

Kolepa Mobile Application Development Based on Android Using SCRUM Method (Case Study: Kolepa Minigolf and Coffe Shop)

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ABSTRACT

Kolepa Minigolf and coffe shop is an instance which run on minigolf services also food and beverages. Kolepa wanted to develop a mobile apps that can be use for Kolepa Customer to check on existing promo and book a table to play. Kolepa Mobile Apps will be integrated with Kolepa database. Based on the interview between Project Manager and owner of Kolepa, there's some feature that must be included on the Mobile Apps, which is Authenticate, Promo, Reservation, and Score Counter. In its implementation, agile methods are applied for each of the functions mentioned above. Application will be develop using Dart Programming Language, which is part of Flutter Framework. Application development is divided into several sprints that are developed with predetermined deadlines. From the results of the development that has been carried out, feature testing is carried out using the blackbox method and it is found that the application has met the functional and non-functional requirements that have been set. The test results using black box testing show that the developed functions can function properly as expected from testing 10 test cases the success is 100 %.



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I. INTRODUCTION

Kolepa Mini Golf & Coffee Shop (PT. Entertainment Dunia Kara) is a business engaged in recreation and food/beverage (F&B). The business, which was founded on April 12, 2021, offers entertainment in the form of mini golf rides (mini golf), in addition, Kolepa Mini Golf & Coffee Shop also has coffee outlets that offer heavy meals, snacks, and varied drinks.

Currently, Kolepa Mini Golf has established a second branch, namely Kolepa Express which focuses on selling food and beverages. Supported by a strategic location at Fresh Market Bintaro, and a variety of food and beverage choices, Kolepa Express makes the right choice to visit after doing sports activities in the golden area of Bintaro.

There are already many business entities in the economic field that use digital services such as social media and online marketplaces to promote the goods/services offered. Because of the affordable cost and easy access, many entrepreneurs are

interested in doing promotions in digital media or e-Marketing. E-Marketing itself is a marketing process that uses internet communication technology, especially the internet. Digital marketing can be an important factor in business by combining internet media with good product communication to attract consumers to buy products [1]. For this reason, Kolepa Mini Golf and Coffee Shop wants to change their promotion into digital so that Kolepa can easily do the ongoing promotions in Kolepa.

Technology brings major changes in business, education, and transportation. One of the things that can be done to help Kolepa mini golf market their promotions digitally is to use an information system [2]. With the information system, it is easier for consumers who visit to interact with each other and make it easier for owners and staff to facilitate business processes that run at kolepa mini golf. In addition, the information system can help manage business process data in kolepa and be able to make backups of the company's database so that it is more organized [3].

The calculation of scores that are still manual and uses paper is very difficult for Kolepa Mini Golf & Coffee Shop, and inappropriate and unorganized reservations are a problem for them in managing their daily business. With the digital service, it is hoped that it will be a breakthrough to reduce the use of paper to play at the Kolepa Mini Golf & Coffee Shop and arrange the reservation format so that it is suitable and easy for managers to manage.

A wide variety of applications and web services need to have some kind of authentication framework in mind while keeping in mind the ultimate goal of recognizing users [4]. One of the use cases of this authentication is to control access to premium data and to store user information. Today, organizations are constantly evolving in terms of resources and their use by different types of users [5]. Both users from within the organization, as well as outside the organization. Role-Based Access Control (RBAC) can ensure that only authorized users are granted access to certain data or resources [6].

Several related studies have been carried out by [7], the researcher made an electronic journal application using the agile method, where from the results of the study 3 sprints were carried out with a total duration of 34 days. Research conducted by [8] is the creation of an inventory system at Telkom Access Ilir using the scrum method where the result is that 11 functional systems can be carried out properly.

From the background described above, this research provides a solution to Kolepa in the form of an Android mobile based Kolepa application. In the application there are features according to Kolepa's problems such as Score Counter, Reservation, Promo, and Authentication so that the features can only be accessed by the desired party. This report will discuss in more detail the steps for creating features in the Kolepa application.

II. METHODS

Many projects that use traditional software development methods have major problems, especially in maintenance and changes based on user requests. Some of these changes are considered to have a major impact, especially on the project development flow that has been designed. This is not a good thing in a project so a method is needed that can accelerate development and effectively respond to changes. This project development method is called Agile [9].

Agile is a project management method that uses short development cycles, or "sprints" 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 the various forms of information systems development methodologies that exist, under the auspices of the Agile Alliance [10].

Agile Process eliminates most of the time on system planning and tries to stick to the promised system delivery schedule as much as possible. The requirements that are

needed are directly driven by the customers themselves, and if there are changes to these requirements, developers are required to be able to adapt to the changes that occur. In the Agile Development method, interpersonal communication relationships take precedence over tools and processes. With the agile method, it will be able to help software developers to complete products in a timely manner from the initial stage. Some of the other advantages of agile methods are

1. Increase the productivity of members in the team
2. Improve the quality of software products
3. Increase the level of user satisfaction
4. Minimize development costs

In this study, the Dart programming language and the Flutter framework were used in developing the application. Dart is an object-based programming language (PBO) created and developed by Google. Dart programming language has been demonstrated as a language capable of creating large-scale web-based applications such as AdWords. Dart was originally created to be a substitute / replacement as well as the successor of Java Script. Darts also actualize most of the important attributes present in Java Script [11]. Flutter is an implementation of the Dart programming language. An SDK for mobile applications that has Java integration. The application creates a simple Dart class, uses optional parameters, creates a factory, implements an interface, and uses Dart to program its functions. The usability and language that programmers are familiar with makes it a good candidate for implementing a complex system [12]. In the agile methodology there are several stages that can be seen in figure 1 [13].

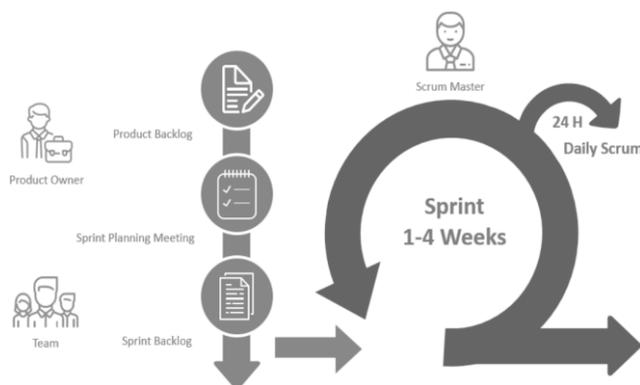


Figure 1. Scrum Method Process

Discovery

It is very important to understand the vision of a client when working on a new project. Software development with the Agile method begins with research to achieve an understanding of the goals to be achieved by the client, the challenges that exist, the current business climate, as well as existing customers and users. This first stage includes ensuring that there is a common understanding among clients, project managers, designers, developers, and product owners.

After the discovery process, the team will start working together to create a high-level Product Backlog containing a list of features that will be useful to both the client and the user. The product owner will work with the client to prioritize features and determine the order in which features will be designed, developed, tested, and implemented. This will help the team stay focused on delivering high-value features before working on low-priority tasks. The table of functional requirements for the system to be built can be seen in table 1.

Table 1. Software Functional Requirements Table

SKPL-ID	Description
SKPL-F01	User can login by entering email and password
SKPL-F02	User can reset (reset) reset password
SKPL-F03	User can do user registration
SKPL-F04	User can send OTP code through whatsapp while registration
SKPL-F05	The software can resend the OTP code within a certain period
SKPL-F06	The user can logout
SKPL-F07	Software can display promo banners in the form of a carousel so that users can scroll the banners horizontally.
SKPL-F08	Software can display the contents of the promo details on the promo detail page according to the banner that the user taps on.
SKPL-F09	The software can switch to the reservation page if the user taps the "Book a Table" button on the promo details page.
SKPL-F10	The software can display a firebase compliant leaderboard when the user taps on the leaderboard banner.
SKPL-F11	The software can display "Promo" page in app When account has superAdmin role.
SKPL-F12	The software can add new promo banner.
SKPL-F13	The software can edit the details of an existing promo banner.
SKPL-F14	User can delete promo banner.
SKPL-F15	User can publish promo banners that are in hold status.
SKPL-F16	User can archive/hold banners that are currently being published.
SKPL-F17	User can run the reservation feature with the input form
SKPL-F18	User can redirect data from the input form to Kolepa whatsapps
SKPL-F19	User can add score counter using Tap to add score
SKPL-F20	User can limit a maximum of 4 players to play
SKPL-F21	The user sees rules and scoreboard
SKPL-F22	User can see the result of the score
SKPL-F23	User can save and share the final score

Product Backlog

After the discovery process, the team will start working together to create a Product Backlog that contains a list of features that will be useful to both the client and the user. The product owner will work with the client to prioritize features and determine the order in which features will be designed, developed, tested, and implemented. This will help the team stay focused on delivering high-value features before working on low-priority tasks. Product backlog can be seen in table 2.

Table 2. Product Backlog Items

No	Activity	Priority Label
1	The need for documents and data	Medium
2	System and database design	High
3	User Login Page	High
4	Dashboard and User Profile	Medium
5	Promo Page	Medium
6	Promo management page	Medium
7	Users can make reservations	High
8	Users can play according to the rules	High
9	Score management	High

In the product backlog contained in Table 2, activities number 1 and 2 are aimed at identifying and designing an information system based on the documents and data that have been collected. Furthermore, activity number 3 and so on are more focused on developing android-based systems.

Iteration

After ensuring that the team understands the client's vision and creates an appropriate backlog, the team will begin implementing the features that have been created in a time-measured iteration called Sprints. Sprint itself lasts for a duration of 1-4 weeks, depending on the size of the project and the time available, where each Sprint will meet the objectives in the backlog.

Sprint

Agile methodology emphasizes orientation to customer needs, as well as how the team can deliver prototypes quickly [8]. Therefore, the project will be divided into several sprints. A sprint is a time-box containing work periods in which the sprint focuses on product delivery based on items selected from the Product Backlog [14].

The sprint plan for feature development on the Kolepa Mobile App that has been discussed and agreed upon by the project manager and the Kolepa Mini Golf and Café can be seen in Table 3. To track progress, the Kolepa Mini Golf and Café always communicate with project manager every two days at week.

Tabel 3. Sprint Plan

No	Sprint	Total Days	PIC
Sprint 1	Register Page	8	Siraz Tri Denira
	Login and Forgot Password Page		
	OTP Page		
	Profile Page		
	Register Page		
	OTP Verification Page		
	Login aand Forgot Password Page		
	Edit Profile Page		
	Manage Admin Page		
	Change Contact Reservation Page		
Sprint 2	Home Page	8	Muhammad Tyaz Gagaman
	Promo Desction and Leaderboard Page		
	Promo List Page		
	On Going Promo Page		
	Description Promo page		
	Add Promo Page		
	Edit Promo Page		
	Delete Promo Page		
	Publish/Hold Promo Page		
Sprint 3	Main Page	8	M. Fazar Zuhdi
	Tap Score Counter Page		
	Player Page		
	Match Result Page		
	Add house rules and Mini map page		
	Score Table		
	Reservation Page		
	Redirect Page (Whatsapp)		

III. THE RESULT AND DISCUSSION

System implementation is the stage for building applications using certain programming languages. At this implementation stage, the development of the inventory system uses the Flutter framework with the Dart programming language. The following is the result of the implementation of the features in the Kolepa Mobile App.

Login Page

The Login page is the page that the user first sees when they want to authenticate. Users can input their registered email and password on the Kolepa Mobile App to login. The login page that has been developed can be seen in Figure 2.

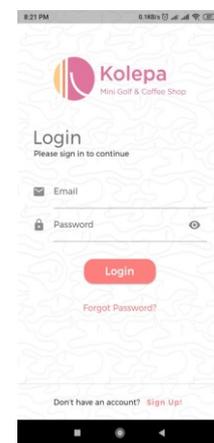


Figure 2. Login Page

Forgot Password Page

When users forget their account password, they can enter their email on the Forgot Password page that has been registered on the Kolepa Mobile App. An email containing a link to change the password will be sent to that email. The forgot password page that has been developed can be seen in Figure 3.

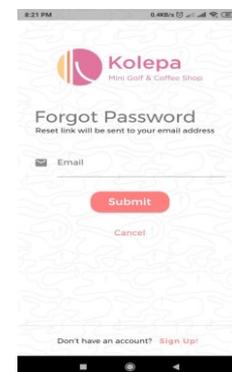


Figure 3. Forgot Password Page

Register Page

For users who want to register for the Kolepa Mobile App, they can do so on the Register Page by entering some data as shown in Figure 4.



Figure 4. Register Page

OTP Verification Page

After completing the form on the Register Page, the user will then be directed to the OTP page to verify the phone number via Whatsapp. If no message comes in, the user can resend the OTP code within a certain period. OTP verification is used to improve security aspects into the system [12][15][16]. The OTP verification page that has been developed can be seen in Figure 5.

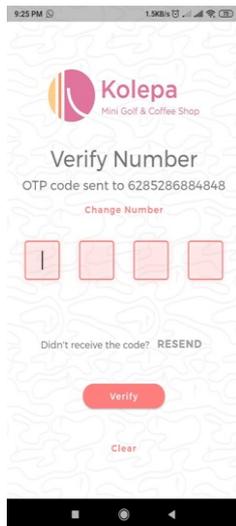


Figure 5. OTP Verification Page

Profile Page

Profile page can only be accessed by users who have authenticated. This page will have a different appearance, according to the role owned by the user. The admin and superadmin user profile pictures can be seen in Figure 6 and Figure 7.

1. Role User and Admin

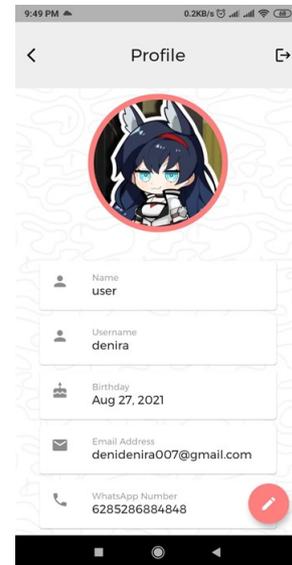


Figure 6. Profile User and Admin Page

2. Role SuperAdmin

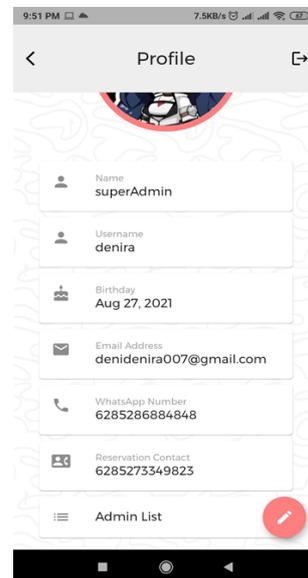


Figure 7. SuperAdmin Profile Page

Management Admin Page

The Manage Admin page can only be accessed by users who have the SuperAdmin role. This page serves to change the user role from User to Admin role or vice versa. Figure of management admin page can be seen in figure 8.

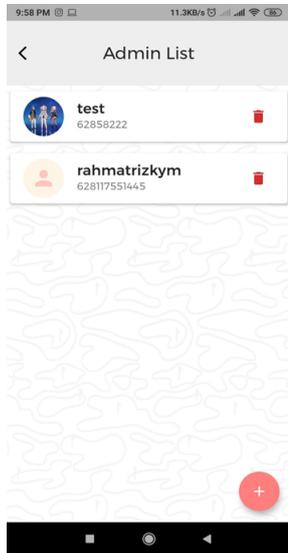


Figure 8. Management Admin Page

Home Page

The Home page displays ongoing promotions in the form of a banner that can be shifted horizontally to display other banners. In addition, the home page also displays the Leaderboard banner of the minigolf challenge held by Kolepa. Figure of homepage can be seen in figure 9.



Figure 9. Home Page

Promotion Description Page

This view appears when the user taps on the banner display on the home page. On this page, users can see the details of the promo such as full-size image of the banner, caption, and description. In addition, the promo description page can also display a "Book A Table" button which is useful for directing users to the reservation page so that users can make reservations immediately if they are interested in the promos offered. Figure of description page can be seen in figure 10.



Figure 10. Description Page

Leaderboard Page

The Leaderboard page displays the rankings of Kolepa customers who took part in the minigolf challenge. Score data is taken based on existing data in the database and compiled automatically by the program according to scores from the smallest to the largest. Figure of leaderboard page can be seen in figure 11.



Figure 11. Leaderboard Page

Registration Promo Page

The promotion list page is linked to the database. This page can only be accessed by accounts with the super admin role. Promotions are divided into 2 groups, namely “Ongoing” which means the promotion is being displayed on the home page and “On Hold” which means that the promotional banner is being archived. On this page, users can also add, delete, edit, and change the status of the promo. Figure of registration of promo page can be seen in figure 12.



Figure 12. Registration Promo Page

Reservation Page

The reservation page is the main view of the reservation menu. In the reservation menu there is no data that you want to input to be submitted as reservation self data when the user wants to play mini golf. Users who want to make a mini golf reservation at Kolepa Mini Golf & Café must fill in the required data to continue the reservation. Users must fill in data in the form of an active whatsapp/mobile number, username, number of people arriving, date and time, and selection of smoking/non-smoking room. Reservation page can be seen in figure 14.

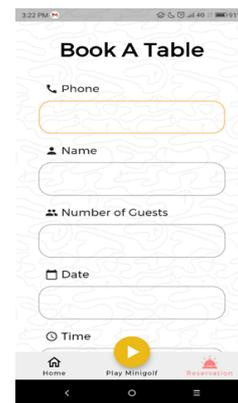


Figure 14. Reservation Page

Add/Edit Promotion Page

The promotion list page is used to display a form to fill in the details of the promo such as the banner image, name, title, and promo description. Add/Edit promotion page can be seen in figure 13.



Figure 13. Add/Edit Promotion Page

WhatsApps Redirect Page

In the picture the author still uses the author's relative number because of the confidentiality that has been discussed by the project manager and owner of Kolepa Mini Golf & Café. After sending the message, the reservation will be reviewed in advance by the Kolepa Mini Golf & Coffee. Whatsapp redirect page can be seen in figure 15.



Figure 15. WhatsApps Redirect Page

Addition Player Page

Display when 4 players are added, due to Kolepa regulations, the maximum number of players in a group is 4 players. So, the add player button will be grayscale and can't add more players. Then there is a red trashbin button to delete unwanted players. Addition player can be seen in figure 16.

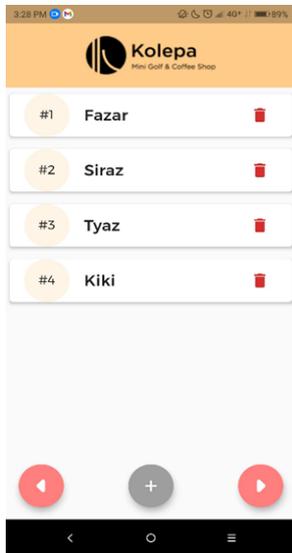


Figure 16. Addition Player Page

Score Counter Page

The initial display of the score counter has four boxes and arrows to set the score for each player playing. Each player is given an initial score of 0. There is an image of the golf course at the top and there are three floating action buttons at the bottom. Starting from left to right, here are the functions of these buttons. The “House rules” button is a button to show the rules when you are at the Kolepa Mini Golf & Café shop. Score Counter page can be seen in figure 17.



Figure 17. Score Counter Page

Final Score Page

The result of the game is 18 courses. The view is the view after adding up the total scores of the players and sorting them from smallest to largest in terms of player strokes. There are decorative ornaments and a container with the contents of the player elements that have been inputted. There are four floating action buttons displayed, with the button on the far left being the Back button, followed by the scoreboard button, then the save picture function button, and the share button. Final score page can be seen in figure 18.



Figure 18. Final Score Page

The Testing Result

The test was carried out by Kolepa together with the research team using the Blackbox testing method. Blackbox testing is a method used to perform testing without using the help of tools. Blackbox testing only tests the system in terms of functional requirements specifications. To perform testing on blackbox testing, unit testing is carried out, namely seeing the units contained in the program features whether they are in accordance with software requirements or not. The results of system testing can be seen in Table 4.

Tabel 4. The Testing Result

No	Testing Page	The number of testing scenarios	Success Percentage
1	Login Page	2	100%
2	Forgot Password Page	2	100%
3	Register Page	3	100%
4	OTP Verification Page	4	100%
5	Profile Page	2	100%
6	Manage Admin Page	2	100%
7	Promo Page	1	100%
8	Description Promo Page	2	100%
9	Leaderboard Page	1	100%

No	Testing Page	The number of testing scenarios	Success Percentage
10	Promo Registration Page	4	100%

Spring Review

In this research, the sprint review takes place at the end of the sprint with the aim of seeing the progress of the application project development that has been made. The team will demonstrate the features that have been worked on. Product demos are carried out by the teams involved in the project. Before this stage is carried out, the team will conduct a trial first to ensure that no bugs/errors are found during the demo.

Sprint Retrospective

In the sprint retrospective stage, the scrum team discusses a list of work that has problems, a list of jobs that can and cannot be done in the next stage. The scope of this task is based on a defined task list and scope of work.

V. CONCLUSIONS

Scrum system development method too assists stakeholders in adjusting to changing system requirements. With resources limited team, scrum can complete applications by relying on coordination between team members to achieve the goal of each of the features required by the user well. System utilization using a web base also makes it easier for users to use the application. The authentication feature developed for the Kolepa Mobile App can run smoothly, where only users with the Super Admin role have access rights to resources for the Super Admin, such as changing the role of the user with the User role into a user with the admin role. Users with the User role cannot add scores to the Ultimate Challenge Leaderboard, which can only be done by users with the Admin Role. This is evidenced by the results of the evaluation that has been carried out together with Kolepa. The reservation system can perform the function of filling in customer data and can send messages according to user input via Whatsapp. The Score Counter system can perform score calculations, score calculations, and final score results. The Home Page system can be used to display promo banners that are currently being broadcast and display the leaderboard. Promo system can add, edit, delete, broadcast and archive promos. The test results using black box testing show that the developed functions can function properly as expected from testing 10 test cases the success is 100 %.

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