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SCUOLA DI INGEGNERIA INDUSTRIALE
E DELL'INFORMAZIONE

Software Engineering 2 Requirements Analysis and Specification Document

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1 | Introduction

Online coding challenges and platforms have become an essential resource for programmers and developers in the modern tech landscape. These platforms provide a versatile means to enhance coding skills, offer practical learning experiences, and promote a competitive and engaging approach to problem-solving. Additionally, participation in such platforms can prepare individuals for tech industry job interviews, as many companies utilize similar coding challenges during their recruitment processes. In summary, these online coding challenge platforms are invaluable tools for skill development, community engagement, and professional growth in the ever-evolving field of programming.

What makes the CodeKataBattle platform even more compelling is the involvement of experienced educators who create coding battles. These experts design challenges that are not only instructive but also thought-provoking, ensuring a rich and educational experience for participants.

Moreover, these platforms often facilitate the creation of groups, enabling collaborative problem-solving and enhancing team working skills. Users can form teams, tackle challenges together, and learn from one another's approaches. This group dynamic adds an extra layer of motivation and shared learning experiences, enhancing the value of these platforms for participants.

1.1. Purpose

1.1.1. Goals

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1.2. Scope

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1.2.1. World Phenomena

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1.2.2. Shared phenomena

ID	Description	Controller	Observer
SP1	The ED creates an account in the CKB system	ED	CKB
SP2	The ED logs in his account in the CKB system	ED	CKB
SP3	The ED creates a tournament	ED	CKB
SP4	CKB adds the tournament to the ED's tournament list	CKB	ED
SP5	The ED can checks his tournament list	ED	CKB
SP6	The ED grants other EDs the permission to create battles within a tournament	ED	CKB
SP7	The ED creates a battle in a specific tournament	ED	CKB
SP8	CBK adds the battle to the ED's battle list	CKB	ED
SP9	The ED can checks his battle list	ED	CKB
SP10	The ED uploads the code kata in the battle	ED	CKB
SP11	The ED sets the minimum and the maximum number of students per group for the battle	ED	CKB
SP12	The ED sets a registration deadline to the battle	ED	CKB

SP13	The ED sets a final submission deadline to the battle	ED	CKB
SP14	The ED sets additional configurations for scoring in the battle	ED	CKB
SP15	The ED sets the badges that STs could gain in the battle	ED	CKB
SP16	The ST creates an account in the CKB system	ST	CKB
SP17	The ST logs in his account in the CKB system	ST	CKB
SP18	CKB notifies STs that a tournament has been created	CKB	ST
SP19	CKB notifies STs that a battle has been created	CKB	ST
SP20	The ST subscribes to a specific battle before the registration deadline	ST	CKB
SP21	CKB adds the tournament to the ST's battle list	CKB	ST
SP22	The ST invites other STs to the battle	ST	CKB
SP23	CKB sends a notification to the ST to join the STG	CKB	ST
SP24	CKB adds the STs to the STG	CKB	ST
SP25	CKB creates a GH repository containing the code kata and sends the lik to all STs registered in the battle	CKB	ST
SP26	When the ST commits a new version o his code, the CKB platform runs the tests on the sources	ST	CKB
SP27	CKB updates the score of the STG	CKB	ST
SP28	STs and EDs can view the current rank evolving during the battle	ST, ED	CKB
SP29	During the consolidation stage, EDs can manually modify the scores	ED	CKB
SP30	CKB notifies all STs when the final battle ranks are available	CKB	ST

SP31	CKB updates the personal tournament score of each ST	CKB	ST
SP32	The ED closes the tournament	ED	CKB
SP33	CKB notifies all the STs involved in the tournament when the final ranks of the tournament are available	CKB	ST
SP34	CKB assigns the badges to the STs	CKB	ST
SP35	The ST can visualize the profile of other ST or ED	ST	CKB
SP36	The ED can visualize the profile of other ST or ED	ED	CKB

Table 1.1: Shared Phenomenas.

1.3. Definition, Acronyms, Abbreviations

Acronyms	**Definition**
RASD	Requirements Analysis & Specification Document
ST	Student
ED	Educator
STG	Student Group
CKB	CodaKataBattle
GH	GitHub
User	All STs and EDs
API	Application Programming Interface
DAX	Domain Assumption X
SPX	Shared Phenomena X
WPX	World Phenomena X
RX	Requirement X

Table 1.2: Acronyms used in the document.

1.4. Revision history

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1.5. Reference Documents

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1.6. Document Structure

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2 | Overall Description

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2.1. Product perspesctive

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2.1.1. Scenarios

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2.1.2. Class diagrams

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2.1.3. State diagrams

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2.2. Product functions

2.2.1. Requirements

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2.2.2. Use cases

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2.3. User characteristic

2.4. Assumptions, dependencies and constraints

2.4.1. Domain assumptions

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3 | Specific Requirements

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3.1. External interface requirements

3.1.1. User interfaces

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3.1.2. Hardware interfaces

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3.1.3. Software interfaces

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3.1.4. Communication interfaces

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3.2. Functional requirements

3.2.1. Requirements

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3.2.2. Mapping on goals

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3.2.3. Use case diagrams

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3.3. Performance requirements

3.4. Design constraints

3.4.1. Standard compliance

The system must be compliant to the EU's GDPR (General Data Protection Regulation), a set of regulations that is designed in order to protect the personal data, the privacy and security of the EU's citizens.

3.4.2. Hardware limitations

The only hardware limitations are the support for a reliable internet connection and for a Web Browser.

3.4.3. Any other constraints

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3.5. Software system attributes

3.5.1. Reliability

The system has to be fault tolerant in order to prevent the propagation of errors and to guarantee a continuous usability of the system.

3.5.2. Availability

The system must be available the most time possible, with a minimum value of 99.9% (three-nines) of time. In this way the system will be unavailable for only 8.76 hours a year.
It shall be prevented a case scenario in which a mainta break occurs near to Battle's end, therefore there must be as few maintenance breaks as possible, with them possibly at nightime.

3.5.3. Security

The system must control the access rights of the users. The system shall grant both authentication, verifying the identity of the users that attempt to login and authorization, verifying the permission of the already logged users to perform certain requested actions. Measures to protect the database will be adopted, such as defense against query injections, and password and users' personal data stored will be encrypted.

3.5.4. Maintainability

The system must be designed using scalable and reusable models in order to permit future addition of features with minimum effort. Ordinary maintenance has to be scheduled at nightime, in order to keep the services available when the user traffic is high.

3.5.5. Portability

The system must be accessible by the users from every kind of Web Browser. There are no particular portability requirements server side.

4 | Formal Analysis Using Alloy

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6 | References

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