

# **CodeKataBattle - RASD**

**Cotrone - De Ciechi - Deidier**

**A.Y.: 2023/2024**

# Goals

- G.1: Allow Students to participate individually or in teams in programming challenges to increase their skills and earn badges
- G.2: Allow Educators to create new Battles
- G.3: Allow Educators to create a new Tournament
- G.4: Allow Educators to evaluate student's work
- G.5: Keep Students updated on any new Tournaments
- G.6: Keep Students updated on the Tournaments in which they are registered (*for example if a new battle is created*)
- G.7: Keep the scoreboard of Tournaments and Battles updated in real time
- G.8: Allow Educators to create new Badges and rules for assigning them
- G.9: Allow Educators to close a Tournament

# ***Relevant World and Shared Phenomena***

## **World Phenomena:**

- A Student wants to improve his software skills and so he decides to participate to a Tournament or Battle
- An Educator wants to create a Tournament

## **Shared Phenomena:**

- The app shows the list of currently active Tournaments and the corresponding ranking - Machine controlled
- A Student decides to invite their mate to form a Team - World controlled
- The system sends notifications when the final rank of the Tournament is ready - Machine controlled

# **Fundamental Requirements**

## **Student Requirements:**

- The system allows each Student to see information and deadlines of each Battle and Tournament
- The system allows each Student to see their Badges and of the other Students
- The system allows Students to create their own Team in a Battle
- The system allows Students to register for a Battle and Tournaments

## **Educator Requirements:**

- The system allows each Educator to create a new Tournament
- The system allows each Educator to create a new Battle (*CodeKata, deadlines, number of students per group*)
- The system allows each Educator to create Badges

# ***Assumptions***

- CodeKataBattle is able, via the GitHub API, to create a repository
- All Students have a computer that allows them to write code and a internet connection
- Each Tournament, Battle, Team and Badge has its own unique ID

# *Relevant Use Case*

## Student registers for a Battle

The screenshot shows a web browser window for 'CKB' displaying the 'www.codekatabattle.com/students/Dashboard'. The main content area has a dark blue background with orange highlights. On the left, under 'MY TOURNAMENTS', there are two cards: 'CodeCrafters Clash' and 'Algorithm Arena', each with a 'More information on this tournament!' button. Below this, under 'ALL THE TOURNAMENTS', are four more cards: 'Binary Battles Championship', 'Syntax Showdown', 'Logic Legends League', and 'Byte Blitz Tournament', each with a similar information button. On the right side, a red sidebar displays the user profile 'Robert McLees' with a placeholder icon, a search bar, and links for 'My profile' (with a person icon), 'Notifications' (with a bell icon), and 'Log Out'.

CKB

www.codekatabattle.com/students/Dashboard

# Code Kata Battle

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## MY TOURNAMENTS

CodeCrafters Clash [More information on this tournament!](#)

Algorithm Arena [More information on this tournament!](#)

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## ALL THE TOURNAMENTS

Binary Battles Championship [More information on this tournament!](#)

Syntax Showdown [More information on this tournament!](#)

Logic Legends League [More information on this tournament!](#)

Byte Blitz Tournament [More information on this tournament!](#)

Robert McLees

Tournaments, profiles...

[My profile](#)

[Notifications](#)

[Log Out](#)

# *Relevant Use Case*

## Student registers for a Battle

The screenshot shows the 'Code Kata Battle' student dashboard. On the left, under 'MY TOURNAMENTS', there are two entries: 'CodeCrafters Clash' and 'Algorithm Arena', each with a 'More information on this tournament!' button. A large orange arrow points from the 'Algorithm Arena' entry towards the right side of the screen. On the right, the user profile for 'Robert McLees' is displayed, featuring a placeholder profile picture, the name 'Robert McLees', and a search bar labeled 'Tournaments, profiles...'. Below the profile are links for 'My profile' (with a person icon) and 'Notifications' (with a bell icon). At the bottom right is a 'Log Out' link.

CKB

www.codekatabattle.com/students/Dashboard

# Code Kata Battle

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## MY TOURNAMENTS

CodeCrafters Clash [More information on this tournament!](#)

Algorithm Arena [More information on this tournament!](#)

## ALL THE TOURNAMENTS

Binary Battles Championship [More information on this tournament!](#)

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Logic Legends League [More information on this tournament!](#)

Byte Blitz Tournament [More information on this tournament!](#)

Robert McLees

Tournaments, profiles...

My profile

Notifications

Log Out

# *Relevant Use Case*

## Student registers for a Battle

The screenshot shows a web browser window with the URL [www.codekatabattle.com/students/Tournaments?id=4316](http://www.codekatabattle.com/students/Tournaments?id=4316). The page is titled "CodeCrafters Clash" and features a "LEADERBOARD" section on the left listing six students with their scores. On the right, there's a summary of the tournament, a list of battles with "Show Battle Informations!" buttons, and a sidebar with user profile links.

CKB

www.codekatabattle.com/students/Tournaments?id=4316

### CodeCrafters Clash 2:0

#### LEADERBOARD

1 - Paul Clark	- 89 pts.
2 - Robert McLees	- 43 pts.
3 - Kellye Moran	- 16 pts.
4 - Andrew Philip	- 15 pts.
5 - William Marlowe	- 11 pts.
6 - Matthew Keener	- 9 pts.

Created by: **Adrian Codecaster** Show educators

Welcome to the "**CodeCrafters Clash**"! This tournament is the ultimate battleground where coding enthusiasts come together to engage in epic programming duels. Whether you're a seasoned coder or a budding developer, this clash is designed to test your mettle in the realms of algorithms, logic, and elegant code craftsmanship.

**Encoding C++ Battle** Show Battle Informations!

**Java Master Code Battle** Show Battle Informations!

**Python Programming Battle** Show Battle Informations!

**JavaScript Code Battle** Show Battle Informations!

**Ruby Rapid Script Battle** Show Battle Informations!

Robert McLees

Tournaments, profiles...

**My profile**

**Notifications**

**Log Out**

# *Relevant Use Case*

## Student registers for a Battle

The screenshot shows a web browser window for the tournament "CodeCrafters Clash". The main content area displays a leaderboard with the top six students and their scores. To the right, a sidebar provides details about the tournament and includes a user profile for "Robert McLees". A large black arrow points from the text "Student registers for a Battle" down to the "My profile" section in the sidebar.

CKB

www.codekatabattle.com/students/Tournaments?id=4316

### CodeCrafters Clash 2:0

#### LEADERBOARD

1 - Paul Clark	- 89 pts.
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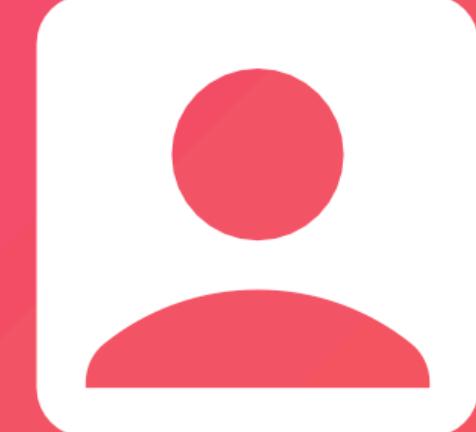
[Encoding C++ Battle](#) [Show Battle Informations!](#)

[Java Master Code Battle](#) [Show Battle Informations!](#)

[Python Programming Battle](#) [Show Battle Informations!](#)

[JavaScript Code Battle](#) [Show Battle Informations!](#)

[Ruby Rapid Script Battle](#) [Show Battle Informations!](#)



Robert McLees

Tournaments, profiles...

My profile 

Notifications 

Log Out 

# *Relevant Use Case*

## Student registers for a Battle

The screenshot shows a web browser window for 'CKB' displaying the URL [www.codekatabattle.com/students/Battles?tourn\\_id=4316&batt\\_id=89](http://www.codekatabattle.com/students/Battles?tourn_id=4316&batt_id=89). The main content is titled 'CodeCrafters Clash - Java Master Code Battle' with a 'battle' icon. On the left, a red sidebar lists a 'LEADERBOARD' with the following entries:

Rank	Team	Points
1	BitMasters	33 pts.
2	Byte Busters	21 pts.
3	LogicLegends	7 pts.
4	Syntax Savants	5 pts.
5	Code Crusaders	1 pts.
6	Algorithm Avengers	0 pts.

The central blue area displays battle details: 'Battle created on: 30/09/2023', 'Registration deadline: 01/11/2023', and 'BATTLE STATUS: RUNNING'. It also shows a large orange diagonal arrow graphic. A message 'You are already registered!' is displayed next to a 'Register!' button. Below this, a section titled 'SecureVault Manager.' describes the task: 'Imagine you are tasked with building a SecureVault Manager, a Java application that manages a secure vault for storing sensitive information.' It lists two main requirements:

- 1. User Authentication System:**
  - Implement a secure user authentication system that requires users to log in with a username and password.
  - Employ strong encryption techniques to safeguard user credentials.
- 2. Vault Creation and Management:**
  - Allow users to create multiple vaults, each with its own set of encrypted

The right side features a red sidebar with a user profile icon for 'Robert McLees', a search bar, and links for 'My profile', 'Notifications' (with a bell icon), and 'Log Out'.

# **Relevant Use Case**

## **Student registers for a Battle**

The screenshot shows a web browser window for 'CKB' displaying the URL [www.codekatabattle.com/students/Battles?tourn\\_id=4316&batt\\_id=89](http://www.codekatabattle.com/students/Battles?tourn_id=4316&batt_id=89). The page title is 'CodeCrafters Clash - Java Master Code Battle'. On the left, there's a 'LEADERBOARD' section listing six teams with their scores: 1 - BitMasters - 33 pts., 2 - Byte Busters - 21 pts., 3 - LogicLegends - 7 pts., 4 - Syntax Savants - 5 pts., 5 - Code Crusaders - 1 pts., and 6 - Algorithm Avengers - 0 pts. In the center, it says 'Battle created on: 30/09/2023' and 'Registration deadline: 01/11/2023'. Below that, it says 'BATTLE STATUS: RUNNING' and 'You are already registered!'. It also mentions 'SecureVault Manager.' and describes the task of building a SecureVault Manager application. On the right, there's a sidebar with a profile picture of 'Robert McLees', a search bar, and links for 'My profile', 'Notifications', and 'Log Out'.

*In this case one could not since the student is already enrolled, in case he/she is not...*

LEADERBOARD

1 - BitMasters - 33 pts.

2 - Byte Busters - 21 pts.

3 - LogicLegends - 7 pts.

4 - Syntax Savants - 5 pts.

5 - Code Crusaders - 1 pts.

6 - Algorithm Avengers - 0 pts.

Battle created on: 30/09/2023

Registration deadline: 01/11/2023

BATTLE STATUS: RUNNING

You are already registered!

SecureVault Manager.

Imagine you are tasked with building a SecureVault Manager, a Java application that manages a secure vault for storing sensitive information.

**1. User Authentication System:**

- Implement a secure user authentication system that requires users to log in with a username and password.
- Employ strong encryption techniques to safeguard user credentials.

**2. Vault Creation and Management:**

- Allow users to create multiple vaults, each with its own set of encrypted

Robert McLees

Tournaments, profiles...

My profile

Notifications

Log Out

# *Relevant Use Case*

## Student registers for a Battle

The screenshot shows a web browser window for the URL [www.codekatabattle.com/students/TeamCreator?tourn\\_id=4316&batt\\_id=89](http://www.codekatabattle.com/students/TeamCreator?tourn_id=4316&batt_id=89). The page title is "CodeCrafters Clash - Java Master Code Battle". The main heading is "CREATE A TEAM FOR THE BATTLE!". Below it, there is information about team creation: "Minimum number of team members: 2" and "Maximum number of team members: 4". There is also a search bar with placeholder text "Search for a student with their full name, username or email address" and a button labeled "Invite student!". A large orange "X" is overlaid on the left side of the page. On the right side, there is a sidebar with a user profile for "Robert McLees" and links for "My profile", "Notifications", and "Log Out".

CKB

www.codekatabattle.com/students/TeamCreator?tourn\_id=4316&batt\_id=89

CodeCrafters Clash - Java Master Code Battle

CREATE A TEAM FOR THE BATTLE!

Information about creating a team:

Minimum number of team members: 2

Maximum number of team members: 4

Search for a student with their full name, username or email address

Invite student!

CURRENT TEAM LINE-UP:

Robert McLees (you)

Mark Bush - (pending reply)

Linda Alderman - (pending reply)

John Garcia (declined)

Tournaments, profiles...

My profile

Notifications

Log Out

# **Alloy**

Focus on:

- Educators
- Tournaments
- Battles
- Teams
- Badges

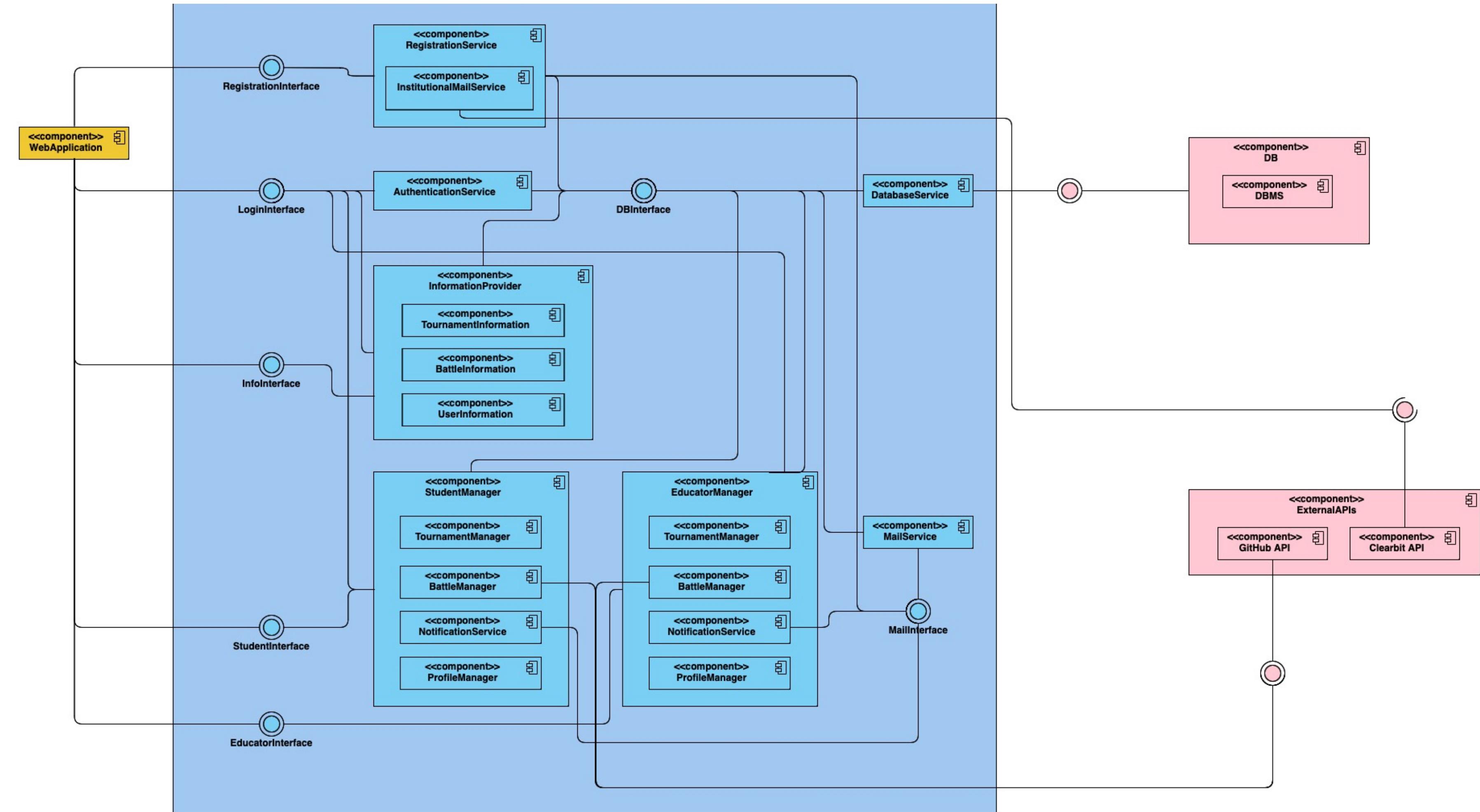
Main points:

- Deadline constraints on Tournaments and Battles with respective statuses
- Assignment of Badges
- Managing Teams and relative constraints
- Creation, lifecycle and closure of Tournaments and Battles

**CodeKataBattle - DD**

# Component View

- Web Application
- Registration Service
- Institutional Mail Service
- Authentication Service
- Tournament Information
- Battle Information
- User Information
- Tournament Manager
- Battle Manager
- Notification Service
- Profile Manager
- Database Server
- Mail Service

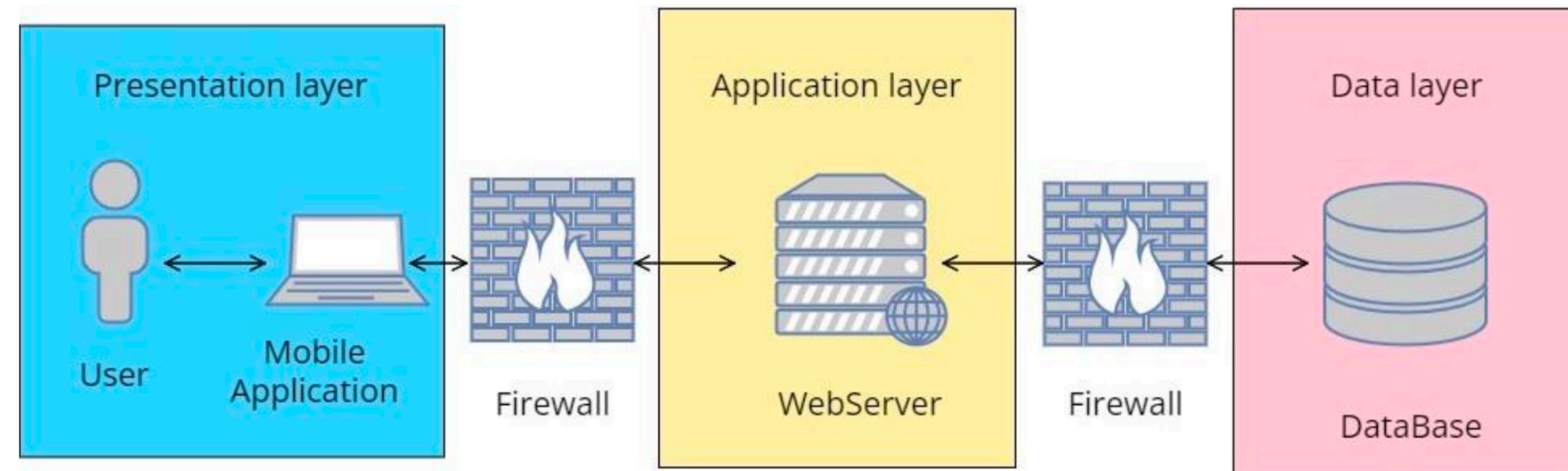


# *Design Choices*

- Web Servers with Cluster DBMS and Load Balancer
- JSON for asynchronous communication
- RESTful Web Application developed with Spring

# Patterns

- Client-Server Architecture Style
- Three-Tier
- Model-View-Controller



# ***Implementation, Integration and Testing***

Implementation and Integration both **Bottom Up**:

- First develop, integrate and test individual components
- Then verification of their interaction with other modules

System Testing:

- Load Testing
- Performance Testing
- Functional Testing
- Usability Testing
- Stress Testing

# ***Implementation Plan***

1. Database Service
2. Mail Service
3. Registration Service
4. Authentication Service
5. Information Provider
  - Tournament Information
  - Battle Information
  - User Information
6. Educator Manager
  - Tournament Manager
  - Battle Manager
  - Notification Service
  - Profile Manager
7. Student Manager
  - Tournament Manager
  - Battle Manager
  - Notification Service
  - Profile Manager
8. Link of the external components
9. Web Application