W4156 Second iteration report

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1 User Cases

1.1 User-related

1.1.1 Signing Up

Actor: Anyone using our app

Description: For anyone who wants to have a try on our app, including the bill-payer or non-bill-payer, the first step is to sign up.

Basic Flow:

1. **Action:** User inputs his/her username and password, both of which should only contain lowercase and uppercase alphabetical characters, numbers and special characters of '@' and '_', and a limited number of characters. then presses submit button.
   Response: On pressing submit button, system will store the valid user information in the database and prompt hint for the user that he/she has successfully registered an account.

Alternative Flow:

1. **Action:** If the username already exists in the database, and a user register again.
   Response: On pressing submit button, system will prompt hint that the username already exists and can not register again.
2. **Action:** If the user try to conduct SQL Injection, like input the command "' or 1 =1 union drop table User --", which will delete the table User in our system.
   Response: System should sanitize the input before executing command. System should not believe user. After sanitizing, illegal input will be filtered and prompt corresponding hint. For example, after deleting the apostrophe, spaces, equality sign and hyphen of "' or 1 =1 union drop table User --", it would be "or11uniondroptableUser", which is a valid username since it is just a normal string.

1.1.2 Signing In

Actor: Any user with an account

Description: For any user who already has an account, he/she can login to his/her own account.

Basic Flow:

1. **Action:** User inputs his/her username and password.
   Response: System checks whether the combination of username and password is valid. If the combination is invalid, prompt hint “wrong username or password”. System should NOT prompt further hint for the user, just “wrong username or password” is enough. Otherwise, if the combination of username and password is valid, the user is successfully logged in.

Alternative Flow:

1. **Action:** User try to avoid login authentication using SQL Injection, like “‘ or 1 =1 --”.
   Response: Sanitizing user input before execution.

1.1.3 Searching and Adding Friend

Actor: Anyone who has logged in the app
Description: User has logged onto the app, and wish to find other users and add them.
Basic Flow:

1. **Action:** Type in the name of another user and press “search”.
   Response: If the target user is in our database, presented the user to the finder. Else, prompts hint that the target user is not in the database.
2. **Action:** Add the found user by pressing the “add” button
   Response: Pressing the button “add” to add the selected user, the system will relate the selected user and the current user as a friend.

Alternative Flow:

1. **Action:** User try to avoid login authentication using SQL Injection, like “‘ or 1 =1 --”, or even try to delete the table in the database.
   Response: Sanitizing the input from user and prompting corresponding hint. For example, after deleting spaces, hyphen, equality sign and apostrophe in “‘ or 1 = 1 --”, it will be “or11”, which will be a valid username.

1.1.4 Creating Group

Actor: A bill-payer
Description: A bill-payer select some of his/her friends and want to create a group.
Basic Flow:

1. **Action:** User selects some of his/her friends in the friend list, press the “create group” button.
   Response: System will create a new group entry in the database. The group has group name, owner and members.

1.2 Receipt-related

1.2.1 Uploading receipts

Actor: A bill-payer

Description: The consumer has just paid for a bill in either a restaurant or a supermarket and needs to record or divide it with friends.

Basic Flow:

1. **Action:** After logging in, press the floating action button on the homepage
   Response: A list of buttons is unfolded by the pressing, involving creating a new receipt button and refreshing button.
2. **Action:** Press the “create new receipt” button
   Response: A modal will be popped up to ask the user whether taking a photo of the receipt or selecting one from the gallery.
   a. **Action:** Take a new photo
      Response: Navigate to the camera page.
   b. **Action:** Select one from the gallery.
      Response: Navigate to the gallery page.
3. **Action:** Wait until “Go Dutch” finish processing the image.
   Response: Show a spinning circle while processing the image. After successfully loaded, a detailed information form of receipt will be shown as an overlay.
4. **Action:** Specify the number of shares of items, modify names of items if anything wrong in the detailed information form, and add other bill-sharers from the friend list, then press the submit button to submit the form.
   Response: Make the overlay invisible and upload the information of this receipt to the server. This receipt will be displayed as a history record on the history pane and it allows users to review and edit. Also, users who share this bill will receive a notification to be asked for the payment.

1.2.2 Paying for bills

Actor: A bill-sharer

Description: A bill-sharer receives a notification of a newly generated bill which waits to be paid to the bill payer(s). Once a receipt is shared by the bill-sharer, the receipt will be displayed in the receipt list of all involving users.

Basic Flow:

1. **Action:** Either press on the notification or select it from the receipt list can open to see the details of the receipt.

Response: Data is fetched from the remote database, and an overlay will be shown to present the details of the selected receipt and let the bill-sharer specify their own items.

2. **Action:** Select the number of shares of items specified by the bill-sharer on the overlay.
   Response: The total price of items will be calculated and updated
3. **Action:** Press the “Confirm” button shown at the bottom of the overlay to confirm the payment (Payment operates offline)
   Response: Request will be sent to the server and doing some check against the remaining amount of items stored in the database.
   - If every item has the sufficient amount remaining, the confirmation is successful and a prompt will be shown up to inform the bill sharer. The database will be updated at the same time. Once the payment confirmed by the bill-sharer, the bill-payer will receive a notification of the confirmation. Then the bill-payer can double-confirm that the payment has been done. After that, the receipt will be marked as “finished” in the interface, and the database will be updated in the meanwhile.
   - If one of the items has not enough amount remaining, the confirmation is unsuccessful and a prompt will also appear to inform users. Nothing update on the database.

1.2.3 Modifying details of receipts

Actor: A bill-payer
Description: After creating a receipt, the receipt creator wants to manually modify some information of the receipt.
Basic Flow:

1. **Action:** Press on a created receipt in the list of receipts.
   Response: An overlay with revisable information will be popped up.
2. **Action:** Modify the information of the receipt.
   Response: The total price and other related information will be updated in the interface.
3. **Action:** Press the “save” button.
   Response: The overlay disappears and new data are sent to the database in the server.

2 Test Suite

Test scripts can be accessed via this readme file on our git repo.

2.1 User-related

2.1.1 Signing Up and Signing In

The circumstances for signing up and signing in are similar, thus they will have similar valid and invalid equivalent partition(will point out their differences).

- **Valid Equivalent Partition:** The valid partition contains of username and password is that the username and password only contains lowercase and uppercase alphabetical characters, numbers and special characters of '@' and '_', and a limited number of characters.
- **Invalid Equivalent Partition:** There are some kinds of invalid partition:
    - Username or password containing Illegal characters like '#', '<' or '&'.
    - Username or password is longer than 16 characters.
    - (Signing In Only) Username does not exist.
    - (Signing Up Only) Username already exists.
    - Username or password contains commands that may cause security issue.
- **Boundary Condition:** There will be boundary case as the length of username or password increases from 0 to >16. If the length is 0, system should prompt NULL INPUT error. If the length is within 1-16 range, it's valid in length. If the length exceeds 16, system should prompt LONG INPUT error.

Test Case	Input	Output
Valid EP*	Username: 'tom' Password: 'mot'	Prompt hint "signing up successfully" or "log in successfully"
1st invalid EP	Username: '<tom>' Password: '<mot>'	(1) Deleting these invalid characters in the server before progressing. Or (2) Prompt hint "wrong username or password".
2nd invalid EP	Username: 'ttttttttttttttttttttttttom' Password: 'mmmmmmmmot'	Prompt hint "wrong username or password"
3rd invalid EP	Username: 'tom', but 'tom' does not exist in the database during signing in.	Prompt hint "wrong username or password". It's a bad idea to prompt hint like "Username does not exist", because attacker can test what usernames are in the database using this hint.

4th invalid EP	Username: ‘tom’, but ‘tom’ is a registered username during signing up.	Promt hint “username exists”.
5th invalid EP	Username: “‘ or 1 =1 --” Password: “‘ or 1 =1 --”	Sanitizing the input in the server. After sanitizing, the input would be “or11”. Prompt corresponding hint for input “or11”
Boundary condition	Username: ‘’	Prompt hint “NULL INPUT”`
Boundary condition	Username: ”thereare15words”	Valid input, no further hint
Boundary condition	Username: “@thereare16words”	Valid input, no further hint
Boundary condition	Username: “@@thereare17words”	Invalid input, prompt hint “LONG INPUT”

*EP: Equivalent partition

2.1.2 Searching and Adding Friend

The valid partition of this subroutine is when the friend exists in the database. If the user has already added the friend, there will be no adding function. Otherwise, the user can choose to add the search result as friend.

- **Valid Equivalent Partition:**
  - Find friend but not add him/her
  - Find friend and already added him/her
- **Invalid Equivalent Partition:**
  - Friend not exists in the database
  - Friend name contains some commands that may cause security issue
- **Boundary Condition:** There will be no boundary condition in this case. Or the boundary case is similar to that in **2.1.1 Signing Up and Signing In** part, but it’s meaningless to discuss it again.

Test Case	Input	Output
1st valid EP	Search Friend: ‘tom’ Press “Add” button	List ‘tom’ or all the user that contains ‘tom’, like ‘tommy’(will implement it in the next

		iteration), and after pressing “Add”, system will relate the user and “tom” as friend
2nd valid EP	Search Friend: ‘tom’	List ‘tom’ or all the user that contains ‘tom’.
1st invalid EP	Search Friend: ‘tom’	Prompt hint “Friend not exists”
2nd invalid EP	Search Friend: “‘ or 1 =1 --”	Sanitizing the input in the server. After sanitizing, the input would be “or11”. Prompt corresponding hint for input “or11”

2.1.3 Creating groups

In our design, every group name should be unique, which means users are only able to create a group if the group name has never been used before. When creating a new group, users are able to select members from the list of friends. Users can also choose to create an empty group and add more friends later.

- **Valid Equivalent Partition:**
  - Create an empty group with an unused name
  - Create a new group with an unused name
- **Invalid Equivalent Partition:**
  - Create a group -with a name which is used before
  - Create a group without a name
- **Boundary Condition:** The input group string should be in length 1 to 100. A group with length 0 or > 100 is invalid.

Test Case	Input	Output
1st valid EP	Group name: “new group” Selected friend ids: [5, 19, 26]	The “new group” name has never been used before so the server create a new group, adding group owner and three members into this group. Return group id of the new group.
2nd valid EP	Group name: “new group 2” Selected friend ids: []	The “new group” name has never been used before so the server create a new group. Add

		only group owner into this group. Return group id of the new group.
1st invalid EP	Group name: “new group” Selected friend ids: []	The group name is used before, therefore, server return -1.
2nd invalid EP	Group name: “” Selected friend ids: []	The group name is with length 0, server return -1.

2.1.4 Adding more member into an existing group

User are provided with a list of friends’ name, and able to pick 0 or more members from the list. Then click submit button to commit the change.

- **Valid Equivalent Partition:**
  - Select 0 person from the list and save the change
  - Select 1 person from the list and save the change
  - Select > 1 people from the list and save the change
  - Select more than 1 people from the list and some of them are already in the group
- **Invalid Equivalent Partition:**
  - User are only able to choose member from the given friend list.
- **Boundary Condition:** Selected number of people from 0 to the number of total friends.

Test Case	Input	Output
1st valid EP	Select 0 person from friend list.	“true”, add no member into the group.
2nd valid EP	Select 1 person from friend list.	“true”, add the specified member into the group.
3rd valid EP	Select > 1 people from friend list.	“true”, add all selected members into the group.
4th valid EP	Select more than 1 people from friend list and some of them are already in the group.	“true”, add only selected members who are not in the group into the group.

2.2 Receipt-related

2.2.1 UI component tests:

For the following use cases in this section, the Valid Equivalent Partition and Invalid Equivalent Partition of them are the same but for a different testing component. For brevity, a general template will be introduced first and customized testing component for each use case will be articulated in the following table.

- **Valid Equivalent Partition:** User presses the button specified in the *Testing component* column
- **Invalid Equivalent Partition:** User presses somewhere else rather than the intended button specified in the *Testing component* column

Secondly, the boundary condition is not applicable for those use case. In addition, the test schema for tests designed for these use cases includes testing if the intended event happens when users operate as expected and also testing if the event does not happen when users perform unexpectedly.

# Use case	Testing component	Intended result when under VEP*
1.2.1.1	The floating action button on the homepage	A list of buttons is unfolded
1.2.1.2	“Create new receipt” button	A modal containing two buttons specified in 1.2.1.2 shows up
1.2.1.2.1	“Take a new photo” button	Navigation to the camera page allowing users to take a picture
1.2.1.2.2	“Choose from gallery” button	Navigation to the gallery page allowing users to choose a receipt from the gallery
1.2.2.1	“Notification”	An overlay where the details of the receipt will be shown up upon the receipt list
1.2.2.1	Select a receipt from the receipt list	An overlay where the details of the receipt will be shown up upon the receipt list
1.2.2.3	“Confirm” button	Either a *successful* prompt or an *unsuccessful* prompt will be displayed

*VEP: Valid equivalent partition

2.2.2 Item claiming tests

Corresponding to the use cases, an overlaying modal will be popped up to let the user specify some items. The valid equivalent partition, as well as the invalid one, will be provided down below.

- **Valid Equivalent Partition:** Users press the increase or decrease button to specify valid amounts of items, which are bounded by the boundary values set by the bill-payer, and then press the “confirm” button.
- **Invalid Equivalent Partition:** Users would like to specify more items even the upper boundary has been reached or quit before any item is specified.

# Use case	Test description	Boundary condition
1.2.2.2	Test if the amounts of items are limited in valid ranges, and each range is provided correctly according to the values provided by the bill-payer.	No items are selected or more items are selected than the permitted range. Both of the circumstances won’t lead to an update of the database, and a prompt will be popped up to hint the user about the invalid operation.
1.2.2.3	Test if there are sufficient items left for each one specified by a user involving in a bill, a *successful* prompt should be displayed, and the amount of corresponding items should be deducted at the same time.	The race condition may happen when multiple users involved since the total amount of items they allocate may exceed the total amount available. If it is the case, none of the requests from involved users would be executed, which means the database remains unchanged.
1.2.2.3	Test if there are insufficient items left for each one specified by a user involving in a bill, a *unsuccessful* prompt should be displayed, and the amount of items involved should be retained.	

3 Code Coverage

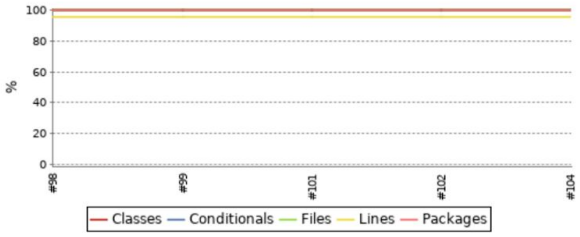
Currently, we only successfully deploy the unit test of our database on our CI server. We ran the analysis tool under the database directory where we intend to test, and we achieved 100% classes coverage and 95% line coverage. The figure below shows the report displayed on our CI server, and the one in xml format can be accessed via the readme file on our git repository.

We keep on working on implementing more test suites for our front-end part as we planned and also trying to figure out how to deploy those test suites on our CI server so that tests can be ran automatically.

Code Coverage

Cobertura Coverage Report

Trend



Project Coverage summary

Name	Packages	Files	Classes	Lines	Conditionals
Cobertura Coverage Report	100% 1/1	100% 7/7	100% 7/7	95% 543/571	100% 0/0

Coverage Breakdown by Package

Name	Files	Classes	Lines	Conditionals
.	100% 7/7	100% 7/7	95% 543/571	N/A

4 Git repo

https://github.com/DoDutchAoA/Do-Dutch/tree/master

References:

[1] https://coverage.readthedocs.io/en/latest/cmd.html