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CREATING A TOURNAMENT MANAGEMENT APPLICATION FOR REFEREES IN OSU GAMES

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Osu! is a free online music game that is simple and easy to play. The player (a person) can use a mouse and pen tablet to click or move the cursor to touch the musical notes that appear on the screen and can spin with the spinner that is rotated in the middle of the screen. osu! has 4 game modes that can be played. The method applied is the agile method. The agile method is an IT project management approach that prioritizes agility (flexibility) and speed. Tournaments are contests in which players compete for prizes awarded based on relative ranking and designed to encourage optimal levels of effort. The tournament cannot be run if there is no referee. The referee has full authority to uphold the rules of the game in connection with the match in which the referee is appointed to officiate. osu tournament! still using manual methods to calculate scores. A referee must record the score that has been given by the system to calculate and determine who has the right to win the match. The aim of making this application is to make it easier for the referee to regulate the course of the match and the match room. Tournament management application for referees in osu games! is a website-based application using JavaScript and the Next.js framework. A referee must have an osu! to be able to use this application.

Keywords: Osu!; Music Games; Tournament; Referee.

Osu! adalah permainan musik online gratis yang sederhana dan mudah untuk dimainkan. Pemain (Seseorang) dapat menggunakan mouse dan pen tablet untuk mengklik atau menggeser kursor agar dapat menyentuh note musik yang muncul dilayar serta dapat melakukan spin dengan spinner yang diputar di tengah layar. osu! mempunyai 4 mode permainan yang dapat dimainkan. Metode yang diterapkan adalah metode agile. Metode agile adalah sebuah pendekatan manajemen proyek IT yang mengutamakan kelincahan (fleksibel) dan kecepatan. Turnamen adalah kontes dimana pemain bersaing untuk mendapatkan hadiah yang diberikan berdasarkan peringkat relatif dan dirancang untuk mendorong tingkat upaya yang optimal. Turnamen tidak bisa dijalankan jika tidak mempunyai wasit. Wasit memiliki wewenang penuh untuk memegang teguh peraturan permainan sehubungan dengan pertandingan di mana wasit tersebut ditunjuk untuk memimpinnya. Turnamen osu! masih menggunakan metode manual untuk menghitung skor. Seorang wasit harus mencatat skor yang sudah diberikan oleh sistem untuk dihitung dan menentukan siapa yang berhak memenangkan pertandingan tersebut.Tujuan dari pembuatan Aplikasi ini adalah untuk mempermudah wasit untuk mengatur jalannya pertandingan dan ruang pertandingan. Aplikasi pengelolaan turnamen untuk wasit pada game osu! merupakan aplikasi berbasis website menggunakan javascript dan framework next.js. Seorang wasit wajib mempunyai akun osu! untuk bisa menggunakan aplikasi ini.

Kata Kunci: Osu!; Permainan Musik; Turnamen; Wasit.

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1. INTRODUCTION

The organizational structure of a sports game can be adjusted to the needs of a particular event. A tournament is a league or institution that is not directly influenced as a sport is played by others. In a tournament there are several people or managers of a tournament, including managers, sponsorship, hosts, and referees as witnesses in the tournament being held. In the osu! game there are various types of tournaments organized by the community, such as the osu! standard game mode, osu! taiko, osu! catch and osu! mania. all four modes have their own distinctive gameplay.

Osu! is a simple and easy free online music game. To play the game, someone uses a mouse or pen tablet to click or drag that appears on the screen at the right time with music or beats, then spin by spinning in the middle of the screen. osu! has 4 game modes that can be played. The four game modes are broadly inspired by various other rhythm games out there with different game mechanisms from each other.

In the osu! game The referee's role in calculating the score, determining the winner and managing the game still uses manual methods, including calculating the score by recording the player's score in Notepad and then calculating it with the temporary points, moving the player into the slot provided, and so on. The referee in the osu! game is chosen voluntarily or registers to become staff for the tournament.

The referee is the person who manages the game and the referee has full rights in his role such as stopping the game in the middle of the game, disqualifying players and prohibiting the player from playing in the tournament. According to Mudian (2017), the referee is given the mandate to behave well outside and inside the game, so that he can be a role model for the players and officials. As a result of the frequent excessive protests by players, officials and spectators and as if insulting the referee in a match, it is not uncommon for the referee to be increasingly unable to control his emotions. In the game mentioned, usually those who cannot control their emotions are the players to bring down their opponents.

The purpose of this study is to create a tournament management application for referees in the osu! game. for referees using node.js and knowing the role of tournament management application for referees in osu! games.

2. THEORETICAL BASIS

2.1. Referee

According to Syahroni et al. (2015) In English it is known as referee, judge, umpire or linesman. The term referee in English referee comes from football. Initially, the captains of each team consulted each other to resolve disputes that occurred on the field. Then this role was delegated to an umpire. Each team brought their own umpire so that the team captain could concentrate on the game. Finally, a person who was considered neutral was named a referee (from would be "referred to") acting as the person who would resolve the problem if the umpire could not resolve it.

The Federation of International Football Association (2012:21) explains that the referee has full authority to uphold the rules of the game in connection with the match where the referee has been appointed to lead it. The referee is the person appointed as the leader in a match and is fully responsible for the progress of a match, from entering the field to leaving the field. The existence of this authority makes the presence of a referee in a match important. As a leader in a match, the referee is responsible for the course of the match and the final result of a match through the decisions he makes in the match. Thus, the referee is required to make the right decision. The right decision will appear if the referee understands the rules of the game well. (Syahroni, M., et al., 2016)

2.2. *Osu!*

Osu! is a simple and easy free online music game. To play the game, someone uses a mouse or pen tablet to click or drag that appears on the screen at the right time with the music or beat, then spin by spinning in the middle of the screen. osu! Has 4 game modes that can be played. The four game modes are broadly inspired by various other rhythm games out there with different game mechanisms from each other.

2.3. *eSport*

According to Bányai et al. (2019) Esport is a new area in game culture, and is starting to become one of the most important and popular parts of video games in society, especially among teenagers and emerging adults. The competitive video game community began in South Korea, and the popularity of First Person Shooter (FPS) games, Real Time Strategy (RTS) games and Massively Multiplayer Online Role-Playing Games (MMORPGs) provided the basis for a burgeoning competition, not only in Asia, but also in Western countries and regions (Taylor 2012; Wagner 2006). Globally, there are now thousands of video game players who defend themselves as professional gamers (i.e., so-called esports players and pro-gamers). Although the FPS and RTS genres have maintained their popularity, the new Multiplayer Online Battle Arena (MOBA) games have become the most popular genre in esports.). (Bányai, F., et al., 2018)

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2.4. Forecasting

The Agile Software Development method or commonly referred to as agile is an iterative process in creating software. In the development process, agile can be said to be a fast development method because the main process of the agile development method itself focuses on design-code test once day.

Figure 1.

Agile Method (nvisia, 2020)

According to N. Lutfiani, et al. (2020) Agile is a project management method that uses a short development cycle, or can also be called a "sprint" to focus on continuous improvement in the development of a product or service. While others avoid the waterfall system development method. It was not until 2001 that the "manifesto for agile software development" and the term agile became synonymous with various forms of existing information system development methodologies, under the auspices of the agile alliance. (Lutfiani, N., et al., 2020)

3. RESEARCH METHODOLOGY

3.1 Research Framework

This research starts from identifying problems to find solutions to solve the problems until the solution is designed, built and tested and evaluated, all summarized in the research framework in the image below:

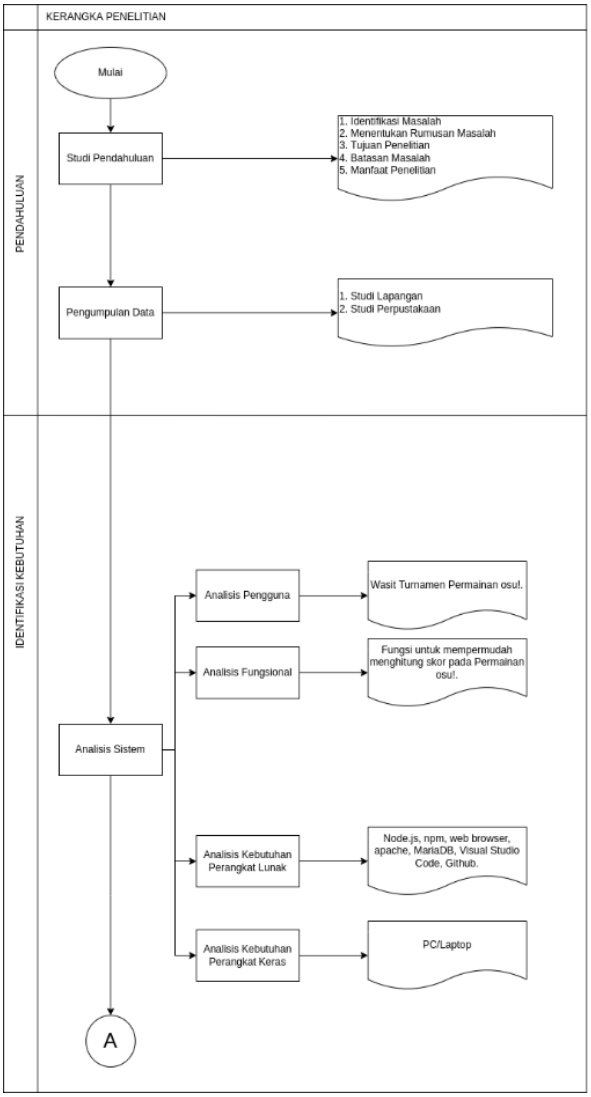

Figure 2.
Research Framework

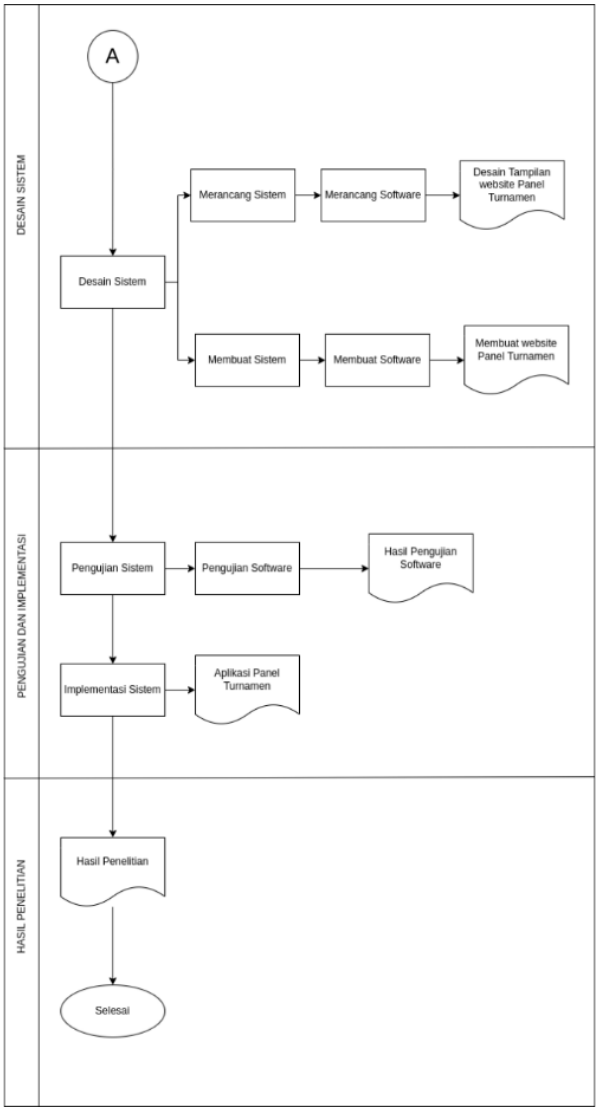

Figure 3.
Advanced Research Framework

This research framework consists of several stages that can be explained as follows:

a. Introduction
The preliminary stage begins by identifying the problems in the osu! Tournament sub-forum by examining each tournament that has been held, formulating the problems that occur in this study including designing and building the Tournament Panel website, determining the objectives to be achieved and limiting the problems in this study so that the discussion can be focused and carry out the process of searching and collecting supporting research data from various sources using direct methods.

b. System Development Method
The second stage is the system development method, where at this stage it explains the method used in developing the system, namely the prototyping method. In the prototyping method there are four stages, namely identification of needs, system design, system testing and system implementation. At the identification of needs stage, an analysis of user needs is carried out as well as the tools and materials that will be used to design the system on the Tournament Panel website and produce output in the form of a list of user needs and software.

c. Design
The design stage is to design a series of displays that will be displayed on the Tournament Panel website. After the design stage is complete, then enter the software creation stage based on the design.

d. Testing
The testing stage is the stage carried out after the overall system development is complete. At this stage, software testing is carried out. Testing is carried out on the display that has been designed according to the expected results. Next, the implementation stage is carried out.

e. Closing
The last stage is the closing, a stage that documents everything that is done during the research and the results that have been obtained in the form of a research report, this is done so that the results of the research can be developed in further research.

3.2 Data Collection

The data collection process uses direct methods and library studies. Data collection is carried out to meet the various sources during the research process, including data from the osu! Tournament sub-forum, several material books and research journals.

a. Library Research
This study was conducted by citing several readings related to the implementation of the research. Quotes are taken from journals related to the game genre and osu! As a reference in conducting this research. In addition, citations are also taken from theories in doing everything related to this research, both from books, lecture materials, books related to writing this research and data collection using search engines available on the internet and scientific articles using Google Scholar.

b. Indonesian Taiko Showdown
Indonesian Taiko Showdown (IDTS) is a one-on-one double elimination tournament, regional osu! taiko mode in Indonesia in 2017. This is the 1st installation of the Asian Taiko Showdown tournament.

Figure 4.
Logo Indonesian Taiko Showdown (IDTS)

c. Indonesian Taiko Showdown 2
Indonesian Taiko Showdown 2 (IDTS2) is a one-on-one double elimination tournament, osu! taiko mode of the Indonesian region in 2021. This is the 2nd installation of the Asian Taiko Showdown tournament.

Figure 5.
Logo Indonesian Taiko Showdown (IDTS2)

3.3 Analysis

a. Functional Analysis

The system built is the Creation of a Tournament Management Application for Referees in the osu! Game. This application has a function to regulate the course of the match process for the osu! game. This application has 1 level of access rights, namely User. User access rights are to carry out the process of creating an osu! game match room, regulate the course of the match, determine the pick and ban map pool, calculate the score, and see the final score. Access rights to this application can only be done for those who have an osu! account.

b. User Needs Analysis

This research was conducted based on the problems that occurred in Tournament management in the osu! game. which is still using manual calculation methods. User analysis is intended to find out who is involved so that the user's level of understanding of this Tournament Panel can be known.

c. Software Needs Analysis

The program to be built is a tournament score counter program that will be accessed via a web browser so that calculating the score can be controlled with the buttons provided. The software needed in carrying out this research is as follows:

1) Node.js which is used for the engine of the website to be built.
2) Next.js which is used for the framework on the website to be built.
3) Bancho,js for direct integration of the osu! website.
4) Postman to test the API.
5) Draw.io to create flowcharts.
6) Balsamiq Wireframes to create website sketch designs.
7) Microsoft Visual Studio Code to create coding.

d. Hardware Needs Analysis

The software analysis in this study is a tool used in developing the application. The tools used are as follows:

1) Laptop/PC with an Intel Core i3 processor or higher.

2) 4GB RAM.

3) Average speed internet connection.

3.4 Use Case Diagram

Use Case Diagram is a diagram used to briefly describe who uses the system and what it can do. The use case diagram does not explain in detail about the use of the use case, but only provides a brief overview of the relationship between the use case, actor and system. Here is a use case for creating a tournament management application for referees in the osu! game:

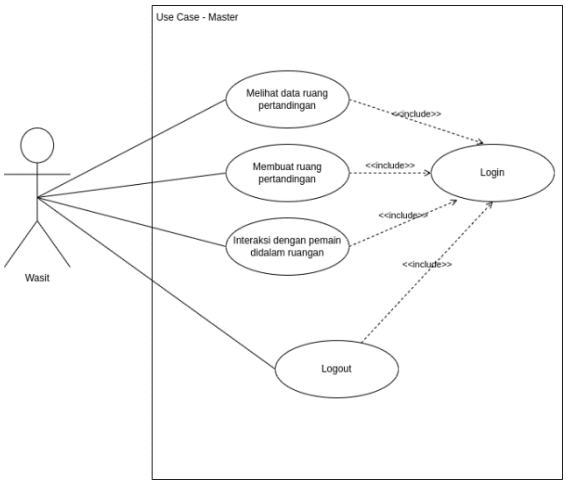

Figure 6.
Use Case Diagram

3.5 Activity Diagram

Activity diagram is a design of the flow of activities or work flow in a system that will be run. Activity diagrams are also used to define or group the display flow of the system. The following is an activity diagram in creating a tournament management application for referees in the osu game!:

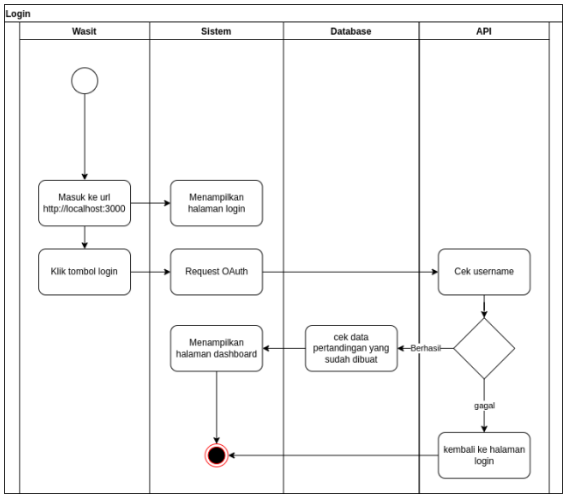

Figure 7.
Activity Diagram of Login

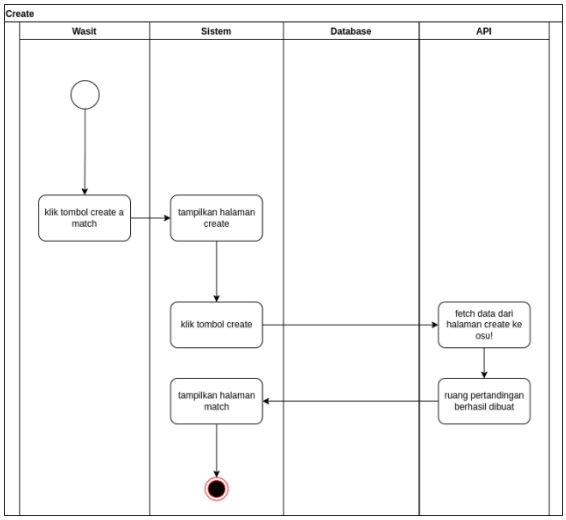

Figure 8.
Activity Diagram of Create

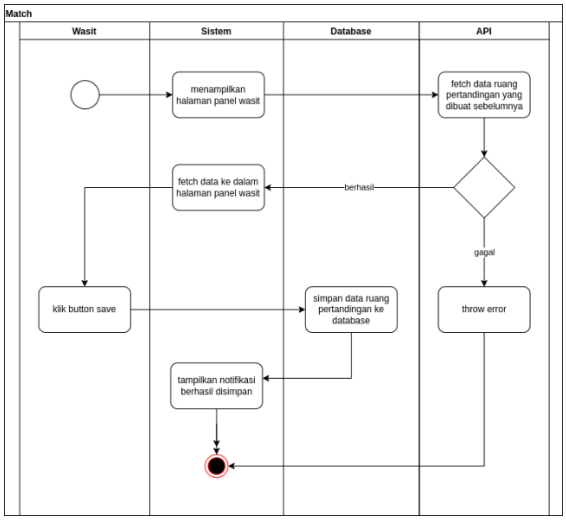

Figure 9.
Activity Diagram of Referee Panel

3.6 Sequence Diagram

This sequence diagram is usually used to describe a scenario or series of steps taken in response to an event to produce a certain output, and what changes occur internally and what output is produced.

The sequence diagram describes how entities in the system interact, including the messages used during the interaction. All messages are described in the order of execution. The following is a sequence diagram of creating a tournament management application for referees in the osu! game.

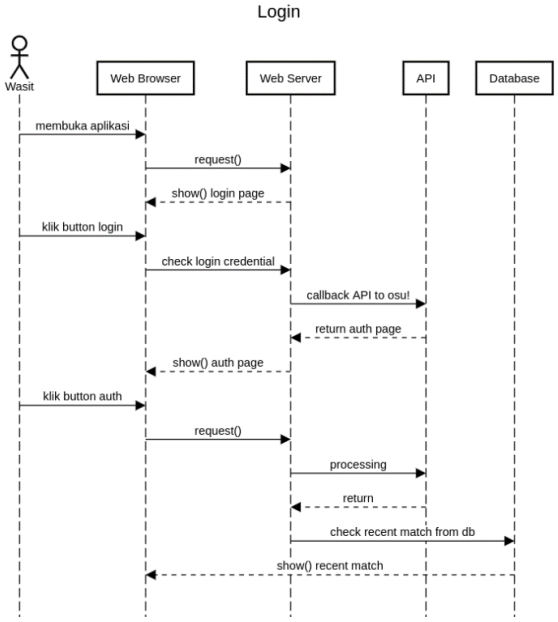

Figure 10.
Sequence Diagram of Login

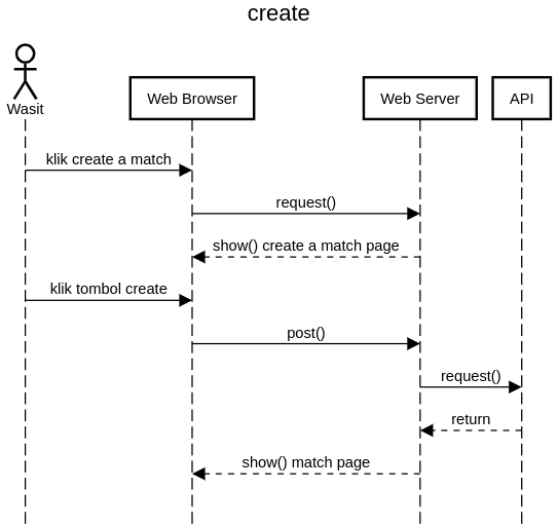

Figure 11.
Sequence Diagram of Create

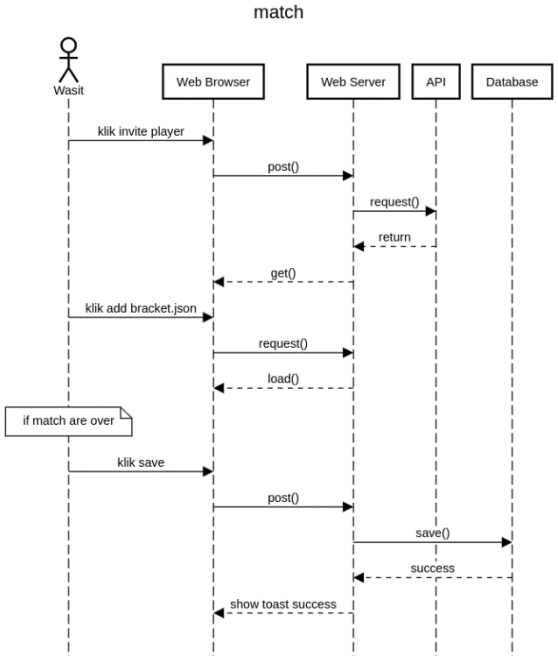

Figure 12.
Sequence Diagram of Referee Panel

3.7 Class Diagram

Class Diagram is used to display several classes and packages in the system being used, the following is a class diagram for creating a tournament management application for referees in the osu! game:

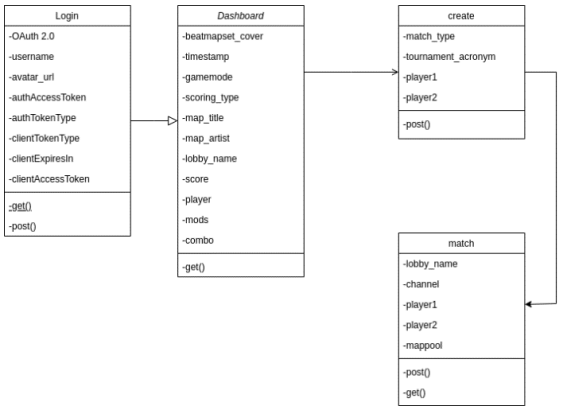

Figure 13.
Class Diagram

4. DISCUSSION

The following is a display of the interface that has been implemented:

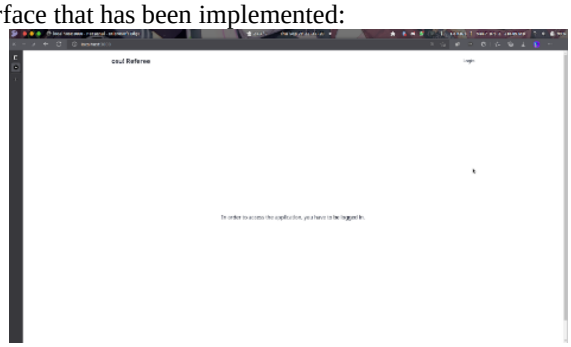

Figure 14.
User Interface of Login

The user interface of login is the main display of the application before the user continues to the next page. Where the user presses the login button on the top right and then authorizes the osu! web. In the authorization there is a code to access the Dashboard page.

Figure 15.
User Interface of Osu! Game Authorization

The user interface of dashboard is the initial display after the user successfully logs in. This display contains a list of match rooms that have been previously created by the referee.

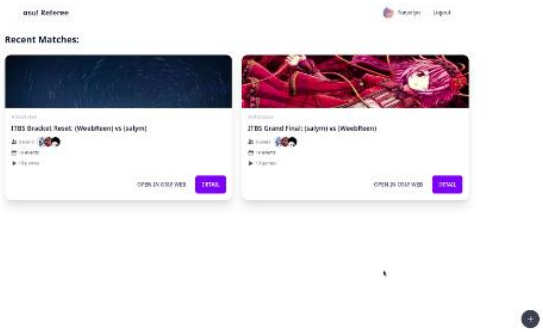

Figure 16.
User Interface of Dashboard

The user interface for creating a match room is a page that contains a form that must be filled in to create a match room.

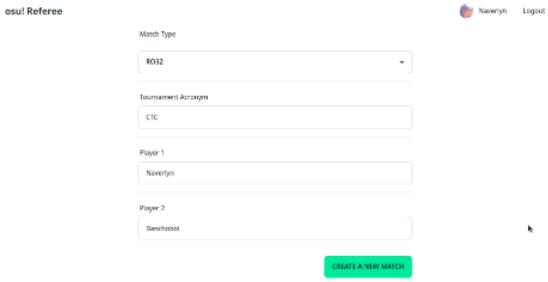

Figure 17.
User Interface For Creating Match Rooms

The user interface of referee panel is a page that contains the actions that will be used by the referee during the match, starting from picking and banning map pools from the pool, inviting players into the match room, uploading bracket.json files into the panel and scoreboard.

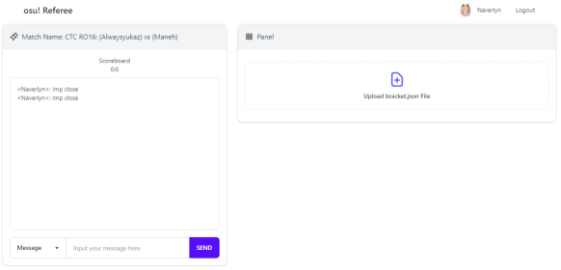

Figure 18.
user interface of referee panel (*chat and upload bracket.json*)

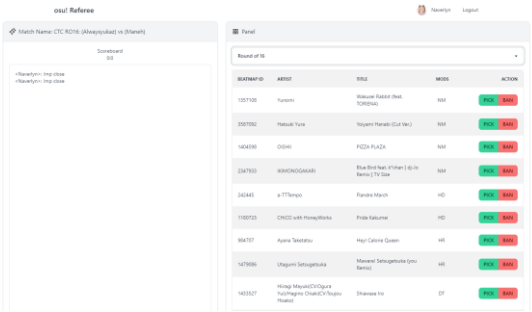

Figure 19.
user interface of referee panel (upload bracket.json)

5. CONCLUSION

Based on the results of the research conducted on the creation of a tournament management application for referees in the osu! game, the following conclusions can be drawn:

a. The tournament management application for referees in the osu! game is made using the JavaScript programming language with the Next.js and node.js frameworks.

b. The role of the tournament management application for referees in the osu! game is to make it easier for referees to manage the tournament matches that will be run.

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