Finding Friends for the Same Purpose at Close Distance

Software Test Specification

2021.05.30.

Introduction to Software Engineering

TEAM 7 (유생찾기)

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1. Introduction

1.1. Purpose

This document is Software Test Specification (STS) for providing '유생 찾기' service. With this service, users can find friends with the same purpose at close distance. The purpose is classified to eat, study, and rest in this service. The purpose of the service is to create a chat room according to the purpose based on a specific place, and to meet with the gathered people at that place to make friends. In this document, the test is designed and implemented so that this service can be tested in unit, component, and system.

In this document, Team7 is the main reader, and Team7 designs and implements tests according to the given environment, hardware specifications, and software specifications. In addition, professors, assistants, and team members in the introduction to software engineering class can be the main readers.

In this document, after introducing the test method and tool, the unit test method and the interface test method will be separately introduced. Each test method is written through pseudo code, and through these tests, you can check whether the service works correctly. If the expected output does not come out for the designed input, software refactoring will be necessary. We design a test for each detailed function such as register, log-in, and chatting. After that, a test is also designed for the external software interface used by the system. External software interfaces include databases, APIs, and AWS servers. At the end of the document, supporting information is explained and the test schedule is introduced before finishing.

1.2. Scope

1.2.1. Exploratory test

[Table 1] Exploratory test

Purpose	The purpose of this test is to make sure critical defects are removed before the next levels of testing can start.
Scope	First level navigation, dealer and admin modules.
Testers	Testing team members.
Methods	This exploratory testing is carried out in the application without any test scripts and documentation.
Timing	At the beginning of the test stage.

1.2.2. Unit test

[Table 2] Unit test

Purpose	Unit testing will be performed to check the functions of the individual units or components in the system. The unit testing is carried out by feeding the input and validates the output from the unit or components in the system.
Scope	Chapter three will detail the scope of the unit test.
Testers	Testing team members.
Methods	This unit testing is carried out in the unit or components in the system by breaking out each part of the source code into the unit and checking that each part works properly.
Timing	After the exploratory test is completed.

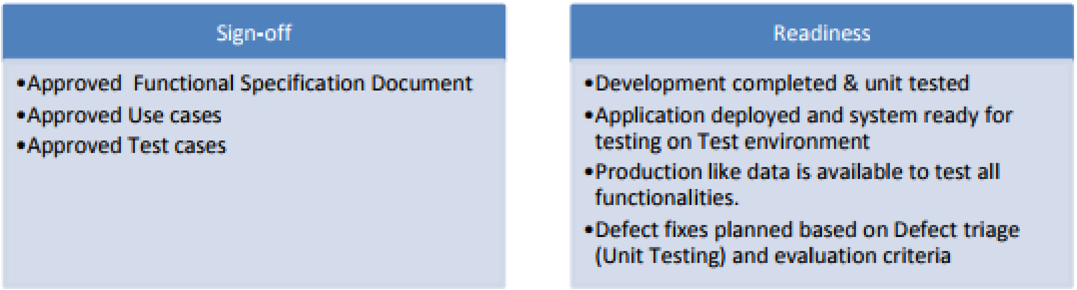
1.2.3. Interface test

[Table 3] Interface test

Purpose	The interface that a connection integrates two components is tested to ensure that end-users or customers should not encounter any problem when using the system.
Scope	Chapter four will detail the scope of the interface test.
Testers	Testing team members.
Methods	Interface test is performed by using abstract test cases and creating concrete instances of the test case for each implementation of interface testing strategy.
Timing	After the unit test is completed.

1.2.4. Test Acceptance Criteria

- Approved Functional Specification document, use case documents must be available prior to the start of the test design phase.
- Test cases approved and signed-off prior to start of Test execution.
- Development completed, unit tested with pass status and results shared to Testing team to avoid duplicate defects.
- Test environment with application installed, configured and ready to use state.



Sign-off

•Approved Functional Specification Document
•Approved Use cases
•Approved Test cases

Readiness

•Development completed & unit tested
•Application deployed and system ready for testing on Test environment
•Production like data is available to test all functionalities.
•Defect fixes planned based on Defect triage (Unit Testing) and evaluation criteria

[Figure 1] Sign-off and readiness

1.3. Definitions, Acronyms, and Abbreviations

The following table explains the acronyms and abbreviations used in this document.

[Table 4] Acronyms and abbreviations

Acronyms& Abbreviations	Explanation
API	Application Program Interface
GUI	Graphical user interface
PM	Project manager
UAT	User acceptance testing
CM	Configuration Management
QA	Quality Assurance

[Table 5] Terms and definitions

Terms	Definitions
User	Someone who uses a system
Client (user device)	A user device/user that connected to server
Server	A computer or computer program which manages access to a centralized resource or service in a network
Software	The programs and other operating information used by a computer
Unit	A unit is the smallest testable part of any software
Interface	A connection that integrates two components

1.4. References

- SoftwareTestingHelp.com Live Project Training - OrangeHRM, 02.05.2014, www.SoftwareTestingHelp.com
- Test Management Plan, Connecticut Department of Social Services
- IEEE 829-1998 Format, Test Plan Template, In IEEEXplore Digital Library, www.ecs.csum.edu

1.5. Overview

The remainder of this Software Test Specification document includes four chapters inside. The second chapter describes an approach on how to run the test. Test methods and test tools used in '유생 찾기' are introduced, and test methods are divided into unit test methods and interface test methods. It also describes test assumptions, and tests can work well only in situations where all the assumptions are applicable.

The third chapter covers the entire software unit test. Since the '유생 찾기' service is a community-based service, there are various units and components such as log-in, member sign-up, chat, and review, and provides methods to test whether the function of the unit is working properly. Each test includes test input and expected result, and if the test fails, the developer has to fix the unit.

The fourth chapter covers software interface testing. Interface testing involves two main segments. The web server and application server interface and the application server and database server interface are included in the interface covered by interface testing. Interface testing inspects whether the server is operating properly, whether errors are properly managed, and outputs appropriate error messages when errors occur.

Finally, the fifth chapter provides supporting information such as test environment and test schedule. All members contributed equally to the production of this project. I hope readers enjoy this document.

1.6. Execution Strategy

1.6.1. Test Cycles

- There will be two cycles for testing. Each cycle will execute all the scripts.
- The objective of the first cycle is to identify any blocking, critical defects, and most of the high defects. It is expected to use some work-around in order to get to all the scripts.
- The objective of the second cycle is to identify remaining high and medium defects, remove the work-around from the first cycle, correct gaps in the scripts and obtain performance results.

1.6.2. Validation and Defect Management

It is expected that the testers execute all the scripts in each of the cycles described above. However, it is recognized that the testers could also do additional testing if they identify a possible gap in the scripts.

Defects found during the Testing will be categorized according to the bug-reporting tool “HP Quality Center” and the categories are:

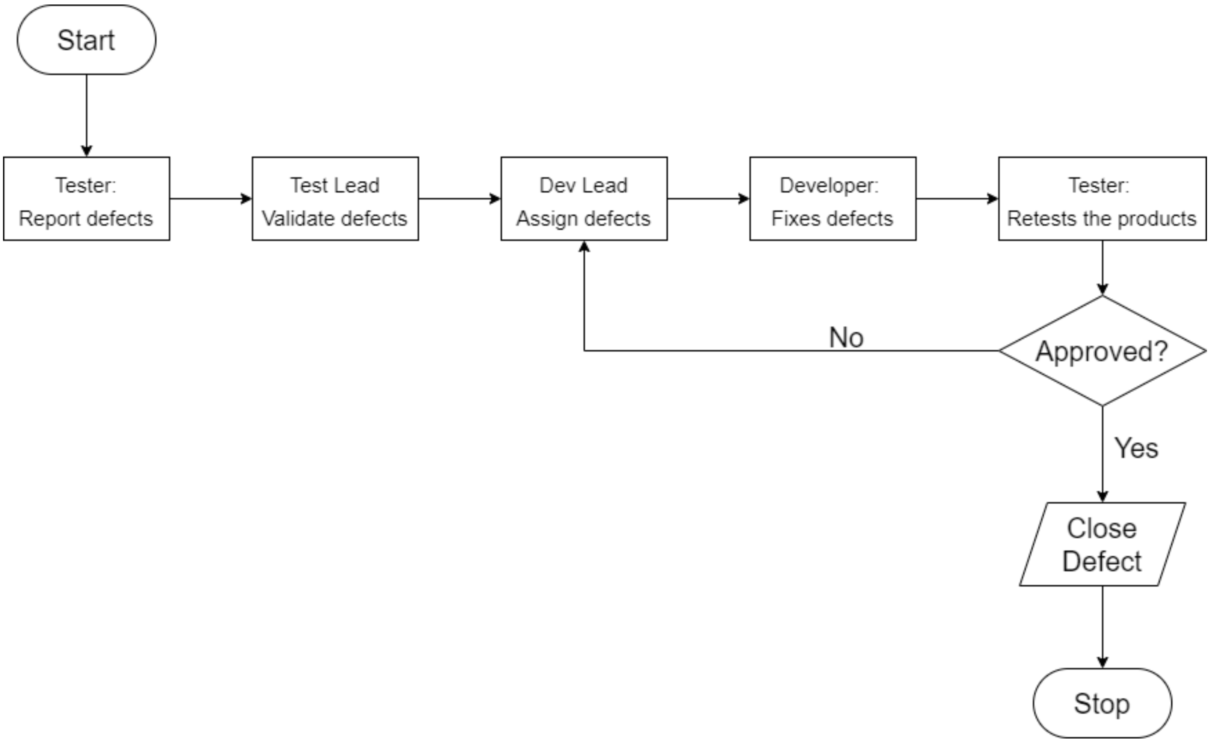
[Table 6] Defect level

Severity	Impact
1 (Critical)	■ This bug is critical enough to crash the system, cause file corruption, or cause potential data loss. ■ It causes an abnormal return to the operating system (crash or a system failure message appears). ■ It causes the application to hang and requires rebooting the system.

2 (High)	■ It causes a lack of vital program functionality with workaround.
3 (Medium)	■ This Bug will degrade the quality of the service. However, there is an intelligent workaround for achieving the desired functionality - for example through another screen. ■ This bug prevents other areas of the product from being tested. However other areas can be independently tested.
4 (Low)	■ There is an insufficient or unclear error message, which has minimum impact on product use.
5 (Cosmetic)	■ There is an insufficient or unclear error message, which has minimum impact on product use.

1.6.3. Defect Tracking & Reporting

Following flowchart depicts Defect Tracking Process:



[Figure 2] Defect tracking process

1.7. Entry and Exit Criteria

1.7.1. Entry Criteria

- All test hardware platforms must have been successfully installed, configured, and functioning properly.
- All the necessary documentation, design, and requirements information should be available that will allow testers to operate the system and judge the correct behavior.
- All the standard software tools including the testing tools must have been successfully installed and functioning properly.
- Proper test data is available.
- The test environment such as, lab, hardware, software, and system administration support should be ready.
- QA resources have completely understood the requirements.
- QA resources have sound knowledge of functionality.
- Reviewed test scenarios, test cases and RTM.

1.7.2. Exit Criteria

- A certain level of requirements coverage has been achieved.
- No high priority or severe bugs are left outstanding.
- All high-risk areas have been fully tested, with only minor residual risks left outstanding.
- Cost – when the budget has been spent.
- The schedule has been achieved.

2. Approach

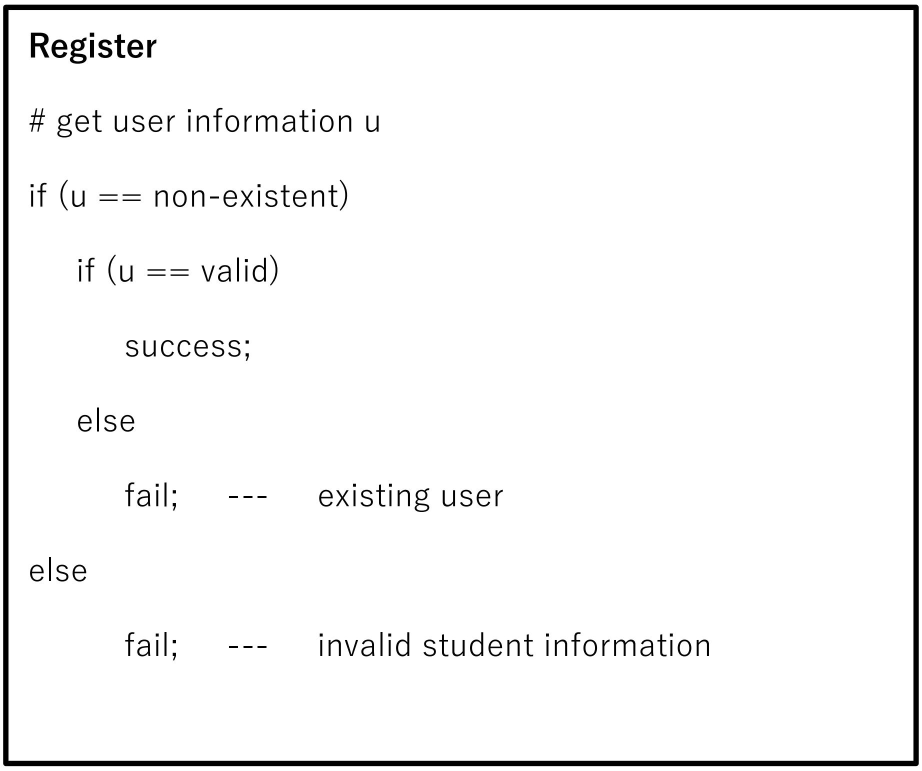
This part introduces the approach of testing. A brief introduction to software unit testing and software interface testing, what to assume before testing, and test tools are introduced. This part is a summary of the tests, since more detailed tests will be included in the documentation.

2.1 Test method

2.1.1 Software unit test methods

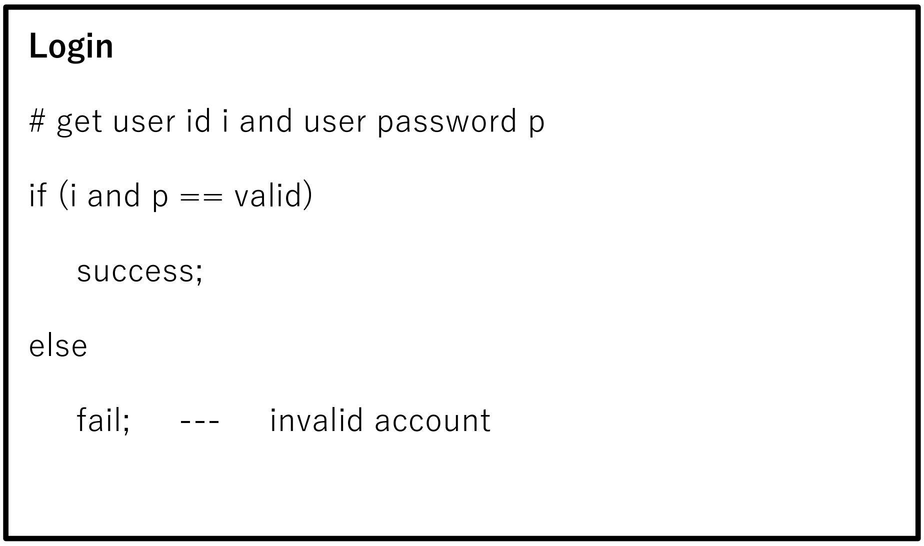
It expresses the contents of software unit test in pseudo code.

[Figure 3] Register



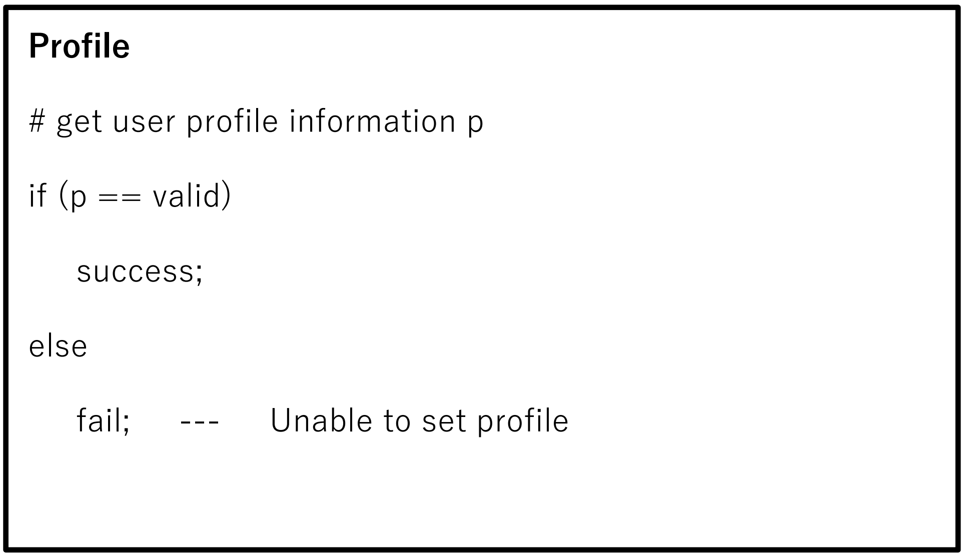
```
Register

# get user information u

if (u == non-existent)

    if (u == valid)

        success;

    else

        fail;    ---    existing user

else

        fail;    ---    invalid student information
```

[Figure 4] Login



```
Login

# get user id i and user password p

if (i and p == valid)

    success;

else

    fail;    ---    invalid account
```

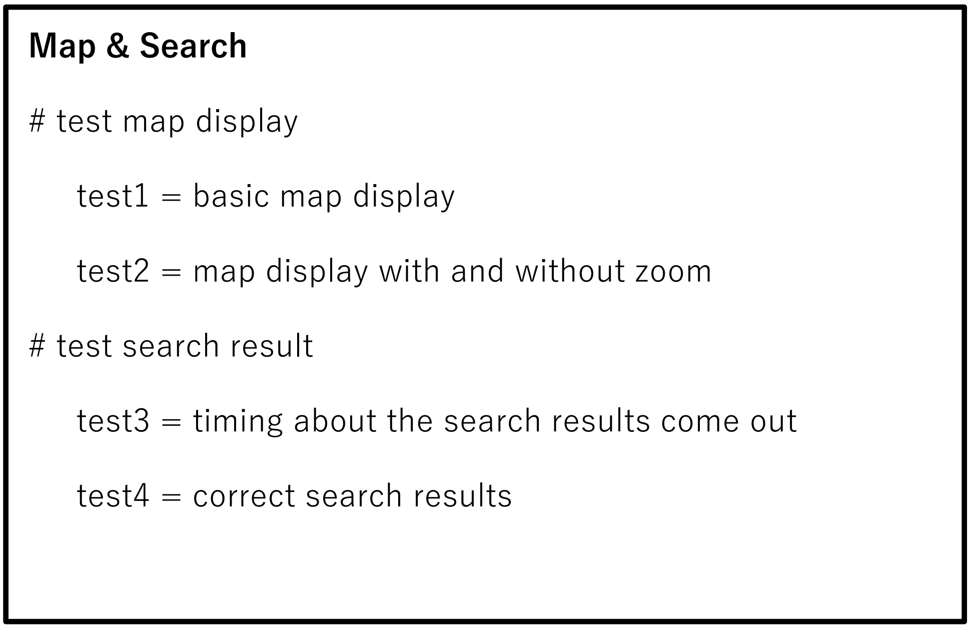
[Figure 5] Profile



Profile

```
# get user profile information p
if (p == valid)
    success;
else
    fail;    ---    Unable to set profile
```

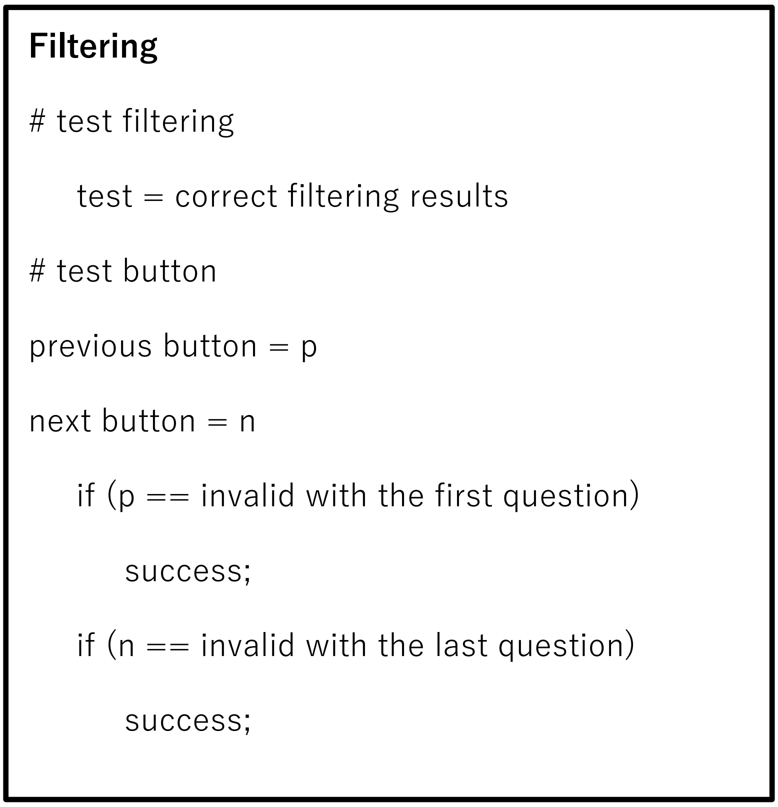
[Figure 6] Maps & Search



Map & Search

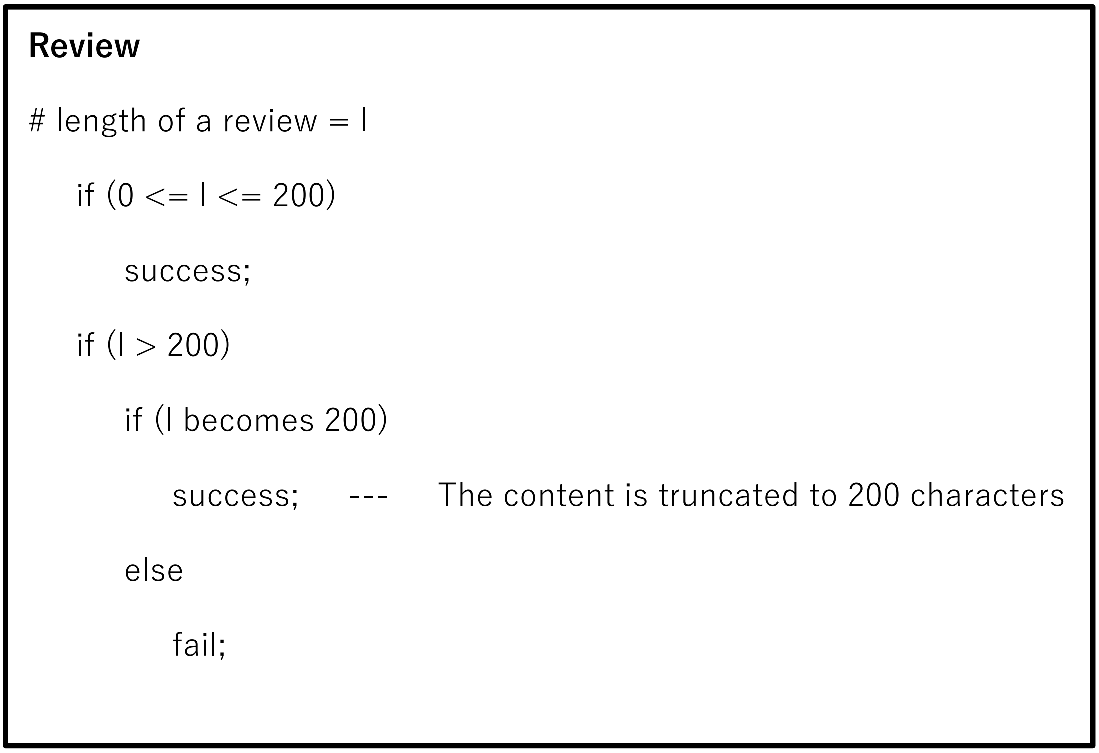
```
# test map display
    test1 = basic map display
    test2 = map display with and without zoom
# test search result
    test3 = timing about the search results come out
    test4 = correct search results
```

[Figure 7] Filtering



```
Filtering

# test filtering

    test = correct filtering results

# test button

previous button = p

next button = n

    if (p == invalid with the first question)

        success;

    if (n == invalid with the last question)

        success;
```

[Figure 8] Review



```
Review

# length of a review = l

    if (0 <= l <= 200)

        success;

    if (l > 200)

        if (l becomes 200)

            success;    ---    The content is truncated to 200 characters

        else

            fail;
```

2.1.2 Software interface test methods

The tests will be conducted on Firebase, Naver Map API, and Apache that will be connected to our application. For each, connection test, stress test, and data test are performed as needed. Description of Firebase, Naver Map API, Apache, and detailed description and method of test will be described later in Part 4.

2.2 Test Assumptions

2.2.1 Key Assumptions

- The data required for the system before each test if provided and available in advance.
- In each testing phase, cycles are performed up to 5 times, and if the defect rate in cycle 3 is high, 2 additional cycles are performed.

2.2.2 General Assumptions

- Defects that occur during testing are saved by taking snapshots in JPEG format.
- Testing conducted in a mobile environment is performed through team members' mobile devices.
- Testing conducted in the Internet environment is conducted through each team members' Internet environment and VPN connection.
- When testing is conducted by external personnel, project team members provide support for test planning, test design, and test execution.
- When a defect is found, the test is stopped immediately, the defect is fixed through the project team member, and the test is performed from the beginning.
- Regardless of what project team members oversee, everyone should be familiar with the test information and share any defects or changes in the test schedule.
- After the end of the test, a review is performed by the project team members, and when

everyone is satisfied with the test result, the project team leader performs the final review.

- After the project team leader's review is over, the test may be terminated depending on the review result.

2.3 Testing tools

[Table 7] Testing tools

Process	Tool
Test case creation	Microsoft Excel
Test case tracking	Microsoft Excel
Test case execution	Java, Python, C++
Test case management	Microsoft Excel
Defect management	Paint, Microsoft Word
Test reporting	PDF
Check list creating	Microsoft Excel

- Microsoft Excel: It is a program mainly used to write documents for statistics and has the advantage of being easy to see the written contents at a glance. Microsoft Excel is most suitable for listing and organizing test cases and managing check list.

- Paint, Microsoft Word: If a defect is found, it is saved in JPEG format through Paint and documented in Microsoft Word.

- Java, Python, C++: Test cases will be performed through the most commonly used programming language, and as described in the proposal, the main work will be done through Java.

- PDF: Final test documentation is produced via PDF.

3. Unit-Test

In this chapter, we will show scope of the unit test based on each page. We have categorized the functions to be tested on each page. There are several functions on each page, and we designed validation testing and defect testing for each function to test them.

From now on, we will show functions in the categorized page and its validation testing and defect testing.

3.1 Log-in page

3.1.1 Register

In the case of a user who has already registered, a new register should not be possible.

1. Click the register button.
2. Fill the user information text boxes with various cases of input.
3. Click the complete button.
4. Wait for the output message.

<Test case>

(Success case)	
Input	Non-existent user information
Output message	“Success to register”

(Failure case)	
Input	Existing user information
Output message	“Existing user. Go to the log-in page.”

An error message is sent for an invalid authentication method.

1. Click the register button.
2. Click the authentication button.
3. Take pictures of various authentications.
4. Wait for the output message.

<Test case>

(Success case)	
Input	Student ID
Output message	"Authentication was successful"

(Failure case)	
Input	Registration card
Output message	"Invalid authentication. Try again with valid student ID"

(Failure case)	
Input	Driver's license
Output message	"Invalid authentication. Try again with valid student ID"

Proper length of student id number (10 for SKKU) should be set for "Student id number" text box.

1. Click the register button.
2. Fill the "student id number" text box.
3. Wait for the output message.

<Test case>

(Success case)	
Input	2020111111
Output message	“Valid student ID number”

(Failure case)	
Input	2020111111111
Output message	“Invalid student ID number”

(Failure case)	
Input	202011
Output message	“Invalid student ID number”

3.1.2 Login

Minimum (0) and maximum (20) lengths should be set for all the text boxes.

1. Fill the user id text box.

2. Fill the user password text box.

3. Click the log-in button.

4. Check for the textbox result.

<Test case>

(Success case)	
User id input (keyboard)	skkustudent1
Textbox result	skkustudent1

(Failure case)	
User id input (keyboard)	Skkudepartmentofsoftware
Textbox result	skkudepartmentofsoft

Blank should not be set for all the text boxes.

1. Fill the user id text box.
2. Fill the user password text box.
3. Click the log-in button.
4. Check for the textbox result.

<Test case>

(Success case)	
User id input (keyboard)	skkustudent1
Textbox result	skkustudent1

(Failure case)	
User id input (keyboard)	skku student 1
Textbox result	skkustudent1

Password should be displayed in masked format.

1. Fill the user password text box.
2. Click the log-in button.
3. Check for the textbox result.

<Test case>

(Success case)	
User id input (keyboard)	skku1234!
Textbox result	●●●●●●●●●

(Failure case)	
User id input (keyboard)	skku1234!
Textbox result	skku1234!

Validation message should be shown when invalid username and/or password is entered, and the fields are left blank.

1. Fill the user id text box.
2. Fill the user password text box.
3. Click the log-in button.
4. Check for the output message.

<Test case>

(Success case)			
Real user id	skkustudent1	Real user password	software1234!
Input user id	skkustudent1	Input user password	software1234!
Output message	"Success to access the account"		

(Failure case)			
Real user id	skkustudent1	Real user password	software1234!
Input user id	skkustudent1	Input user password	skku1234!
User id textbox result	(blank)		
User password textbox result	(blank)		
Output message	"Invalid user id or password. Try again!"		

(Failure case)			
Real user id	skkustudent1	Real user password	software1234!
Input user id	skku1	Input user password	software1234!
User id textbox result	(blank)		
User password textbox result	(blank)		
Output message	"Invalid user id or password. Try again!"		

(Failure case)			
Real user id	skkustudent1	Real user password	software1234!
Input user id	skku1	Input user password	skku1234!
User id textbox result	(blank)		
User password textbox result	(blank)		
Output message	"Invalid user id or password. Try again!"		

3.2 Profile page

3.2.1 Set profile image

User can update his profile image if at his profile page.

1. Click image file.
2. Click change button in enlarged image.
3. Click photo album/camera button.

   3-1. (When click camera button) Take a picture to set as profile image.

   3-2. (When click photo album button) Select a picture to set as profile image.

4. Click update button at profile page.
5. Wait for output.

<Test case>

(Success case)	
Input	User's own profile image
Output message	"Update complete"
Output	Profile page with selected profile image

(Failure case)	
Input	Someone else's profile image
Output message	"You do not have permission to change profile"

The type of image must be jpg type.

1. Click image file.
2. Click change button in enlarged image.
3. Click photo album/camera button.

3-1. (When click camera button) Take a picture to set as profile image.

3-2. (When click photo album button) Select a picture to set as profile image.

4. Wait for the output.

<Test case>

(Success case)	
Input	jpg file
Output message	“Usable image”
Image	Selected jpg file

(Failure case)	
Input	Bmp file
Output message	“Your image is not suitable, please select jpg file”
Image	Image before change

3.2.2 Set nickname

User can update his nickname at his profile page.

1. Click nickname text box.
2. Type nickname to change.
3. Click update button at profile page.
4. Wait for output.

<Test case>

(Success case)	
Input	User’s own nickname
Output message	“Update complete”
Output	Profile page with changed nickname

(Failure case)	
Input	Someone else’s nickname
Output message	“You do not have permission to change profile”

The nickname must not be blank.

1. Click nickname text box.
2. Type nickname to change.
3. Click check button to check new nickname meets condition.

<Test case>

(Success case)	
Input	Skku2017^^
Output message	“Usable nickname”
Output	Skku2017^^

(Failure case)	
Input	blank
Output message	“Your nickname must bot be blank”
Text box result	blank

The nickname consists of numbers and English letters and cannot exceed 15 characters.

1. Click nickname text box.

2. Type nickname to change.

3. Click check button to check new nickname meets condition.

<Test case>

(Success case)	
Input	Skku2017^^
Output message	“Usable nickname”
Text box result	Skku2017^^

(Failure case)	
Input	sasjdkkjzxbkcqwqbkasbckxz
Output message	“Your nickname exceeds 15 characters”
Text box result	blank

Blank should not be set for nickname.

1. Click the nickname text box.

2. Type nickname to change.

3. Click check button to check new nickname meets condition.

<Test case>

(Success case)	
Input	Skku2017^^
Output message	“Usable nickname”
Text box result	Skku2017^^

(Failure case)	
Input	Skku 2017 ^^
Text box result	Skku2017^^

Nickname must not be duplicated with other users.

1. Click the nickname text box.

2. Type nickname to change.

3. Click check button to check new nickname meets condition.

<Test case>

(Success case)	
Input	Nickname that doesn't exist in database (Skku2017^^)
Output message	"Usable nickname"
Text box result	Skku2017^^

(Failure case)	
Input	Nickname that already exists in database (Superpower123)
Output message	"This nickname is already exists"
Text box result	blank

3.2.3 Set major

User can update his major at his profile page.

1. Click major text box.

2. Type major to change.

3. Click update button at profile page.

4. Wait for output.

<Test case>

(Success case)	
Input	User’s own major
Output message	“Update complete”
Output	Profile page with changed major

(Failure case)	
Input	Someone else’s major
Output message	“You do not have permission to change profile”

Major must not be blank.

1. Click major text button.
2. Type major to change.
3. Wait for message.

<Test case>

(Success case)	
Input	Software engineering
Output message	“Valid major”
Text box result	Software engineering

(Failure case)	
Input	blank
Output message	“Major must not be blank”
Text box result	blank

Major user typed in text box must be exist in database.

1. Click major text box.
2. Type major to change.
3. Wait for message.

<Test case>

(Success case)	
Input	Software engineering
Output message	“Valid major”
Text box result	Software engineering

(Failure case)	
Input	Hotel culinary arts
Output message	“Invalid major”
Text box result	blank

3.2.4 Set sex

User can update his sex at his profile page.

1. Click sex button.
2. Select sex among male and female to change.
3. Click update button at profile page.
4. Wait for output.

<Test case>

(Success case)	
Input	User’s own sex
Output message	“Update complete”
Output	Profile page with selected sex

(Failure case)	
Input	Someone else’s sex
Output message	“You do not have permission to change profile”

3.2.5 Set introduction

User can update his introduction at his profile page.

1. Click introduction text box.
2. Type introduction to update.
3. Click update button at profile page.
4. Wait for output.

<Test case>

(Success case)	
Input	User’s own introduction
Output message	“Update complete”
Output	Profile page with changed introduction

(Failure case)	
Input	Someone else’s introduction
Output message	“You do not have permission to change profile”

The number of characters in the introduction must not exceed 200 characters.

1. Click introduction text box.
2. Type introduction to update.
3. Wait for output.

<Test case>

(Success case)	
Input	150 characters
Text box result	150 characters

(Failure case)	
Input	250 characters
Output message	“Introduction should not exceed 200 characters”
Output	250 characters

3.3 Main page

3.3.1 Map

The map only displays the current user's location as red dot and information within a 1km radius.

1. Login to the application.
2. Turn on the GPS system.
3. Wait for the map to appear on the screen.

<Test case>

(Success case)	
Motion	Login to the application and wait for the main page.
Map result	Current user's location displayed with red dot.
	Only displays within a 1km radius with user's location.

(Failure case)	
Motion	Login to the application and wait for the main page.
Map result	Current user's location displayed with red dot.
	Only displays more than a 1km radius with user's location.

(Success case)	
Motion	Login to the application and wait for the main page.
Map result	Current user's location displayed with blue dot.
	Only displays within a 1km radius with user's location.

(Success case)	
Motion	Login to the application and wait for the main page.
Map result	Current user's location displayed with blue dot.
	Only displays more than a 1km radius with user's location.

The map should be able to zoom in and out appropriately.

1. Login to the application.
2. Turn on the GPS system.
3. Wait for the map to appear on the screen.
4. Zoom in with two fingers and check it works properly to desired direction.
5. Zoom out with two fingers and check it works properly to desired direction.

<Test case>

(Success case)	
Motion 1	Zoom in the map.
Motion 2	Zoom out the map.
Motion 1 result	Works properly to desired direction.
Motion 2 result	Works properly to desired direction.

(Failure case)	
Motion 1	Zoom in the map.
Motion 2	Zoom out the map.
Motion 1 result	Does not move.
Motion 2 result	Works properly to desired direction.

(Failure case)	
Motion 1	Zoom in the map.
Motion 2	Zoom out the map.
Motion 1 result	Works properly to desired direction.
Motion 2 result	Does not move.

(Failure case)	
Motion 1	Zoom in the map.
Motion 2	Zoom out the map.
Motion 1 result	Does not move.
Motion 2 result	Does not move.

When the map is zoomed in, certain popular places are displayed with their information, but when it zoomed out, that places are displayed as blue dots only.

1. Login to the application.
2. Turn on the GPS system.
3. Wait for the map to appear on the screen.
4. Zoom in with two fingers and check it displays places properly.
5. Zoom out with two fingers and check it displays places properly.

<Test case>

(Success case)	
Motion 1	Zoom in the map.
Motion 2	Zoom out the map.
Motion 1 result	Places are displayed as blue dots.
	Places have their information in their right side.
Motion 2 result	Places are displayed as blue dots.
	Places do not have any information in their right side.

(Failure case)	
Motion 1	Zoom in the map.
Motion 2	Zoom out the map.
Motion 1 result	Places are displayed as red/no dots.
	Places do not have any information in their right side.
Motion 2 result	Places are displayed as blue dots.
	Places do not have any information in their right side.

(Failure case)	
Motion 1	Zoom in the map.
Motion 2	Zoom out the map.
Motion 1 result	Places are displayed as blue dots.
	Places have their information in their right side.
Motion 2 result	Places are displayed as red/no dots.
	Places have their information in their right side.

(Failure case)	
Motion 1	Zoom in the map.
Motion 2	Zoom out the map.
Motion 1 result	Places are displayed as red/no dots.
	Places do not have any information in their right side.
Motion 2 result	Places are displayed as red/no dots.
	Places have their information in their right side.

3.3.2 Search

Search result should be displayed when user click the search button or press the enter key.

1. Click the search textbox.
2. Write the search keyword in textbox.
3. Wait for the result.
4. Click the search button or press the enter key.
5. Wait for the result.

<Test case>

(Success case)	
Motion	Write “Alchon” and click search button
Search result	Information of “Alchon”

(Success case)	
Motion	Write “Alchon” and press enter key
Search result	Information of “Alchon”

(Failure case)	
Motion	Write “Alchon”
Search result	Information of “Alchon”

When user start typing word in text box it should suggest words that matches typed keyword.

1. Click the search textbox.
2. Write the search keyword in textbox.
3. Check the changed textbox.

<Test case>

(Success case)	
Motion	Write the keyword in textbox.
Input content	“Alchon”
Textbox result	Display “Alchon” simultaneously

(Failure case)	
Motion	Write the keyword in textbox.
Input content	“Alchon”
Textbox result	Display “Alchon” not simultaneously

Search result displayed should be relevant to search keyword.

1. Click the search textbox.
2. Write the search keyword in textbox.
3. Wait for the search result.

<Test case>

(Success case)	
Motion	Write the keyword in textbox.
Input content	“Alchon”
Search result	Information of “Alchon”

(Failure case)	
Motion	Write the keyword in textbox.
Input content	“Alchon”
Search result	Information of “Subway”

3.4 Filtering page

User can update recommendation friend list by choosing one item when receive some questions. User must select at least one of the items corresponding to the question.

1. Click the Next button until the question is finished.
2. Click Finish button when question is finished.
3. Wait for output.

<Test case>

(Success case)	
Input	Data with selecting for all items per question
Output page	Updated recommendation friend list page

(Failure case)	
Input	Data without selecting one or more of the questions
Output message	"You have to select at least one of the items corresponding question"
Output page	First Pages with questions with no item selected

User can move to next question by clicking Next button until last question.

1. Click Next button.
2. Wait for output.

<Test case>

(Success case)	
Input	Page that is not the last question
Output page	Page with the following question

(Failure case)	
Input	Page with last question
Output message	“This is the last question”
Output page	Page with last question

User can move to previous question by clicking Previous button if current question is not first question.

1. Click Previous button.
2. Wait for output.

<Test case>

(Success case)	
Input	Page that is not the first question
Output page	Page with previous question

(Failure case)	
Input	Page with first question
	“This is the first question”
Output page	Page with first question

3.5 Review

The length of a review is longer than 0 and shorter than 200.

1. Close the chatting room.
2. Write the review.
3. Click the submit button.
4. Check the review textbox.

<Test case>

(Success case)	
Textbox input	“Alchon is a great restraint that deserves an excellent rating in its atmosphere, but it is certainly not a great restaurant.”
Textbox result	“Alchon is a great restraint that deserves an excellent rating in its atmosphere, but it is certainly not a great restaurant.”

(Success case)	
Motion	“Alchon is a great restraint that deserves an excellent rating in its atmosphere, but it is certainly not a great restaurant. It is worth paying a visit and I definitely suggest! Service was friendly and the food was fantastic.”
Search result	“Alchon is a great restraint that deserves an excellent rating in its atmosphere, but it is certainly not a great restaurant. It is worth paying a visit and I definitely suggest! Service was friendly an”

(Failure case)	
Motion	“Alchon is a great restraint that deserves an excellent rating in its atmosphere but it is certainly not a great restaurant. It is worth paying a visit and I definitely suggest! Service was friendly and the food was fantastic.”
Search result	“Alchon is a great restraint that deserves an excellent rating in its atmosphere but it is certainly not a great restaurant. It is worth paying a visit and I definitely suggest! Service was friendly and the food was fantastic.”

4. Software Interface Test

4.1. Objectives

In this chapter, we describe the test plan of the interface between our application and the database, API, and web server. We use Realtime Database provided by Firebase, Naver Map API for the map searching process, and the Apache web server for our '유생찾기' project. While doing the interface test, we will verify that the server is working properly, that a problem between the application and the server is handled normally and returns an error message, and that it produces the correct result when the connection between the server is reset. Through testing, we can check that there are no problems when using our application, that communication within the system is smooth, and that errors can be handled in the event of a network failure.

4.2. Firebase

We can test the connection and stress testing using the Firebase Performance Monitoring service. Using the Firebase Performance Monitoring service, we can collect the performance data from applications using the Performance Monitoring SDK and review and analyze the data in the Firebase Console.

4.2.1 Connection Test

In the connection test, we check that the database server is connected to our application and what the connection state is. The connection test will be done using the database profiler tool which is provided by the Firebase.

4.2.1.1 Test Method

[Table 8] Firebase Test Method – Connection Test

Input	Database profiler tool which provided by Firebase firebase database: profile
Expected results	Speed, bandwidth, and unindexed queries.
Error handling	If speed report return permission denied property, show the communication error information message.
Condition	N/A

4.2.2 Stress Test

In the stress test, we measure the database performance on its robustness and error handling capabilities under the heavy load conditions. The stress test on the Firebase realtime database will be done by using the Monitor Database Usage in Cloud Monitoring service.

4.2.2.1 Test Method

[Table 9] Firebase Test Method – Stress Test

Input	Monitor Database Usage in Cloud Monitoring
Expected results	Connections, storage, downloads, load
Error handling	If load approaches 100%, show the error information message.

Condition	The limitation supported by Firebase is 200000 of simultaneous connections, and ~100000/second simultaneous responses sent from a single database. Database should be connected first.

4.2.3 Data Test

In the data test, we test if the database is working properly while communicating with our application and handling the data request properly.

4.2.3.1 Test Method

[Table 10] Firebase Test Method – Empty Input

Input	Empty input to store in the database
Expected results	Return the error message as it has not null attributes.

[Table 11] Firebase Test Method – Exceed Input

Input	Input value that exceeds the limit of the attribute of the database table.
Expected results	Return the error information message to request again.

[Table 12] Firebase Test Method – Request does not exist.

Input	Request data which is not in the database
Expected results	Return the no result message.

[Table 13] Firebase Test Method – Normal Request

Input	Request data which is in the database
Expected results	Return the data corresponding to the request.

4.3. Naver Map API

4.3.1 Connection Test

In the connection test, we check that the API is working properly with our application and what the connection state is. The connection test on the Naver Map API will be done by using the Naver Cloud Platform Gov Client for connect request.

4.3.1.1 Test Method

[Table 14] API Test Method – Connection Test

Input	Connect request using Naver Cloud Platform Gov Client
Expected results	Successfully connected message.
Error handling	If it returns 401 error code, it is exception of unauthorized client, so re-assign the client. If it returns 429 error code, it is exception of exceeded limit, so shows the exceeded information message. If it returns 800 error code, it is exception of unspecified client, so re-assign the client.
Condition	N/A

4.3.2 Data Test

In the data test, we test if the Naver Map API is working properly with our application and handling the information request properly.

4.3.2.1 Test Method

[Table 15] API Test Method – Empty Request

Input	Request empty input
Expected results	Return the no result message.

[Table 16] API Test Method – Normal Request

Input	Request search location
Expected results	Return data information for response

[Table 17] API Test Method – Request does not exist.

Input	Request search location which has no corresponding result
Expected results	Return the no result message.

4.4. Apache

We can test the connection and stress testing using the ab (Apache HTTP server benchmarking tool). Using the Apache ab, we can collect the performance data of Apache server by inundating web server with HTTP requests and recording metrics about latency and success. It helps to determine how much traffic can sustain before performance degrades and set a baseline for typical response times.

4.4.1 Connection Test

In the connection test, we check that the Apache server is connected to our application and what the connection state is. The connection test on the Apache web server will be done by using the Apache HTTP server benchmarking tool.

4.4.1.1 Test Method

[Table 18] Apache Test Method – Connection Test

Input	Apache ab ab -v [additional option] [domain name]
Expected results	Time taken for tests, complete requests, failed requests, requests per second, time per request.
Error handling	For the failed request with non-2xx responses, shows the error information message.
Condition	N/A

4.4.2 Stress Test

In the stress test, we measure the web server on its robustness and error handling capabilities under the heavy load conditions. The stress test on Apache web server will be done by using the Apache HTTP server benchmarking tool.

4.4.2.1 Test Method

[Table 19] Apache Test Method – Stress Test

Input	Apache ab ab -n 1000 -c 20 -v [additional option] [domain name]
Expected results	Time taken for tests, complete requests, failed requests, requests per second, time per request.
Error handling	For the failed request, shows the error information message.
Condition	Web server should be connected first.

5. Supporting Information

5.1. Test Environment

5.1.1. Tools

[Table 20] Testing Tools

Testing Tools	
Support Level 1 (browsers)	● Windows 10: Edge, Chrome(latest), Firefox(latest), Safari(latest) ● Mac OS X: Chrome(latest), Firefox(latest), Safari(latest) ● Linus Ubuntu: Chrome(latest), Firefox(latest)
Support Level 1 (devices)	● iphone 11/12, ipad 8, Samsung Galaxy S21, Galaxy Tab S6
Support Level 2	● Windows 10: IE 11, Chrome(latest), Firefox(latest),

	Safari(latest)
Support Level 3	● Anything else

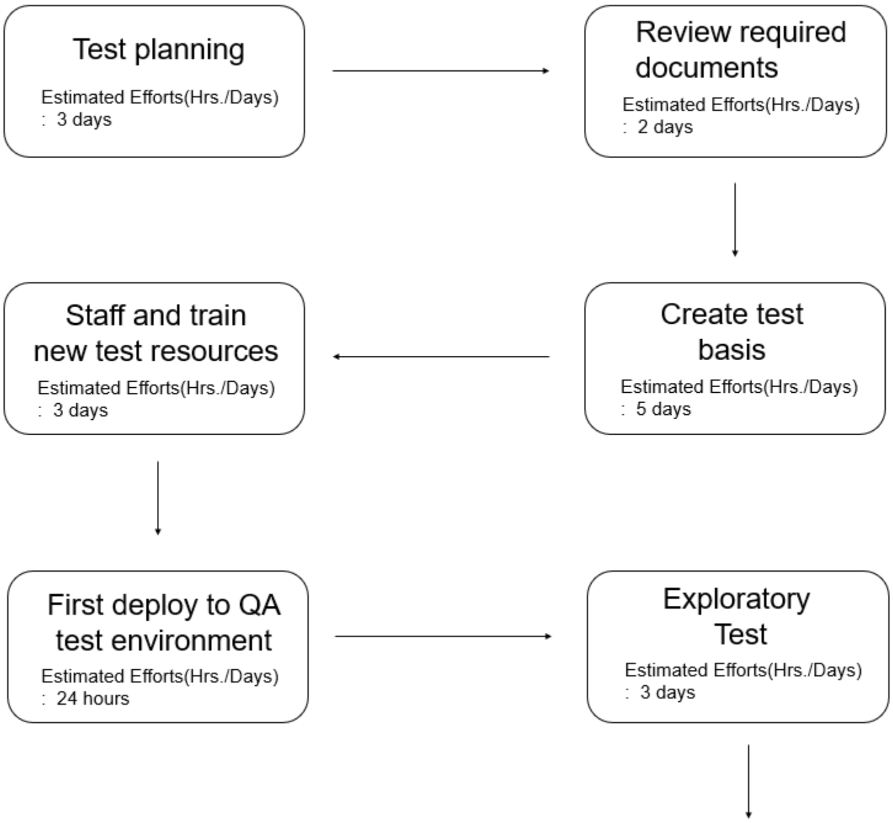
5.1.2. Staffing

[Table 21] Test Staffing

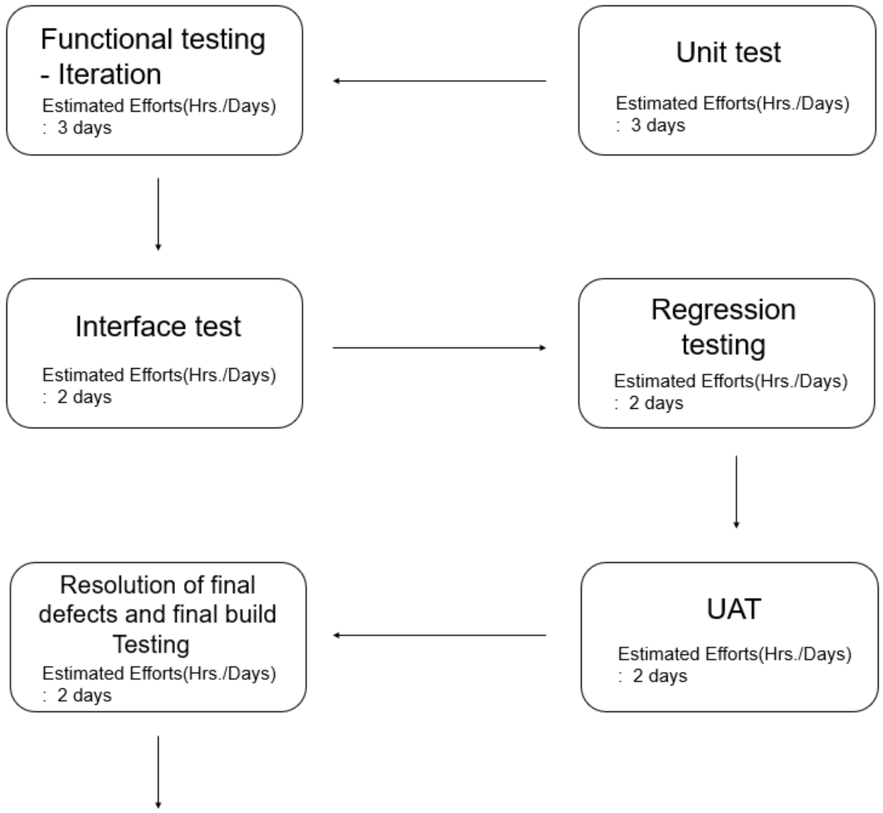
Responsibilities	Team member
Test Plan	Eunju Seok, Hyejoon Jang
Test Case	Jiwon Seo, Hyeyeong Kim
Manual Testing	Georyang Park, Eunji Gil

5.2. Test Schedule

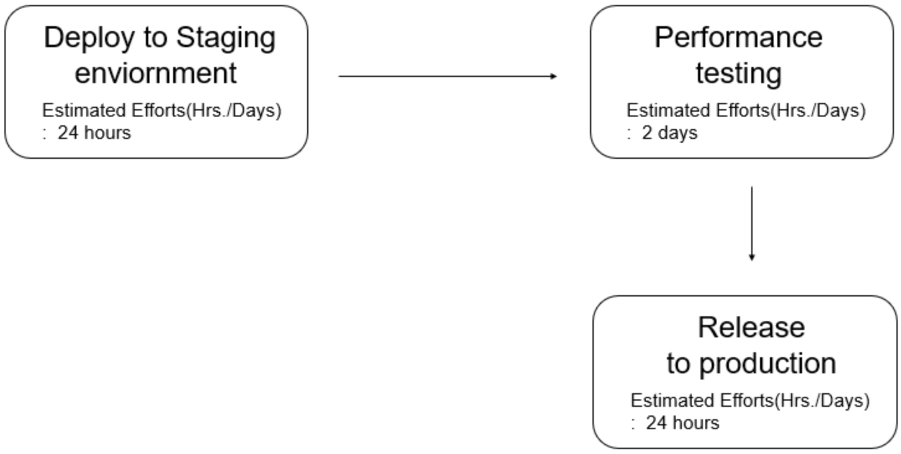
5.2.1. Scheduling


Test planning
Estimated Efforts(Hrs./Days) : 3 days
Review required documents
Estimated Efforts(Hrs./Days) : 2 days
Create test basis
Estimated Efforts(Hrs./Days) : 5 days
Staff and train new test resources
Estimated Efforts(Hrs./Days) : 3 days
First deploy to QA test environment
Estimated Efforts(Hrs./Days) : 24 hours
Exploratory Test
Estimated Efforts(Hrs./Days) : 3 days

[Figure 9] Test Scheduling


Functional testing
- Iteration
Estimated Efforts(Hrs./Days)
: 3 days
Unit test
Estimated Efforts(Hrs./Days)
: 3 days
Interface test
Estimated Efforts(Hrs./Days)
: 2 days
Regression testing
Estimated Efforts(Hrs./Days)
: 2 days
Resolution of final defects and final build Testing
Estimated Efforts(Hrs./Days)
: 2 days
UAT
Estimated Efforts(Hrs./Days)
: 2 days

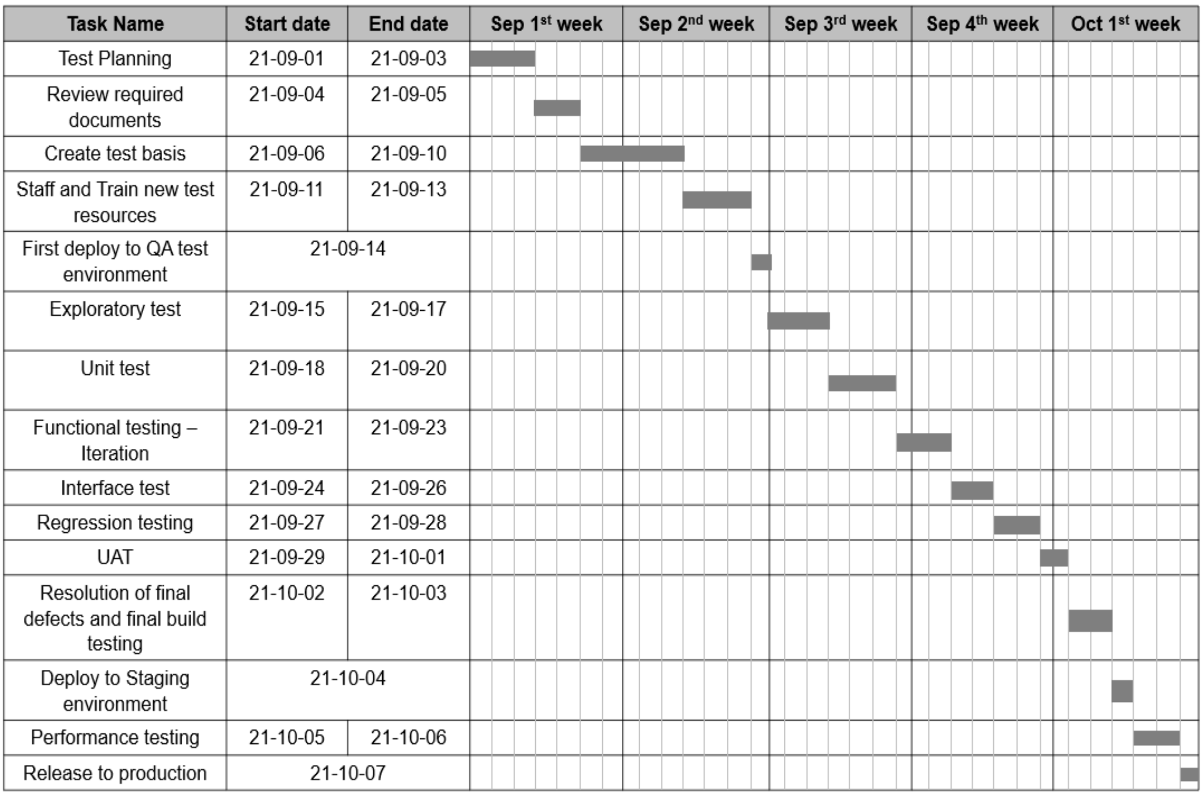
[Figure 10] Test Scheduling2


Deploy to Staging enviornment
Estimated Efforts(Hrs./Days)
: 24 hours
Performance testing
Estimated Efforts(Hrs./Days)
: 2 days
Release to production
Estimated Efforts(Hrs./Days)
: 24 hours

[Figure 11] Test Scheduling3

5.2.2. Timeline

[Table 22] Test Timeline



Task Name	Start date	End date	Sep 1st week	Sep 2nd week	Sep 3rd week	Sep 4th week	Oct 1st week
Test Planning	21-09-01	21-09-03	■				
Review required documents	21-09-04	21-09-05	■				
Create test basis	21-09-06	21-09-10	■	■			
Staff and Train new test resources	21-09-11	21-09-13		■			
First deploy to QA test environment	21-09-14			■			
Exploratory test	21-09-15	21-09-17			■		
Unit test	21-09-18	21-09-20			■		
Functional testing – Iteration	21-09-21	21-09-23			■	■	
Interface test	21-09-24	21-09-26				■	
Regression testing	21-09-27	21-09-28				■	
UAT	21-09-29	21-10-01				■	■
Resolution of final defects and final build testing	21-10-02	21-10-03					■
Deploy to Staging environment	21-10-04						■
Performance testing	21-10-05	21-10-06					■
Release to production	21-10-07						■

5.3. Document

This test plan specification was written in accordance with format of attached file that the professor provided to i-campus.

5.3.1. Document History

[Table 23] Document History

Date	Version	Description	Writer
2021/05/19	0.1	Style and overview	Eunju Seok
2021/05/20	1.0	Addition of 4	Hyejoon Jang
2021/05/24	1.1	Addition of 1	Eunju Seok
2021/05/25	1.2	Revision of 4	Hyejoon Jang

Date	Version	Description	Writer
2021/05/25	1.3	Addition of 3.1, 3.2	Jiwon Seo
2021/05/26	1.4	Addition of 3.3, 3.4	Hyeyeong Kim
2021/05/26	1.5	Addition of 3	Jiwon Seo
2021/05/27	1.6	Revision of 3	Hyeyeong Kim
2021/05/27	1.7	Addition of 2	Georyang Park
2021/05/28	1.8	Addition of 5.1, 5.2	Eunji Gil
2021/05/28	1.9	Addion of 5.3	Eunji Gil
2021/05/29	2.0	Revision of 2	Georyang Park
2021/05/29	2.1	Integration	Eunju Seok