

Ding Dong - Community App for Circles

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Abstract—Circles are essential activities for university students. In Korea, about 80% of university students participate in circles. Also, There are many students who participate in more than 1 social activities. For these students, managing circle schedule and keeping track of necessary information of dozen circles is not easy. Ding Dong is a mobile application for circle members. It helps users manage circle activities and to be in touch with other members more easily.

Index Terms—mobile app, community board, circle

I. INTRODUCTION

This document is about our project Ding Dong. It explains how we came up with the idea, functions of the app and how we progress to develop our final outcome.

A. Motivation

Our motivation began with the problem that team members actually suffer from. All three members of the team are participating in several circles. We found it very inefficient how the circles use group chats or alternative social services such as ‘Facebook’, or collaborative tools such as ‘Slack’ and ‘Discord’ to share schedule and notifications. because these services are not made for circle management, there exists several inconvenience. Especially when a person participate in more than one circle. Keeping track of notifications becomes more complicated because the information you need is not well organized. Thus, we came up with the idea of a mobile app that allows circles to organize and handle notices and schedules.

B. Problem Statement

Circle members suffer from following notification and circle schedules using unorganized, decentralized group chats or group pages. Also for circle executives, it is hard to manage the members efficiently. For instance, it is difficult to check who have read the notices, and whether the member is active member or not. Thus we decided to develop a mobile app focused on providing these functions necessary for circle activities.

C. Related Software

‘Band’ is the most famous community board mobile app in South Korea. ‘Band’ is an app for groups, including circles. It provides useful services for group members and leaders

to use. Currently, ‘Band’ is the most similar mobile app out in the market to our service. However, band is more about communicating between band members freely rather than managing notices and schedules. This differentiates our service from theirs. Other social services such as ‘Kakao Talk’, ‘Facebook’ and collaborative tools such as ‘Slack’, ‘Discord’ are also widely used for social circles.

TABLE I
ROLE ASSIGNMENTS

Roles	Name	Task description and etc.
User	Kyung Rok, An	Predict current discomfort from the user's point of view. Also, look for alternatives.
Customer	Kyung Rok, An	Research the functions that the customers need. In addition, Consider how customers will continue to use this application.
Software developer	Chang Hui, Yun	Compose an overall app view that can satisfy users. Implement various functions. Create data base. Manage data I/O.
Development manager	Jun Seub, Lim	In charge of the project, Develop and implement a development plan. Calculate the cost. Pursue communication of each role.

II. REQUIREMENTS

A. Login and Sign Up

- 1) Onboarding: Couple of slides to show users that explains about the app and how to use it. Onboarding will be displayed only the first time the user opens the app.
- 2) Sign up and Log In
 - a) Signing up: Sign up requires username, email, password
 - b) Log in: log in via username and password.
 - c) Log out: log out by pressing log out button
 - d) Password Reset : Password Reset view using mail authentication.

- e) Auto Login : Once login is successful, login is not required for execution unless separate logout is performed. (Token-based Authorization)

B. Main Page

The main page will consist of tab bar, side drawer and a header.

- 1) Tab Bar: The tab bar will consist of 4 pages: Home, Calendar, Circles, MyPage. Click on each will navigate to each page. The first page to be shown is the Home page.
- 2) Side Drawer: The Side drawer will show the user's information and the list of circles the user has joined. Clicking on the list item will navigate to the circle's page.
- 3) Header: Header consist of title, and a notification button.

C. Home Page

The Home page consists of two parts. Notice board and posts feed. Notice board will show previews of the latest notifications from all the circles the user is in. The news feed will show new posts.

- 1) Notice board: Notice board block shows 5 recent notices from all the circles the user is in. It will be horizontally scrollable.
- 2) Post feed: Post feed will provide posts from all the circles the user is in. It will be vertically scrollable.

D. Calendar Page

Calendar page shows schedules for each or all circles.

- 1) Choose circle: Users can choose the circles the calendar to show schedules of. (box button)
- 2) Detailed Schedule: Users can click on a specific date to see the detailed information about the schedule.

E. Circles Page

Circles page is where circles can promote themselves and attract new members. Also, users can find new circles to join.

- 1) Search: Users can search circles based on the name or the explanation of circles.
- 2) List: A list of circles will be shown to to users to choose from.

F. MyPage

MyPage is where users can modify their information, change settings and log out. It will provide a list consisting of: change profile image, change username, change settings, log out and 1:1 QnA.

G. Page for each Circle

Each circle owns a single page. A page is where admins can create boards for specific purposes(i.e notices).

- 1) Page creation and deletion.
 - a) Create a Page: Circle administrators can create a page by providing the name, thumbnail(optional), and a brief explanation.

- b) Delete a Page: Circle administrators can delete a page, when all executive members of the circle agrees.
 - c) Modify a Page: Circle administrators can modify a page by changing the name, the thumbnail or the explanation.

- 2) Members and Administrators: The members of the page are divided into two groups: administrators and members. They have different authorities.

- a) Appointing administrators: The creator becomes the president of the page. He or She can appoint members as administrators of the circle.
 - b) Administrators: The administrators have authorities:
 - Creating a board
 - Control access to each boards
 - Invite new member to the page
 - Dismiss a member from the page

- c) Members: The members do not have any special authority. They can read and leave comment to a post.

- 3) Community Board: Boards are used to post notices, schedules and any other information to share with the group members.

- a) Create a Board: Administrators can create boards, each for any specific purposes.
 - b) Manage a Board: Administrators can grant members permissions for each board. The permissions are as following:
 - Read: A member can read the posts.
 - Write: A member can create, modify, delete posts.

- 4) Posts: Posts must include a title, content and can include circle functions(which will be explained later), and images.

- a) Create a Post: Only members with permissions to the board can create a post.
 - b) Modify a Post: Only the owner of the post or administrator can modify a post.
 - c) Delete a Post: Only the owner of the post or administrator can delete a post.
 - d) Comment to a post: Any members who have access to the board can comment on a post.

- 5) Circle functions: circle functions are useful functions for circles to use. These functions can be included in posts.

- a) Voting function: Members can vote on a item.
 - b) Ladder game: Members can participate on a ladder game.
 - c) Lottery: Members can participate on a lottery game.

- 6) Invitation function: for inviting new members of the circle.

- a) Invite new members: Executives can send KakaoTalk message that includes a link that will

allow new member to join the group. Or users can search for circles in the app and send request to the executives.

- b) Accepting request: Executives can accept requests from new members to join the page.

III. DEVELOPMENT ENVIRONMENT

A. Development Environment and programming languages

- 1) React-Native 0.63.3: for development of Android and iOS application.
- 2) Python 3.7.4: for development of web server.
- 3) Django 3.1.1: Django is the most popular python web framework that allows rapid development of web services. We will use Django for development of our backend server.
- 4) Django-Rest Framework 3.12.1: Django-Rest framework is a framework that helps making the django server RESTful. Since we will be using our django server as a backend server for mobile application, we will need to make our server RESTful.
- 5) MySQL: Database management.
- 6) AWS EC2: AWS EC2 is a web service that provides secure, resizable compute capacity in the cloud. We will use EC2 to host our django server.
- 7) AWS RDS: AWS RDS is a web service that makes it easier to set up, operate, and scale a relational database in the AWS Cloud. We will use RDS to manage our database.
- 8) AWS S3: AWS S3 is a storage service. We will use S3 to store images that the users upload.
- 9) Linux(Ubuntu Server 18.04): We will use Ubuntu Server 18.04 on our EC2 instance to deploy our server.

B. Cost Estimation

The cost will mostly come from using AWS services. We estimate the cost to be around \$100.

C. Software in Use

We made use of open sources to build our app. Especially for React-Native, there are many third-party libraries that we can use, such as react-native-navigation.

D. Task distribution

- 1) Kyung Rok An: Front-end developer. He is in charge of development of our mobile app using react-native.
- 2) Chang Hui, Yun: Back-end developer. He is in charge of development of our Django based server.
- 3) Jun Seub, Lim: He is in charge of deployment and management of the service.

IV. SPECIFICATION

A. Onboarding

Few pages with image and text that explains about our service and how to use. Will only be displayed the first time user opens the app.

B. Sign up and Log In

- 1) Signing up : Enter 'username', 'email', 'password', and 'password again' in the Text input box. If the format is not correct, the alert window appears when the Sign up button is pressed and all text input boxes are initialized. The format of username and password is specified below the Text input box. The ID must contain letters and numbers of 8 to 11 characters, and the password must contain letters and numbers of 11 to 15 characters. Email specifies the method by placeholder in Text input box. If the password entered in 'password again' and string do not match, a red warning window appears under the Text input box. If sing up is successful, the server generates user information such as tokens.
- 2) Log in : Enter 'username' and 'password' and press the log in button to immediately check the user information on the server and navigate to the main home if it matches the user information.
- 3) Logout : Click the Logout button and the 'alert' window appears, and if user agree to log out, clear the user's token from the Async Storage and the server.
- 4) Password Reset : When entering a user email, a link to the password reset website is sent to the email.
- 5) Auto Login : Auto Login after the first log in is made. We will use token based http authentication.

C. Main Page

- 1) Tab Bar : Use React Native tab Navigate open source. The tabs consist of a total of four: 'Home', 'Calendar', 'Clubs', and 'Mypage'. When the user clicks the tab icon that they want to move, the icon focusing feature highlights which tab they selected.
- 2) Slide Drawer : Use the Drawer Navigate open source from React Native. The slide drawer has three main functions: 'Mypage' is exposed to Drawer's information, and if user press it, it will be navigated to my page. Next is the circle list. The list of circles that users are participating in will be included. When the user presses the name of the circle, the user navigates to the page of the circle. Stack navigation is used and you can specify the circle name in the header section. Finally, the Add clubs button. When you press this button, you can create your own circle there by navigating to a separate stack page, Add circle. When the creation is completed, the items are returned to the drawer navigator state and added to the club list.
- 3) Header : Headers on the main page include the title and notification button. Refresh is executed when pressing Title. Notification button contains new notification and, displays how much new notification has arrived next to the icon.

D. Home Page

- 1) Notice board : Provide notification in text box. User can check each news by sliding it. Click the arrow button at

the bottom of the text box to navigate to the appropriate notice board.

- 2) Post board : Other recent news other than the notice is provided in feed format. The number of exposure is unlimited and user can see all the news of own clubs.

E. Calendar Page

- 1) Choose circle : At the top of the page, images of user's circle are provided in the form of bubbles. Click on the image to expose the schedule of the circle to the calendar. If user don't click any circle, the schedule of all circles will be exposed. Press the star button and link it with the calendar app in the device so that schedule date and time information can be synchronized to the calendar app.
- 2) Detail schedule : Click on a specific date to expose it as modal and to know the circle schedule information. If user press the Title, it will be navigated to the corresponding article page.
- 3) Circle Schedule emphasis : If the circle schedule is updated, a fluorescent border will appear around the circle image bubble.

F. Circles Page

- 1) Search : Entering the circle name in the search box exposes the circle's information as a result.
- 2) Circle's tag : Place circle tags randomly under the search bar. Click to reveal the same results as you searched for the tag.
- 3) List : Basically, circles are exposed to the list randomly.
- 4) Select : Photos, circle names, tags, circle introductions, etc. are exposed when the name of the circle is pressed in the list or search results, and applications can be entered into the circle by pressing the button.

G. My Page

- 1) My photo : My photo: User can upload own photos by synchronizing them with photo album. Circular lenses are provided and the user adjusts the picture they want to fit the size of the round lens we have set. If not used, a base image is provided.
- 2) User introduction : User introduction: Users can set up self-introduction. Only basic text and emoticons are available.
- 3) Change setting : Change setting: Settings include notification settings and cache deletion. User can turn off the notification at any time. Both expose the alert window.
- 4) Logout : Logout function is provided and the alert window is exposed.
- 5) 1:1 QnA : Navigates to a separate page and allows users to post app-related pain points or questions, and developers provide comments on posts.

H. Page for each circle

- 1) Navigates to each circle page through the drawer bar, then presses the info button on the top right to Navigate to the info page.

- 2) Information for each circle : Information entered when creating a circle is exposed. The information is as follows: circle name, circle tag, circle unique code, circle photo, circle member.
- 3) Modify a Page : Modify a Page: It allows circle information to be modified. Photographs, introductions, etc. can be edited and the alert window is exposed when approached by non-authoritarian persons. In the case of authority, it will be moved to the editing page and you can add an authority among circle members or change the authority to a non-authoritative person. User can also delete the circle page. For deletion, the alert window is exposed and takes about 5 days. If an application for restoration is filed within five days, the deletion shall be withdrawn.
- 4) Withdraw from the circle: Any member of the circle can access it, and an alert is exposed when pressed. User can press the 'Leave' button, user will be removed from the circle and the circle name will be deleted from user's drawer navigation system.

I. Members and Administrators

- 1) Appointing administrators: The creator of the circle page will obtain Modify a Page rights within the circle information page. There, members of the circle will be added to the list of authorities through the + button.
- 2) Administrators : The authority may open a notice board and has the right to delete all postings on the board. Admin can also invite specific people through the personal code.
- 3) Members : Members may write on all boards except notice boards.

J. Community Board

- 1) Create board : Only authorized administrator can add boards through the Add Board button. Notice board and gallery are provided by default and cannot be deleted.
- 2) Manage board : The administrator may delete the bulletin board. A red delete button is provided next to the bulletin table. The notification window will be displayed during press, and the confirmation will be deleted within 3 days.

K. Post

- 1) Posts includes Title, content and circle function.
- 2) Create post : All circle members can write posts on all boards except for notice board. When the write button is pressed, it is navigated to a separate Write page. To prevent abusing, only one article can be written in five minutes. The time spent writing remains next to the title of the article.
- 3) Modify a Post : Only the writer can modify user own writing. If modified, the modified time remains next to the title.
- 4) Delete a Post : The writer can delete own Post. Administrators can also delete all posts. For Administrators,

the delete button is exposed for all posts and the alert window is displayed when pressed. If the administrator deletes Post owner's post, the owner is notified.

- 5) Comment to a Post : All members can write the comment and reply further to the comment. The number of comments and reply is unlimited. Comment also has the same delete process as Delete a Post.
- 6) Add calendar : Only administrators are exposed to the calendar display button above the delete button for all posts. When clicking the button, the calendar is exposed through the pop-up window, and the contents of the article are copied.

L. Circle Functions

Circle functions that can be used to write posts.

- 1) Voting function: Ask the members to vote. Voting box have Title, introduction, and content. In Content, items can be increased through the + Add Item button and must have at least one content. Also, the bottom of the voting box is provided with a multiple-response function and a time-set function. Readers will be shown whether a title, introduction, content, deadline, and multiple responses.
- 2) Ladder game function: Ladder game is a game that choose n people randomly. The writer can choose which members will be participating in the game and the number of people to be chosen.
- 3) Check function : When writer enable check function, the check box and the message 'I have checked' are printed on the right end of the writer information. When the readers press, it is activated and the list of people checked is saved in the DB. If the reader presses the box once more, the number of people checked through the model and the number of people not checked will appear.

M. Gallery

Only the title and image are exposed. Although there is no particular difference from the board, it is exposed in the latest order on the main circle page by default.

N. Invitation function

Administrators invite new members directly. Send the circle's ID code via Kakao Talk or mobile message. After that, the user will search the circle's ID code on the main page and apply for the circle. When a user submits an application to the circle, a message is sent to the administrators by notification and the Accept/Decline button is used to decide whether the person can join or not.

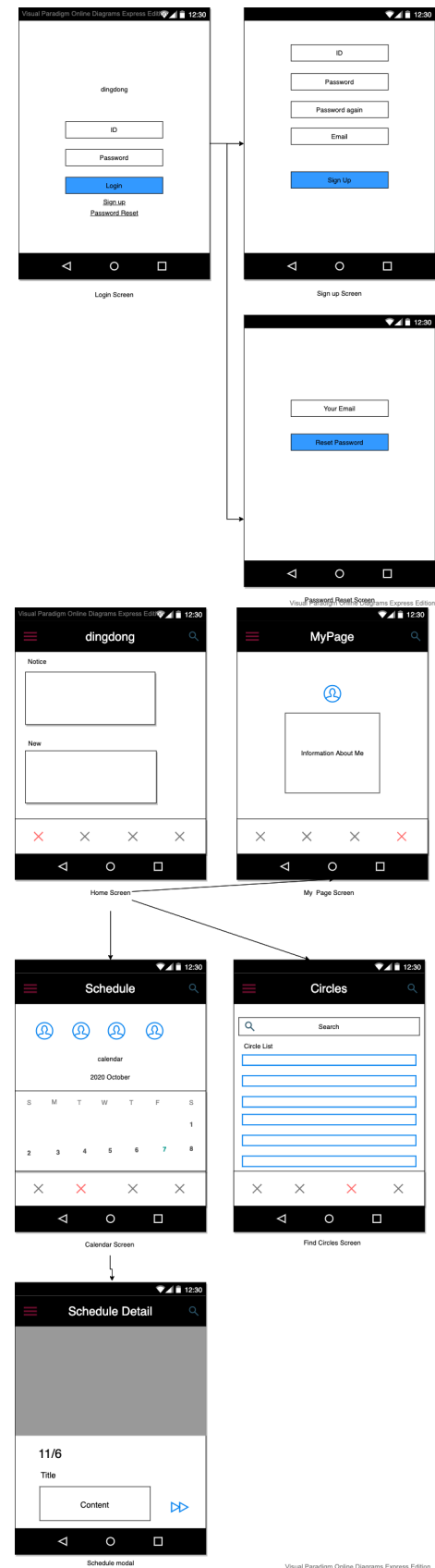


Fig. 1. Log In and Main Page

