

Final Presentation for Term Project

Software Engineering

| Gachon Software Festival | 2021.06.29 |

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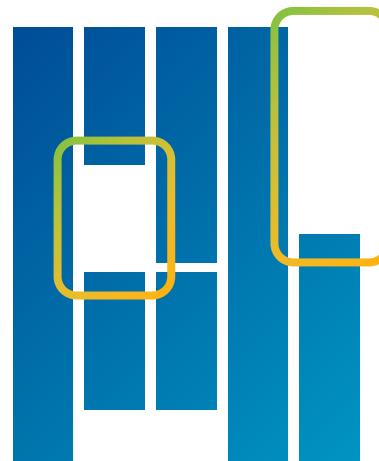


Try on
<https://gcse.doky.space>

Sign in with Gachon University account

Project Objective

Classroom Reservation Service without classes



Find Empty Classroom



Reserve a Classroom



Nudge Based Service

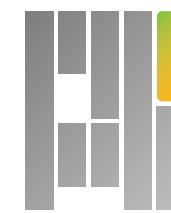
Project Objective



Gachon CRS



Find Empty
Classroom



Reserve
Classroom

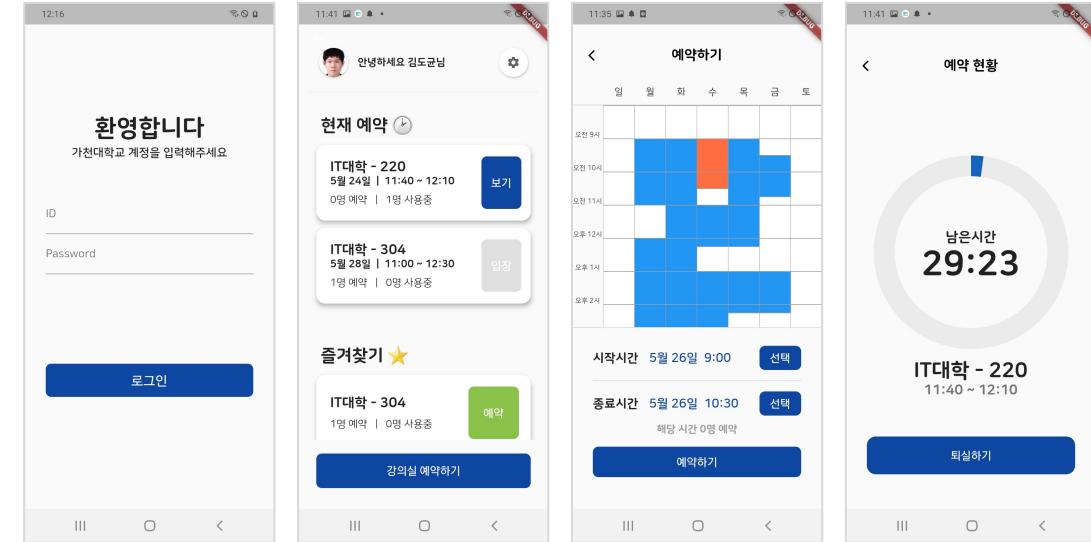


Nudge Based
Service

User Requirements

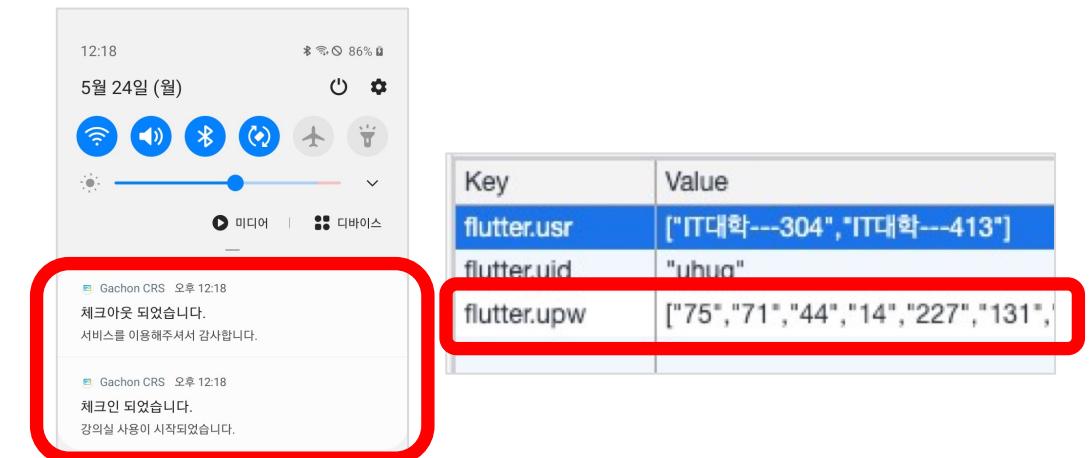
Functional Requirement

- (U) Sign in
- (U) Reserve classroom
- (U) Check status of classroom
- (U) Check information of reservation



Non-Functional Requirement

- (U) Usability - Notifications
- (U) Security - User privacy
- (U) Accuracy - Real-time reservation system



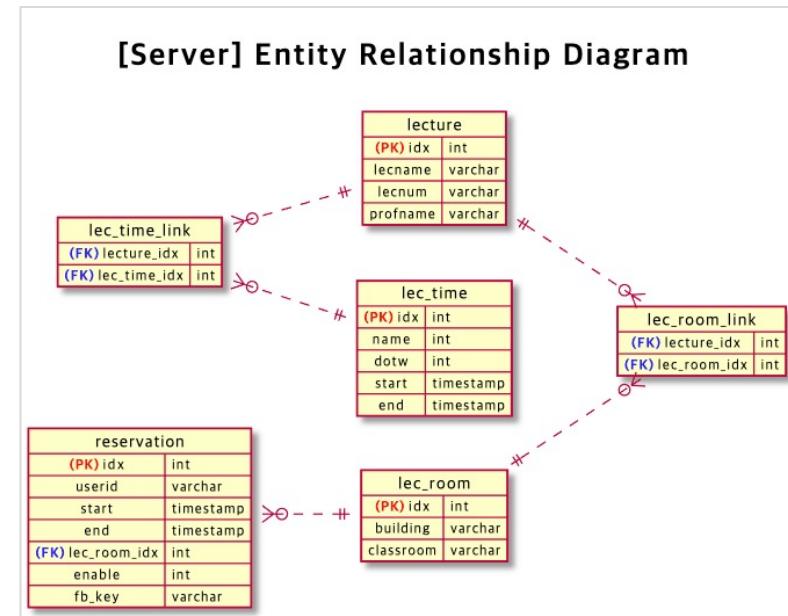
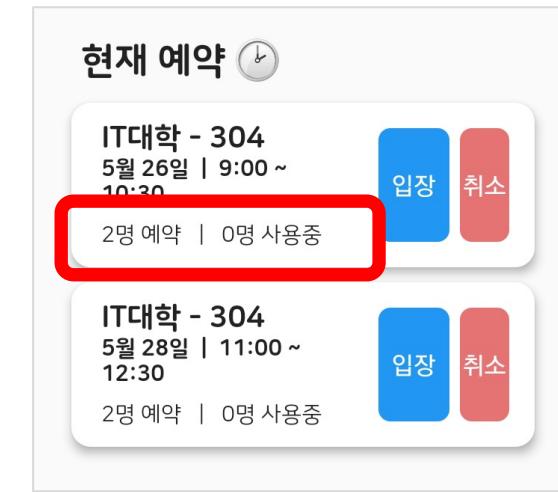
System Requirements

Functional Requirement

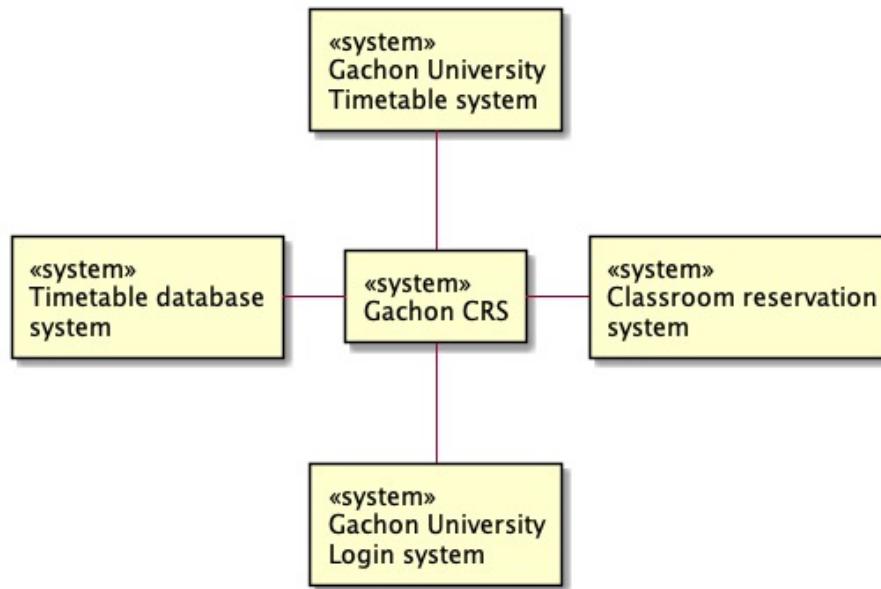
- (S) Showing how many people reserve or using classroom
- (S) Timetable management
- (S) Reservation management

Non-Functional Requirement

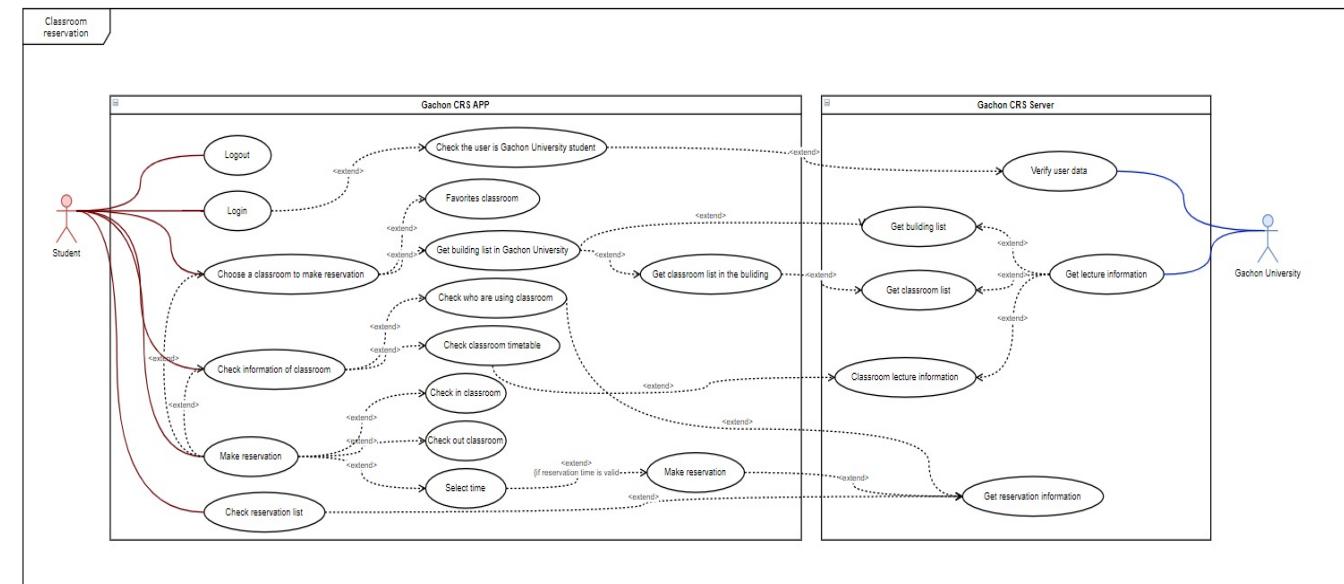
- (S) Development environment & Distribution
- (S) Prevent abusing or free riding user



System Modeling

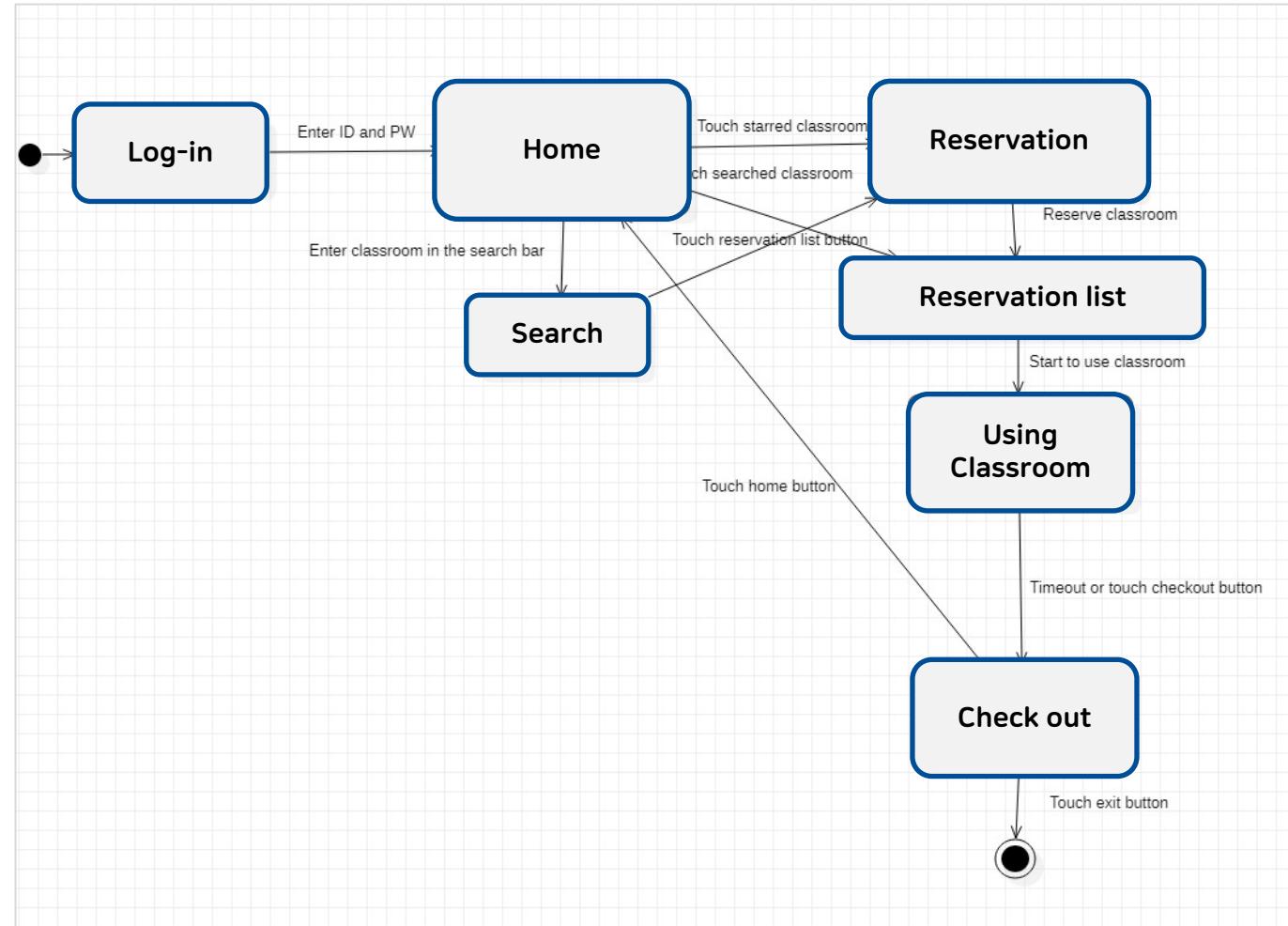


Context Model



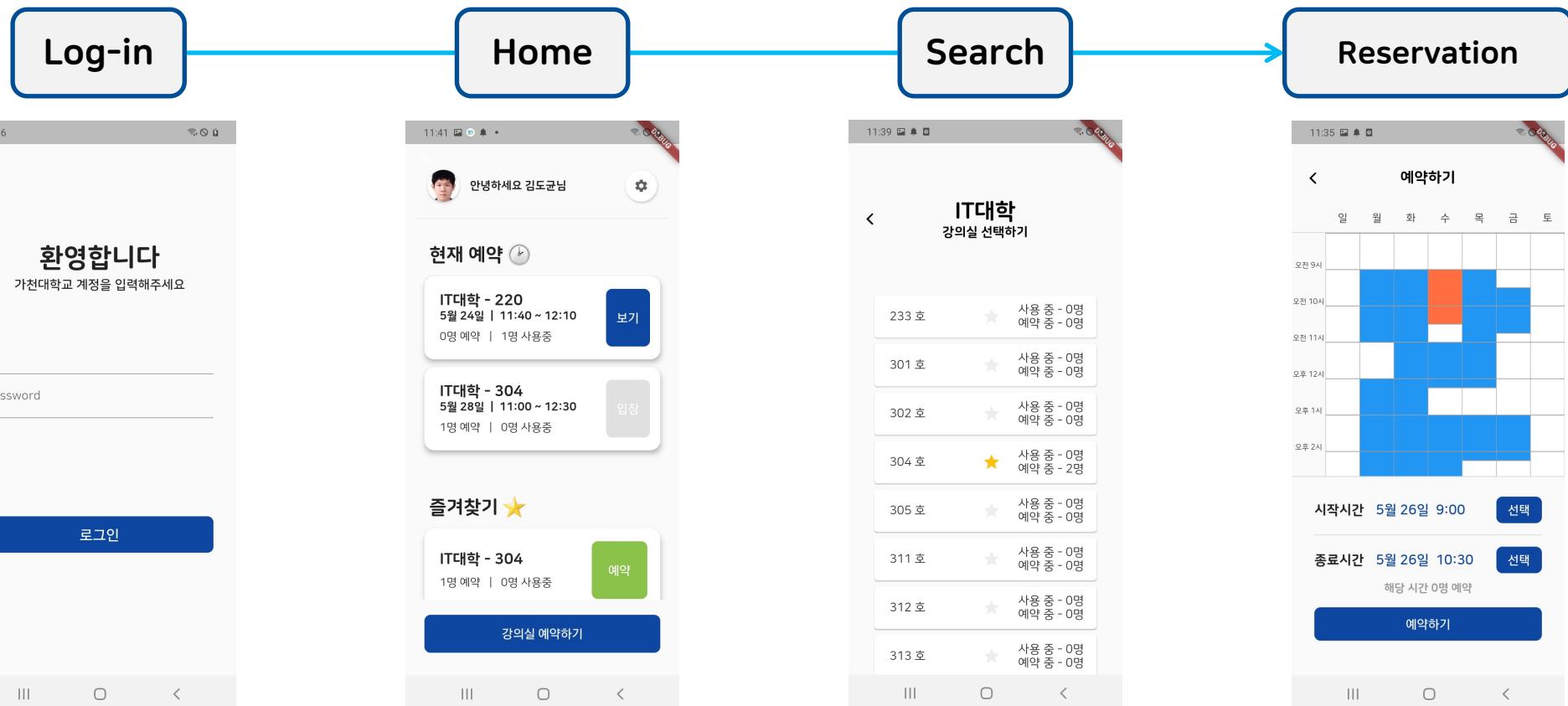
Interaction Model

System Modeling



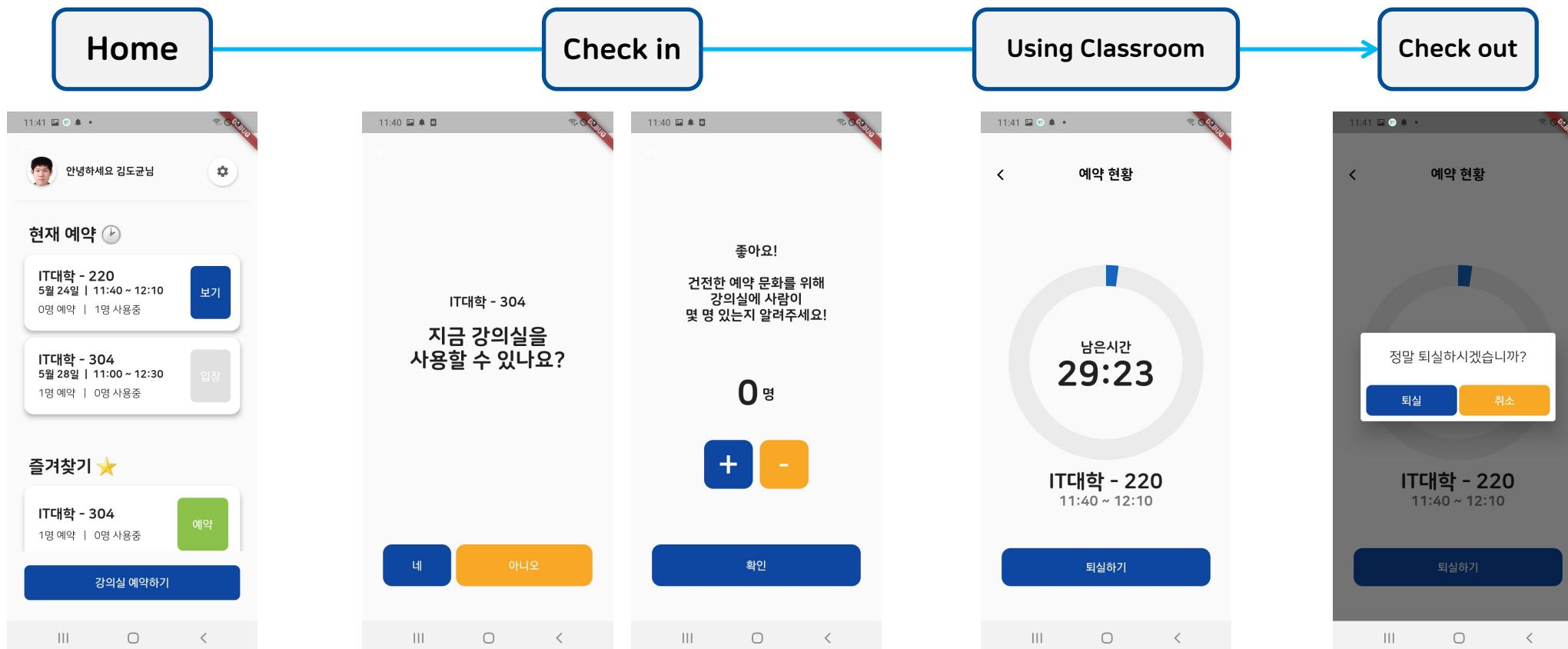
Behavior Model (Event-Driven)

System Modeling



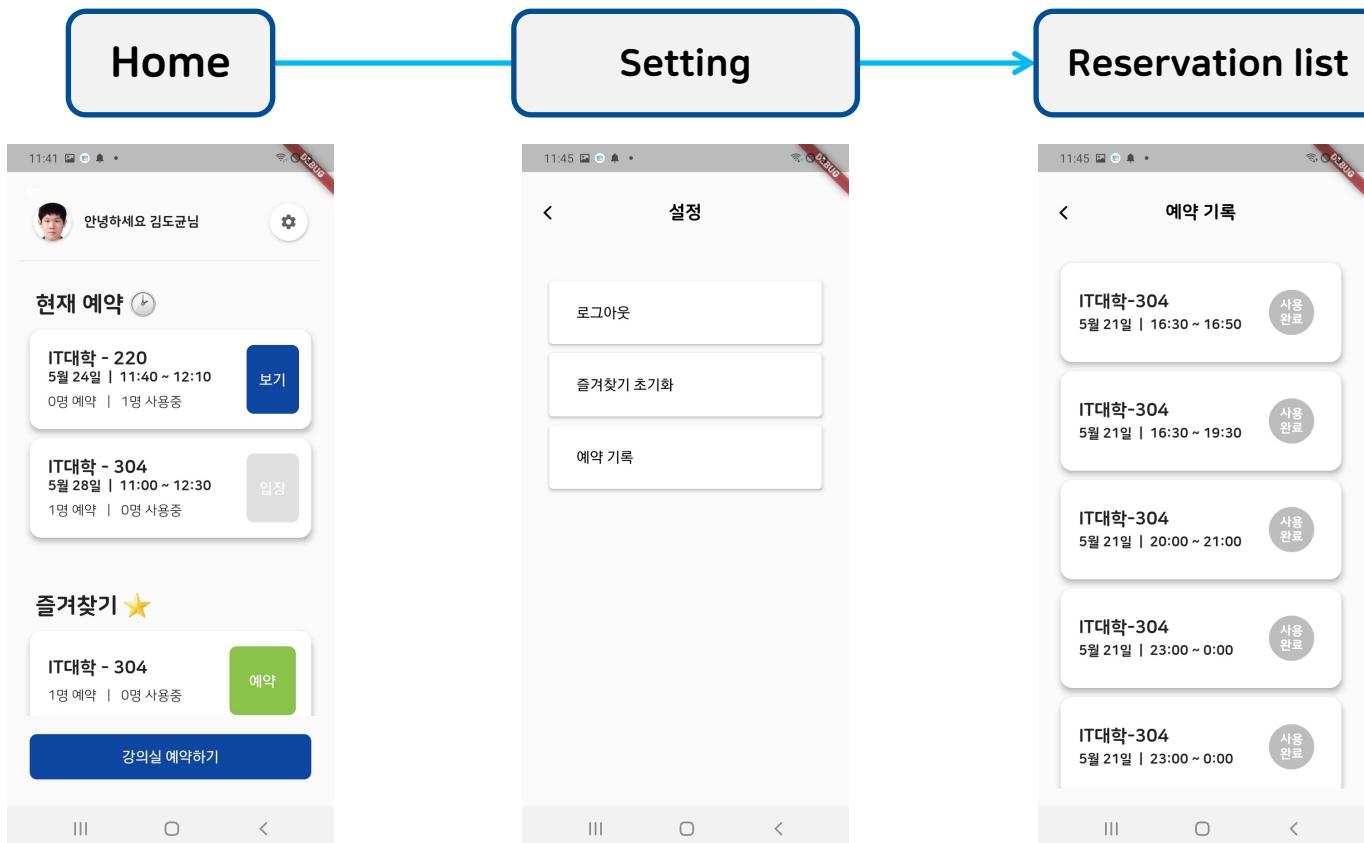
Storyboard

System Modeling



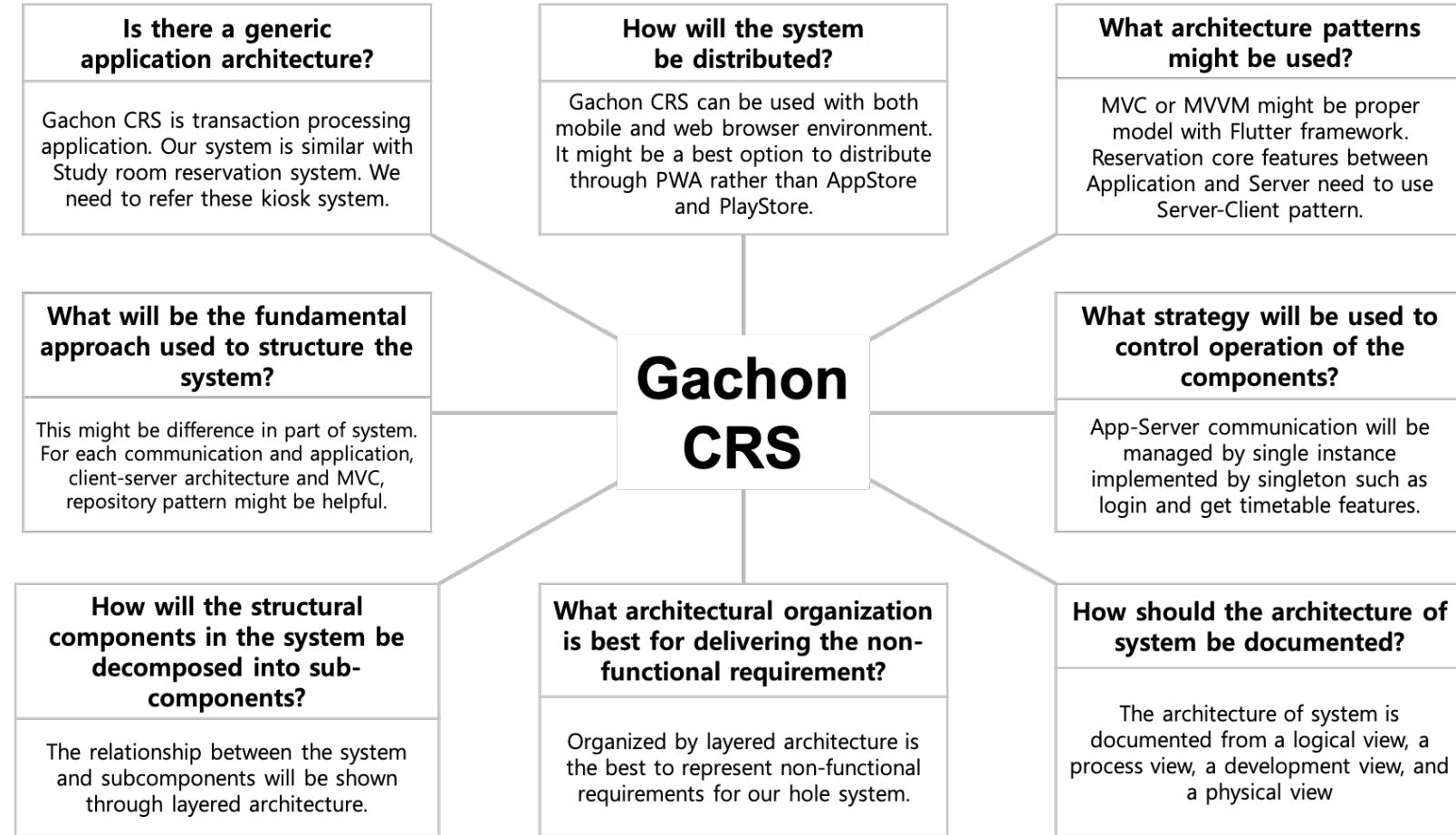
Storyboard

System Modeling



Storyboard

Architecture Design

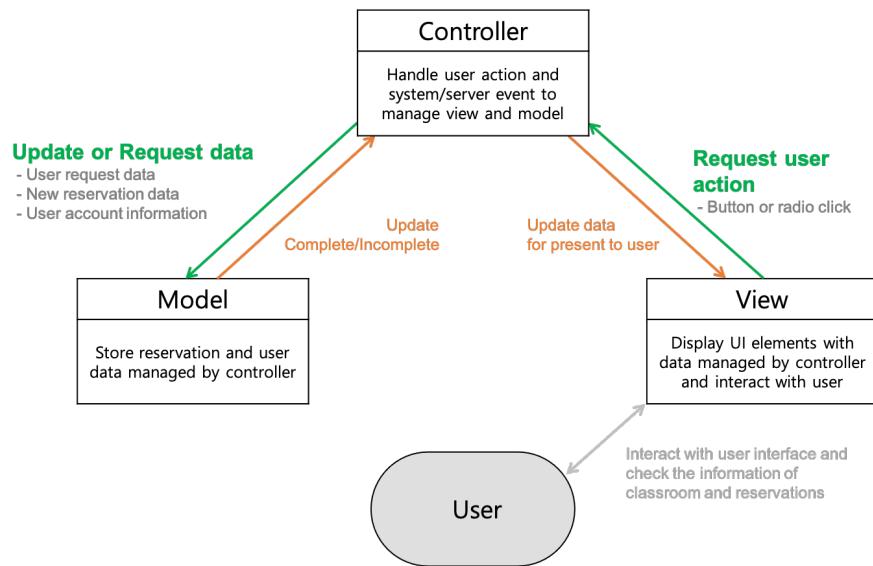


Architecture Design

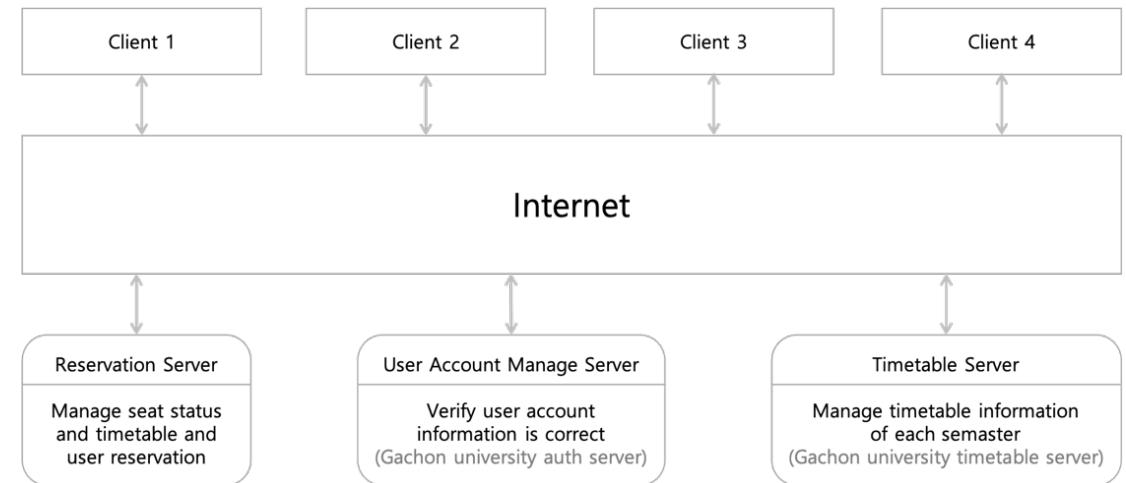
Generic Application
Kiosk for Study Cafe
Transaction Processing Application



Architecture Design



Application Architecture
MVC Pattern



System Architecture
Server-Client Model

Architecture Design

System Environment

Linux (Ubuntu) 18.04

Node.js

MySQL

Nginx

Development Environment

Flutter SDK

Visual Studio Code

Android Studio

Architecture Design

Development Environment

Flutter SDK

Visual Studio Code

Android Studio

Fast Development
Fast Debugging
Web & App Distribution



Implementation

1. Requirement

- Elicit and validate requirements through survey targeted by students of Gachon University.
- Search technical issues for modeling system and application satisfying the requirements.

2. Implements

- Implement Mobile or Web Application.
- Implement Server for API Communication.
- Testing and Debug for communication between App and server.

4. Evolution

- Collect new requirements with validation process.
- Plan to improve and apply the new requirements.



3. Validation

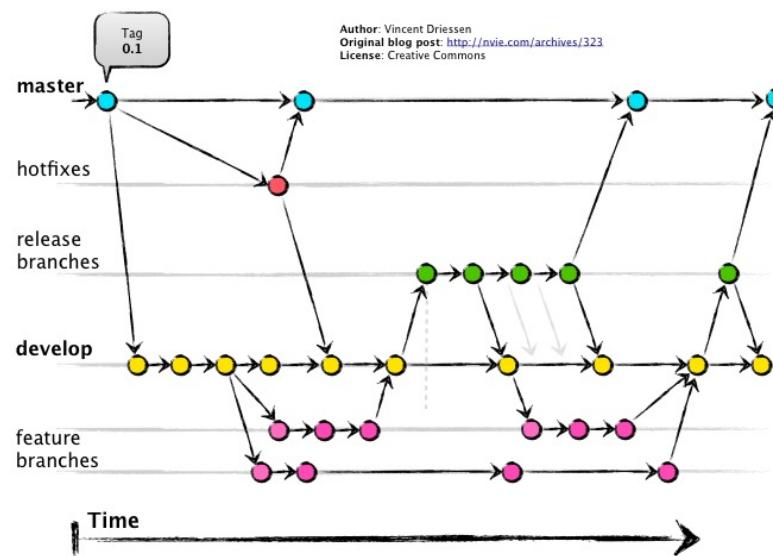
- Unit test for Application and Server.
- Deploy and verify system.
- Validate using feedback with in-app survey system.

Agile Model

- Can develop system faster with incremental modeling
- Available to get fast feedback for modeling and implementation

Configuration Management

Branching Strategy



Git-Flow

Separate branch with..

- main (master)
- develop
- feature
- release
- hotfix

Adoption

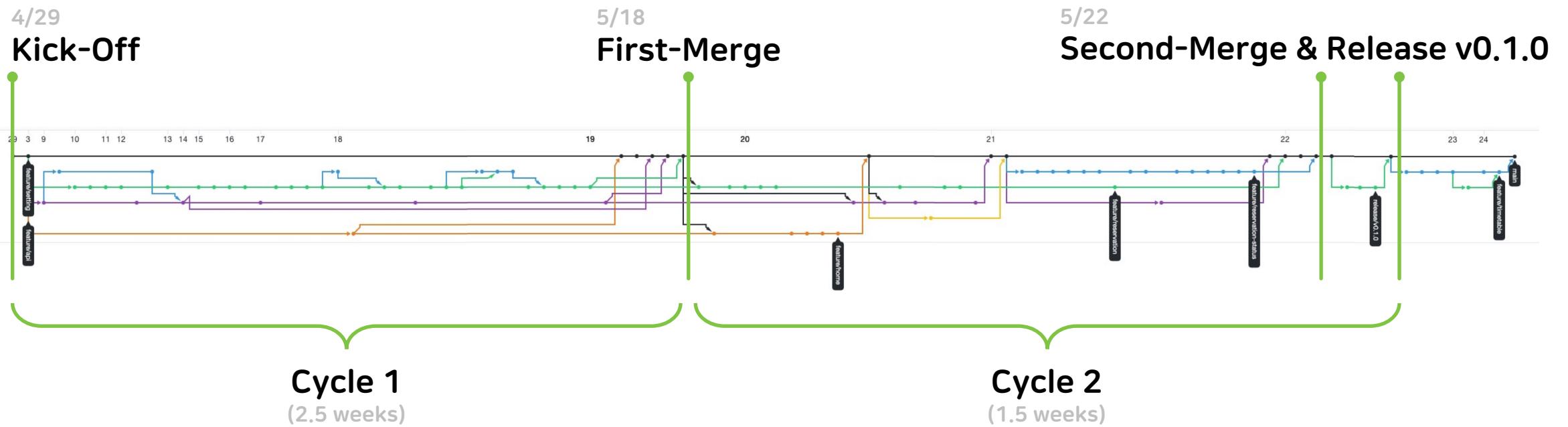
Branches	Tags
✓ main	default
feature/api	
feature/home	
feature/reservation-status	
feature/reservation	
feature/setting	
feature/timetable	
release/v0.1.0	

Branches	Tags
v0.1.1	
v0.1.0	

Reference:

<https://woovictory.github.io/2019/01/21/Etc-Git-Flow/>
<https://github.com/DokySp-study/git-flow-test>

Configuration Management



Demonstration

Web Demonstration

Demonstration

Firebase Cloud Messaging

- 10 minute before check in
- On time
- Check-in
- 10 minute after no check in
- 10 minute before check-out
- Check-out



Testing

API Document

SIGN

GET: /api/sign?id=&pw=

- Verify user data
- parameter
 - id : (mandatory) user id to get data
 - pw : (mandatory) user password to get data
- example: <https://gcse.doky.space/api/sign?id=gdhong&pw=11111>
- response [Success]
 - {
 - "success": true,
 - "id": "gdhong",
 - "name": "홍길동",
 - "dept": "IT융합대학 소프트웨어학과",
 - "photo": "https://wind.gachon.ac.kr/ko/module/member/photo/000000/profile.jpg"
- response [Failed]
 - {
 - "success": false,
 - "msg": "login failed"

SCHEDULE

GET: /api/schedule/buildings

- Give all building names
- example: <https://gcse.doky.space/api/schedule/buildings>
- response
 - {
 - "result": [
 - "(M)간호대학",
 - "(M)보건대학원대학",
 - "(M)약대학원대학",
 - "(M)의과대학",
 - "IT대학",
 - "기획관",
 - ...

GET: /api/schedule/classrooms?bd=

- Give all classroom of certain building
- parameter
 - bd : (mandatory) building name
- example: <https://gcse.doky.space/api/schedule/classrooms?bd=IT대학>
- response
 - {
 - "result": [



API Document based unit test with Jest, Supertest, and Should packages

backend git/master* 16s
➤ npm test

> se@0.0.0 test /home/uhug/SE/backend
> jest test/* --coverage --forceExit

RUNS test/sign.spec.js
RUNS test/schedule.spec.js
RUNS test/reservation.spec.js

Test Suites: 0 of 3 total
Tests: 0 total
Snapshots: 0 total
Time: 7 s, estimated 13 s

PASS test/reservation.spec.js (9.352 s)
Test reservation.js
GET: /api/reservation/all

- ✓ Give all reservation of specific classroom (174 ms)
- ✓ Handle wrong query (4 ms)
- ✓ Handle wrong query (empty) (3 ms)
- ✓ Handle query missing (bd) (2 ms)
- ✓ Handle query missing (all) (2 ms)

GET: /api/reservation/currtotal

- ✓ Give all number of reservation of specific classroom (28 ms)
- ✓ Handle wrong query (3 ms)
- ✓ Handle query missing (bd) (2 ms)
- ✓ Handle query missing (crn) (2 ms)
- ✓ Handle query missing (all) (2 ms)

GET: /api/reservation/personal

- ✓ Give all personal reservations (23 ms)
- ✓ Handle wrong query (13 ms)
- ✓ Handle wrong query (empty) (12 ms)
- ✓ Handle query missing (2 ms)

GET: /api/reservation/curruser

- ✓ Give user's current reservations (14 ms)
- ✓ Handle wrong query (13 ms)
- ✓ Handle wrong query (empty) (10 ms)
- ✓ Handle query missing (2 ms)

GET: /api/reservation/targettotal

- ✓ Give targeted of reservation of specific classroom (20 ms)
- ✓ Handle wrong query (2 ms)
- ✓ Handle query missing (bd) (2 ms)
- ✓ Handle query missing (crn) (2 ms)
- ✓ Handle query missing (time) (2 ms)
- ✓ Handle query missing (all) (2 ms)

POST: /api/reservation

- ✓ Enable user's reservations (186 ms)
- ✓ Error handle user's Error (3 ms)
- ✓ Handle wrong body (userid) (10 ms)
- ✓ Handle wrong body (start) (11 ms)
- ✓ Handle wrong body (end) (9 ms)
- ✓ Handle wrong body (bd) (9 ms)
- ✓ Handle wrong body (crn) (10 ms)
- ✓ Handle wrong body (fb_key) (9 ms)
- ✓ Enable body test (108 ms)
- ✓ Handle body missing (9 ms)

PATCH: /api/reservation/checkin

- ✓ Check-In (221 ms)
- ✓ Check-In false (16 ms)
- ✓ Handle query missing (userid) (10 ms)
- ✓ Handle query missing (idx) (9 ms)
- ✓ Handle query missing (2 ms)

PATCH: /api/reservation/checkout

- ✓ Check-Out (40 ms)
- ✓ Check-Out false (13 ms)
- ✓ Handle query missing (empty) (10 ms)
- ✓ Handle query missing (8 ms)

PATCH: /api/reservation/cancel

- ✓ cancel user's reservations (19 ms)
- ✓ Handle wrong query (9 ms)
- ✓ Handle wrong query (userid) (9 ms)
- ✓ Handle wrong query (idx) (9 ms)
- ✓ Handle query missing (2 ms)

PASS test/schedule.spec.js (10.954 s)
Test schedule.js
GET: /api/schedule/buildings

- ✓ Get all buildings (154 ms)

GET: /api/schedule/classrooms

- ✓ Get all classrooms (21 ms)
- ✓ Handle get all classrooms error (14 ms)
- ✓ Handle query error (12 ms)

GET: /api/schedule

- ✓ Get all classroom's timetable (19 ms)
- ✓ Handle get all classroom's timetable error (13 ms)
- ✓ Handle query error (nothing) (10 ms)

PASS test/sign.spec.js (12.819 s)
Test sign.js
GET: /api

- ✓ Handle no query (178 ms)
- ✓ Handle wrong Password (908 ms)
- ✓ Handle login (5662 ms)

Reference:
<https://github.com/GC211SE/backend/blob/master/api.md>

Test code Coverage

File	% Stmt	% Branch	% Funcs	% Lines	Uncovered Line #s
All files	84.08	76.47	89.66	84.69	
backend	90.5	50	100	100	
app.js	96.15	50	100	100	34
cipher.js	100	100	100	100	
backend/routes	82.93	76.92	89.29	83.27	
reservation.js	79.7	75.79	100	79.5	...361–362,366,397–398
schedule.js	84.78	71.43	70	88.1	8–13,94
sign.js	97.44	100	100	97.44	73

Test Suites: 3 passed, 3 total
Tests: 58 passed, 58 total
Snapshots: 0 total
Time: 16.538 s, estimated 21 s

Total Tests

58 Tests

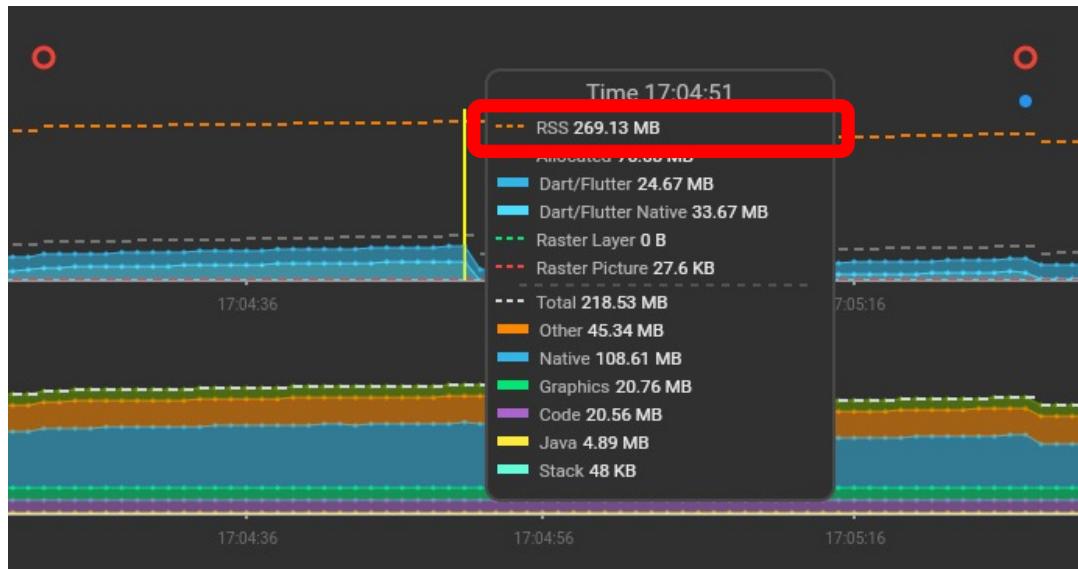
Total Test Coverage

Statement: 84%

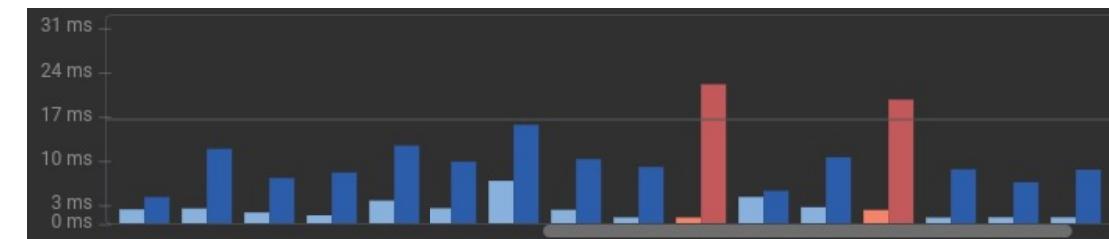
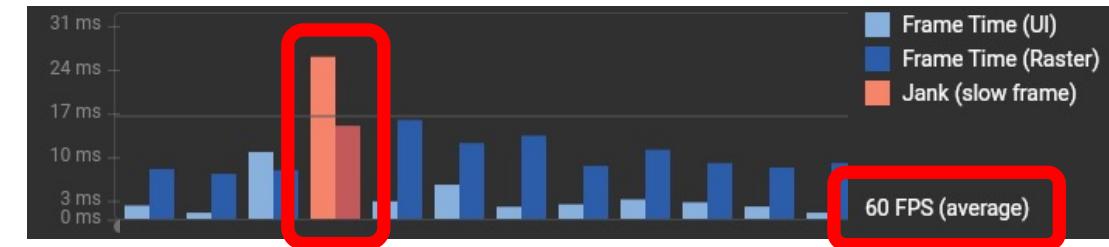
Condition: 76%

Function: 90%

Performance Test



Resident Set Size
Average: 220MB



Frame Performance Test
Average: 60 FPS
Min: 38.61 FPS

PWA Availability Test



Progressive Web App

These checks validate the aspects of a Progressive Web App. [Learn more.](#)

Installable

- Web app manifest and service worker meet the installability requirements

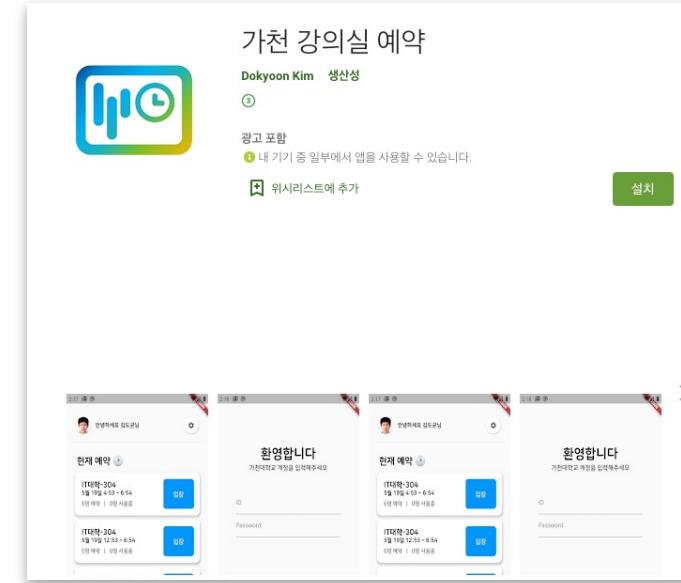
PWA Optimized

- Registers a service worker that controls page and `start_url`
- Redirects HTTP traffic to HTTPS
- Configured for a custom splash screen
- Sets a theme color for the address bar.
- Content is sized correctly for the viewport
- Has a `<meta name="viewport">` tag with `width` or `initial-scale`
- Provides a valid `apple-touch-icon`
- ▲ Manifest doesn't have a maskable icon

Download

Android

Get “가천 강의실 예약” on Google Play.



Web

Go <https://gcse.doky.space> and you can use website or install PWA app in your device(PC, Mobile).

iOS

To be determined.

Github

Try and experience our service with cloning our Github repository.
<https://github.com/GC211SE/>

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See more information from our Github organization.
<https://github.com/GC211SE>

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