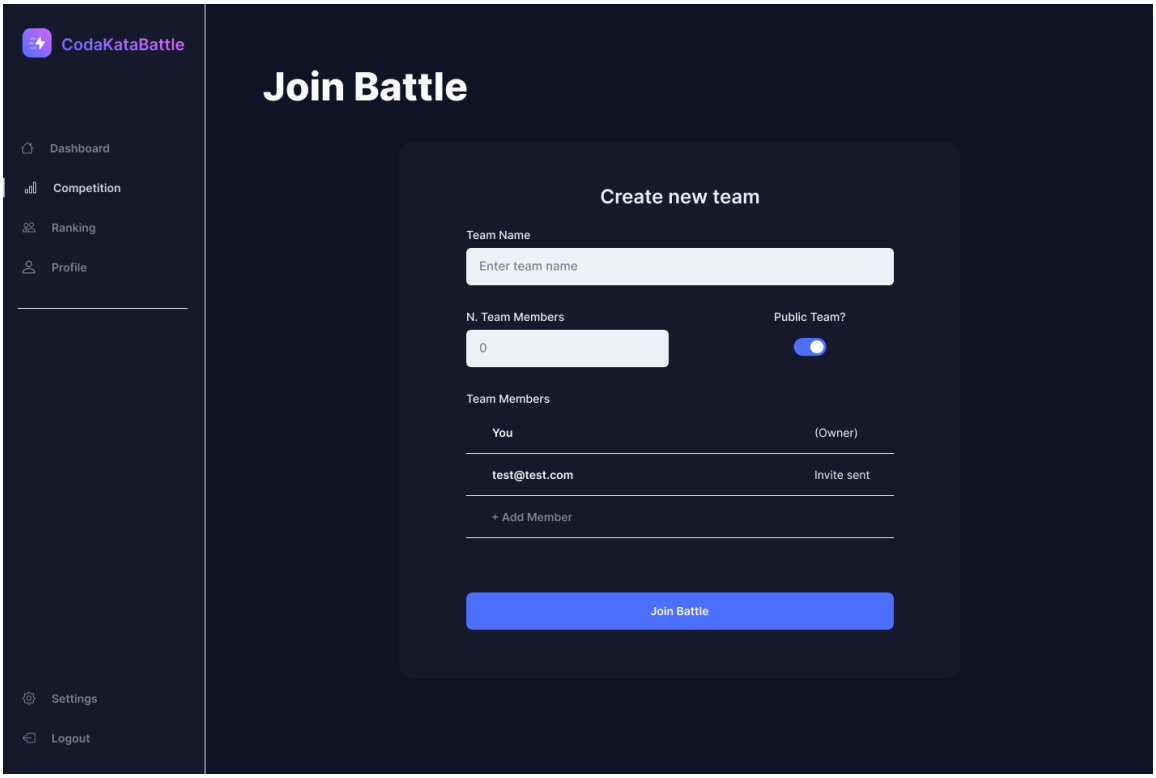


Figure 3.9: Create a new team

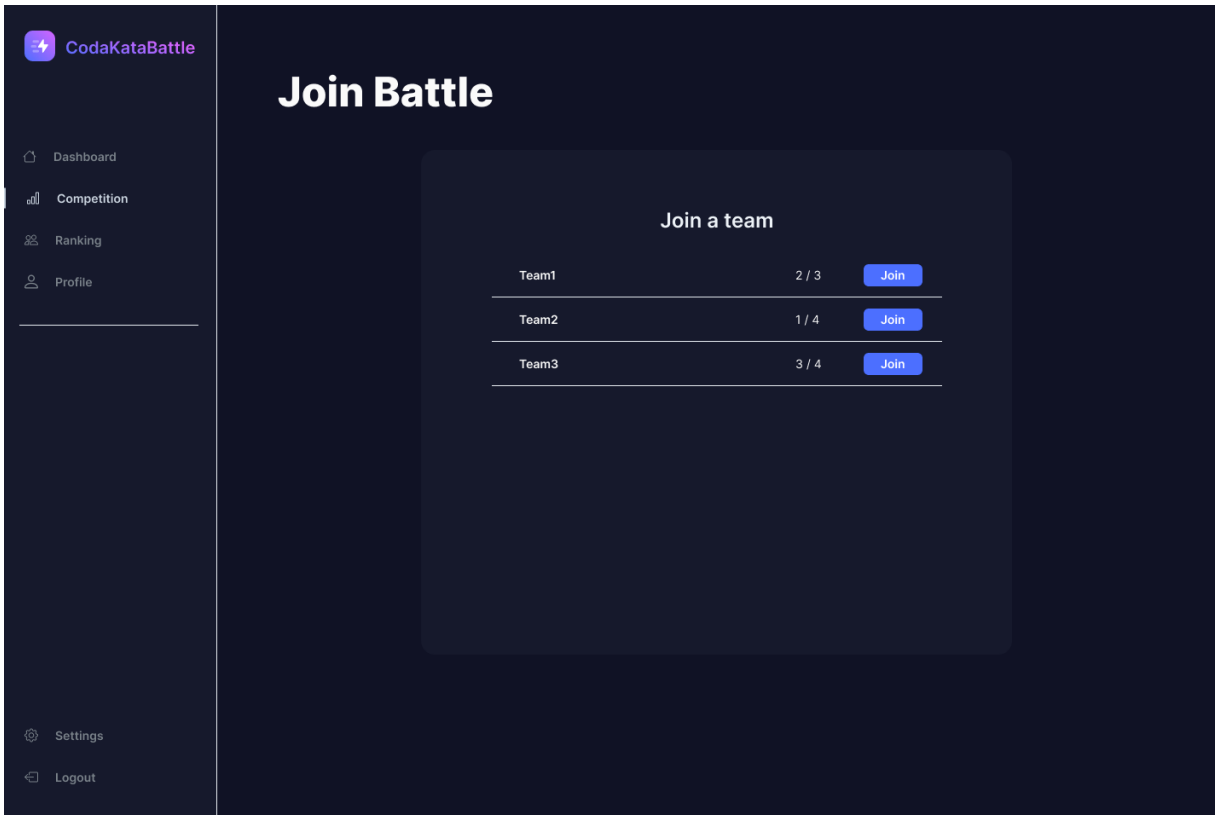


Figure 3.10: Join a public team

## ED Interfaces

In this section are presented the interfaces that are specific for the ED, in particular are shown the pages relative to the creation of a competition, the creation of a battle and the creation of a badge.

### Create Competition Page

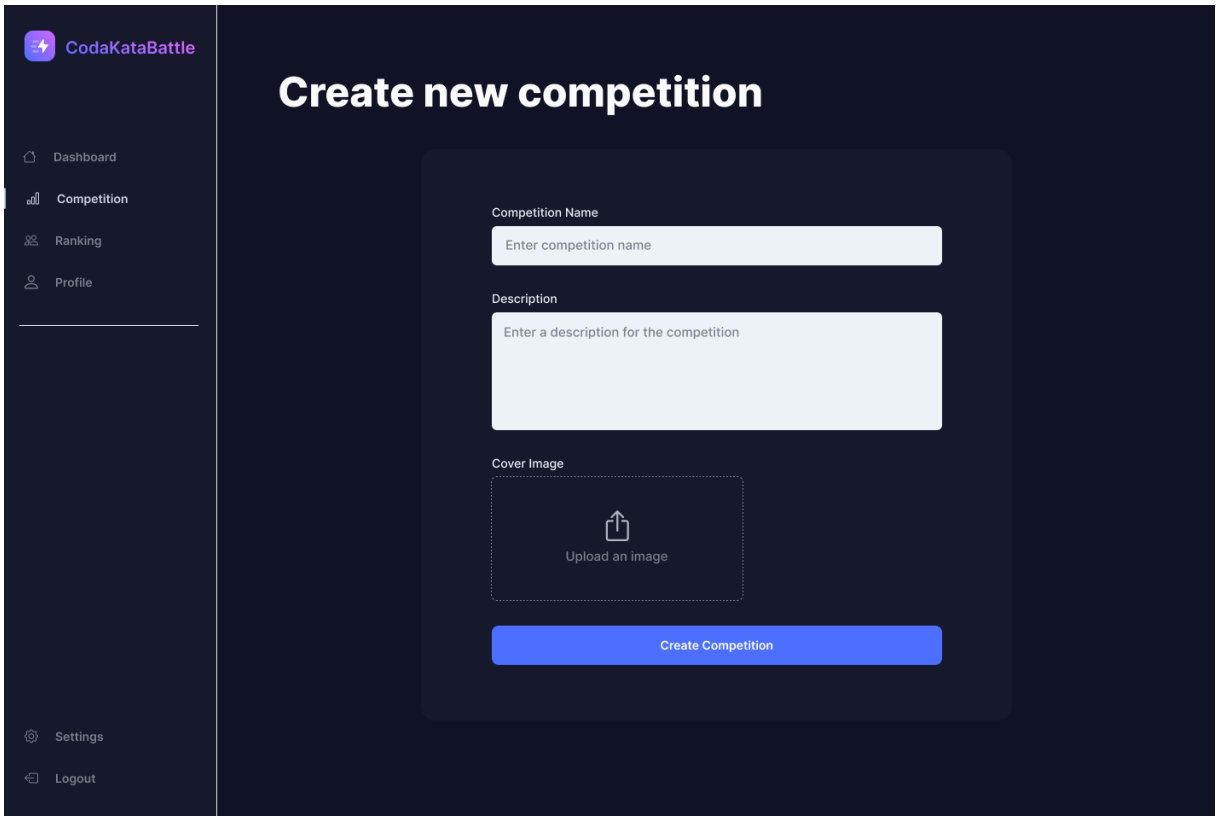


Figure 3.11: CKB create competition page

### Create Battle Pages

As for the join of a battle for a ST also the creation of a battle is divided in two different steps. In the first step the ED has to insert all the general information about the battle, while in the second step he/her has to insert the code and settings for the automatic evaluation of the code.

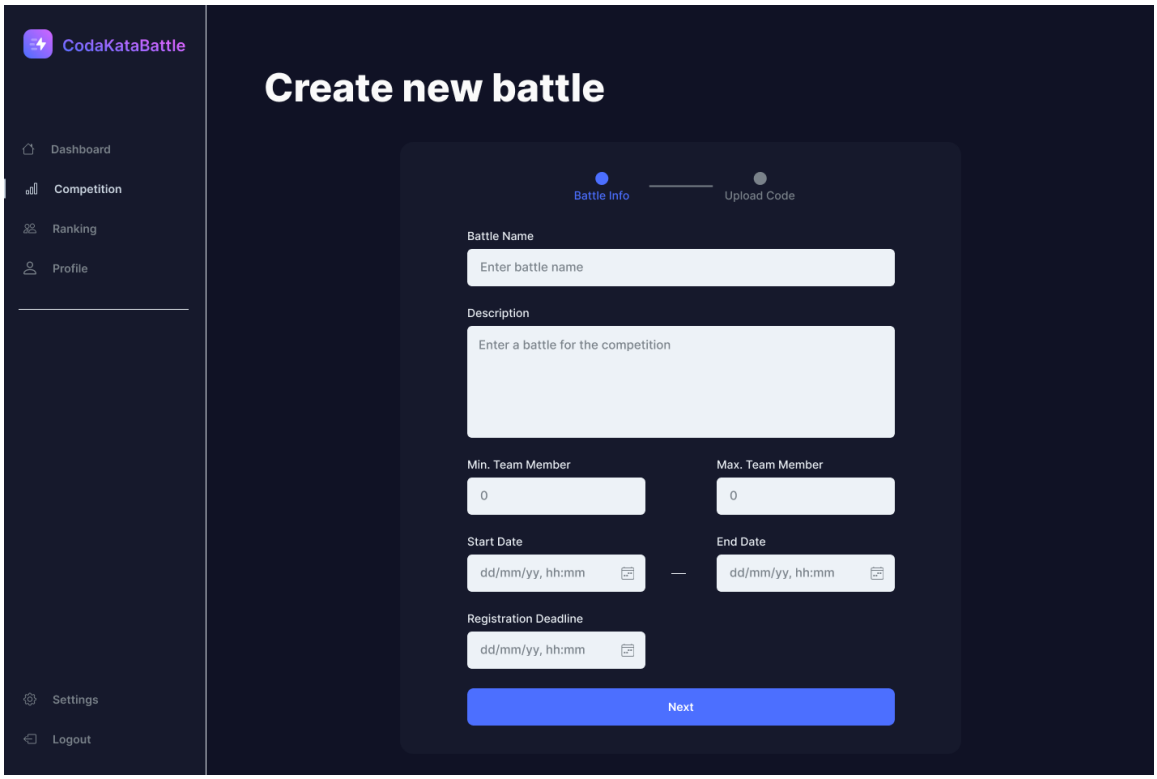


Figure 3.12: CKB create battle page - step 1

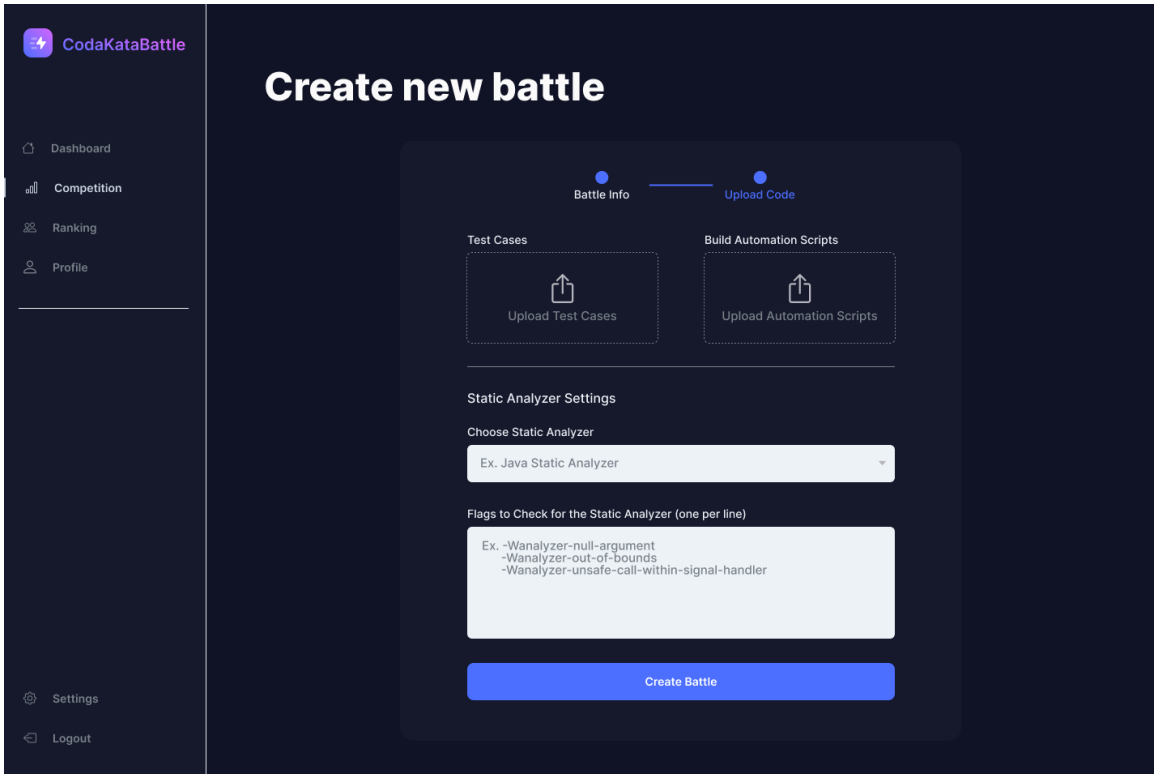


Figure 3.13: CKB create battle page - step 2

## Create Badge Pages

Similarly to the last function, the creation of a badge is divided in two steps. In the first step the ED can insert all the information of the badge, that include the name of the badge, a description and a picture. In the second step the ED can choose the criteria that the ST has to satisfy to earn the badge, this is done by a set of pre-defined criteria that the ED can choose from.

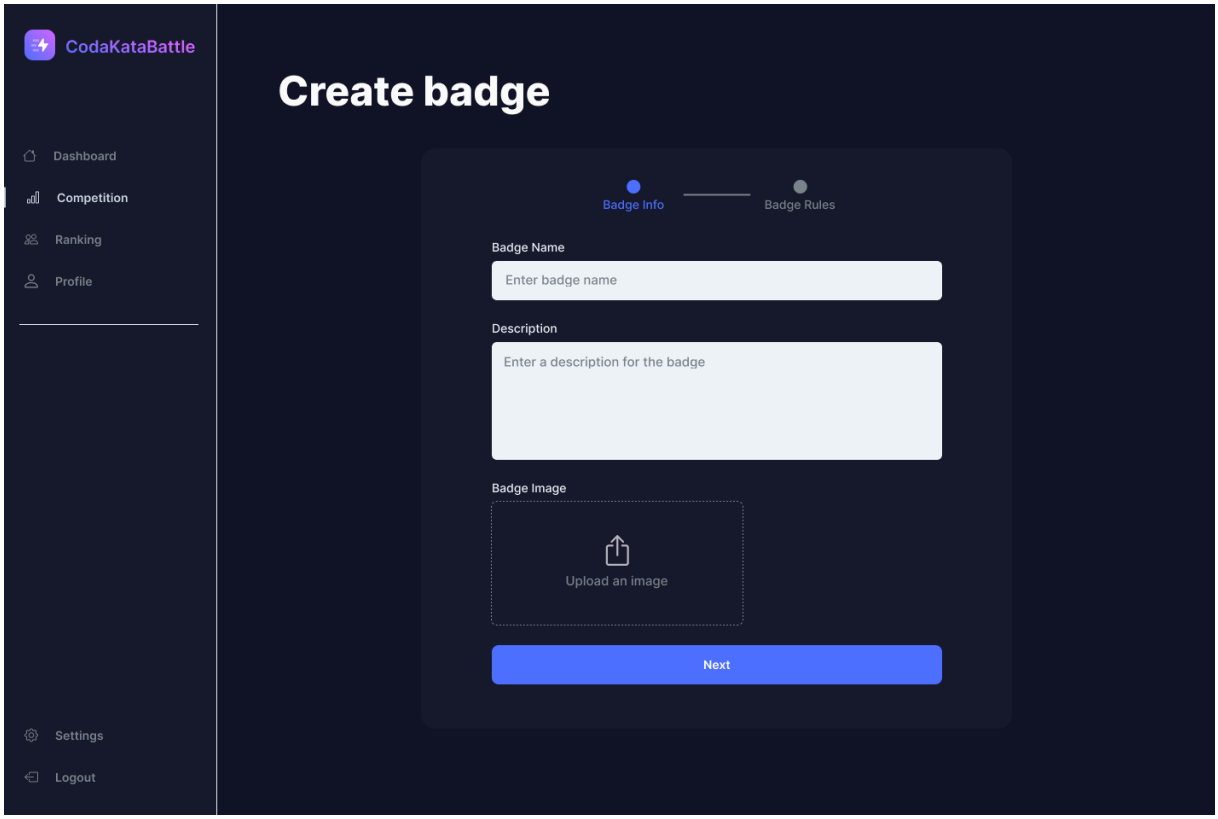


Figure 3.14: CKB create badge page - step 1

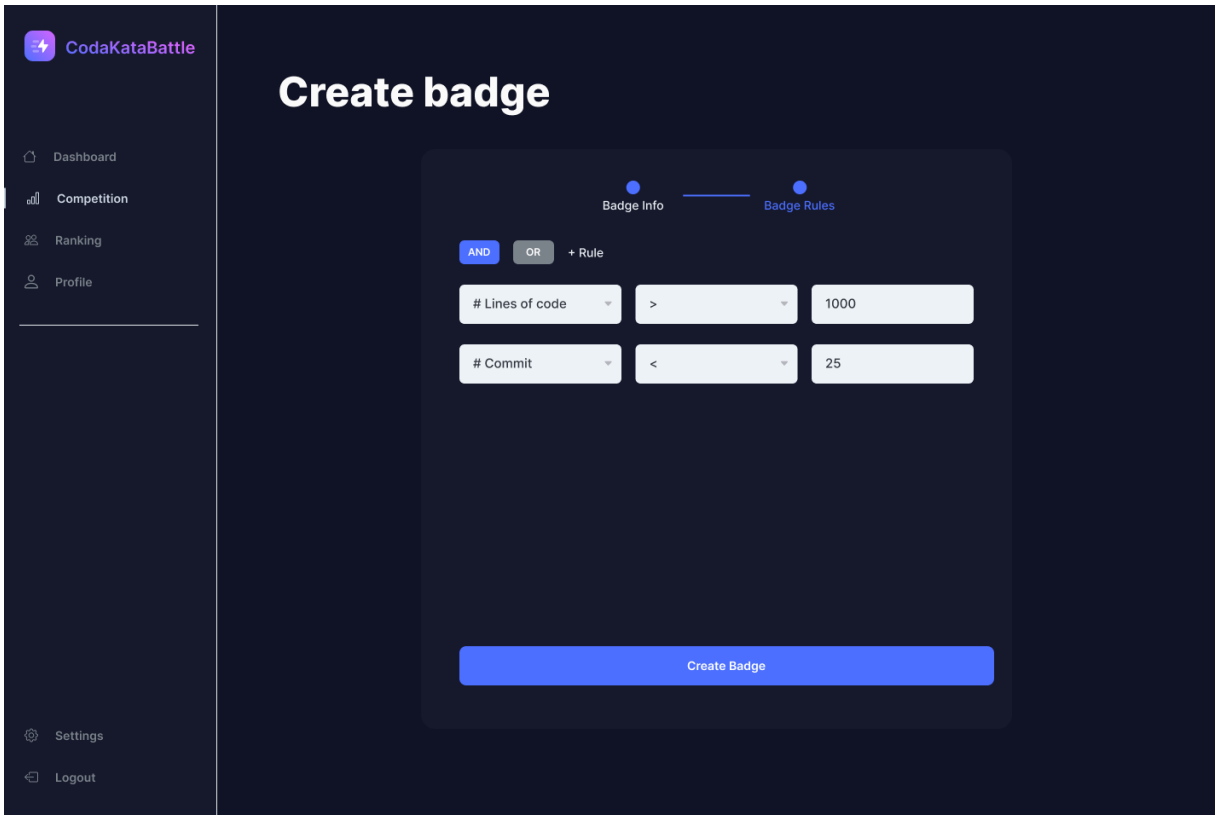


Figure 3.15: CKB create badge page - step 2

## Manual Evaluation Page

This is the page where the ED can manually evaluate the code of a T. In particular, the ED can see some information about the latest submission of a T and can visit GitHub to see the code of the T. Then the ED can evaluate the latest submission of the T, assigning a score.

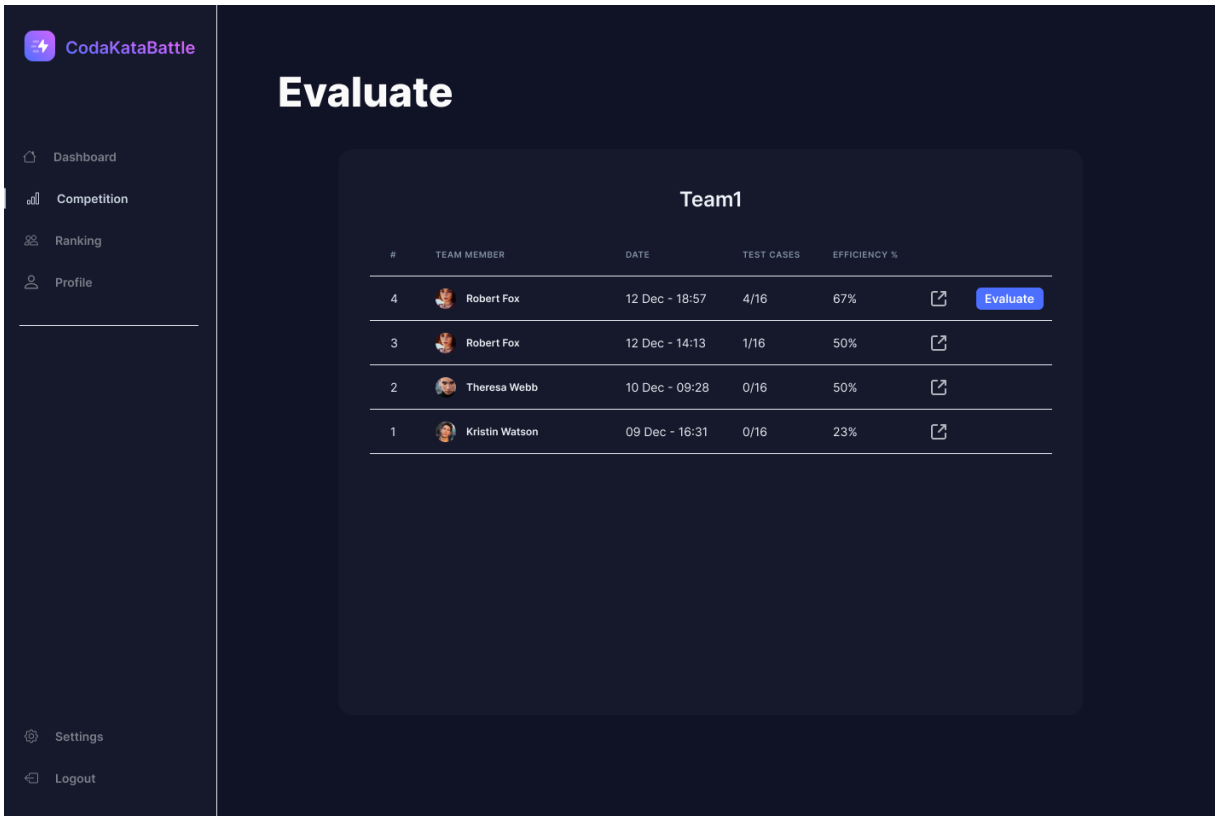


Figure 3.16: CKB manual evaluation page

# 4 | Requirements traceability

# 5 | Implementation, integration and test plan

# 6 | Effort Spent

| Members of group | Effort spent (hours) | |
|---|---|---|
| Filippo Balzarini | Introduction | 0*h* |
| | Architectural design | 0*h* |
| | User interface design | 0*h* |
| | Requirements traceability | 0*h* |
| | Implementation, integration and test plan | 0*h* |
| | Reasoning | 0*h* |
| Christian Biffi | Introduction | 1*h* |
| | Architectural design | 4*h* |
| | User interface design | 8*h* |
| | Requirements traceability | 0*h* |
| | Implementation, integration and test plan | 0*h* |
| | Reasoning | 4*h* |
| Michele Cavicchioli | Introduction | 0*h* |
| | Architectural design | 5*h* |
| | User interface design | 0*h* |
| | Requirements traceability | 0*h* |
| | Implementation, integration and test plan | 0*h* |
| | Reasoning | 0*h* |

Table 6.1: Effort spent by each member of the group

# References