MyCal
By Team Xeon

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Mission Statement

To develop an application that allows the users to choose their NTU courses, plan, share and add their timetable to their calendar easily. Furthermore, to facilitate this process, the application should provide ratings and reviews of courses.

Introduction

- MyCal allows users to plan and customize their timetable. After which they can save, share or download it to add it to their calendars.
- The users can explore different courses and gain insights from ratings and comments, which can also be saved to their profile.
- They can also upload multiple timetables to find common free time slots which is particularly helpful in planning group meetings.

Timeline

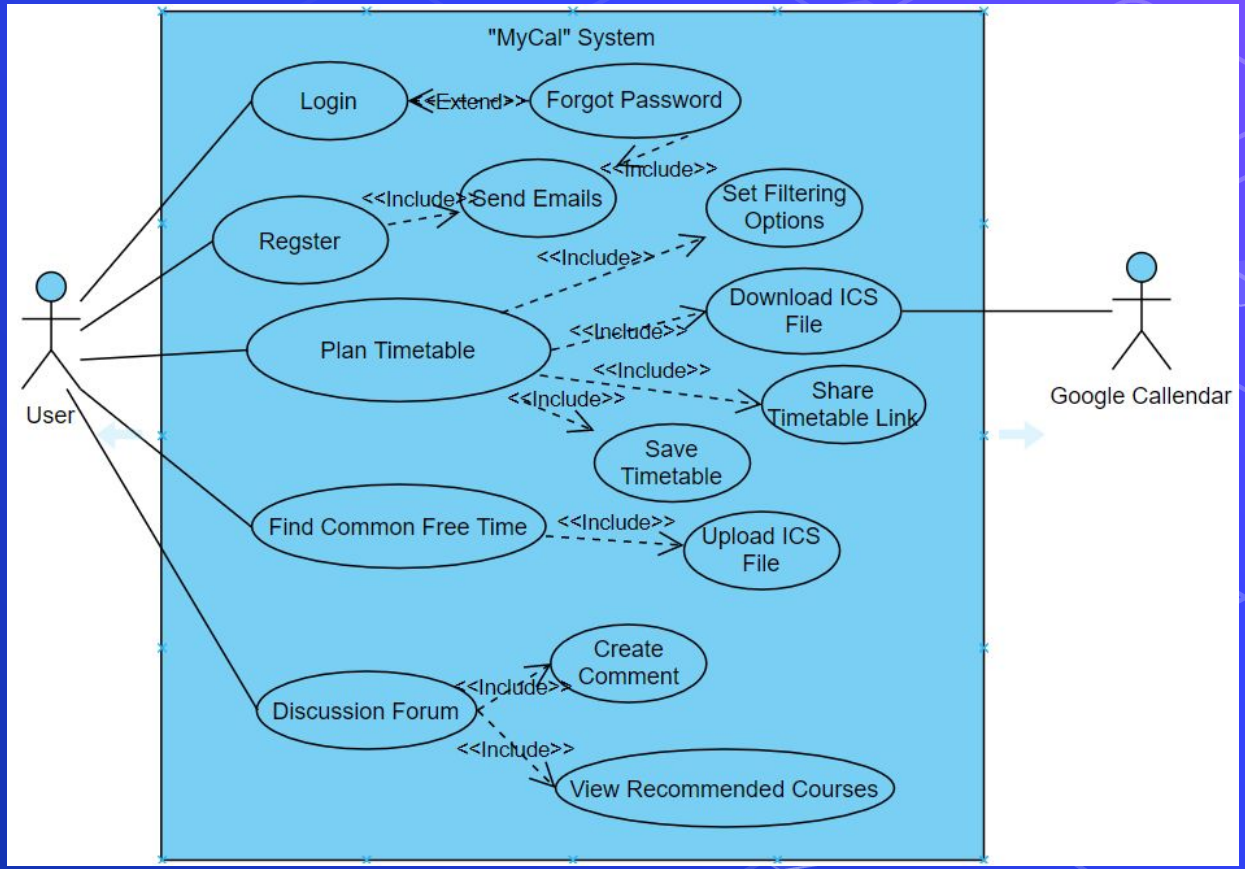
Week 1-5
Research and Planning
Initial requirements
Use Case Model

Week 5-7
Class Diagram
Sequence Diagram
Dialog Map
User Interface Design

Week 7-11
System Architecture
Implementation

Week 11-13
Bug Fixing
Black Box Testing
White Box Testing

Use case Diagram

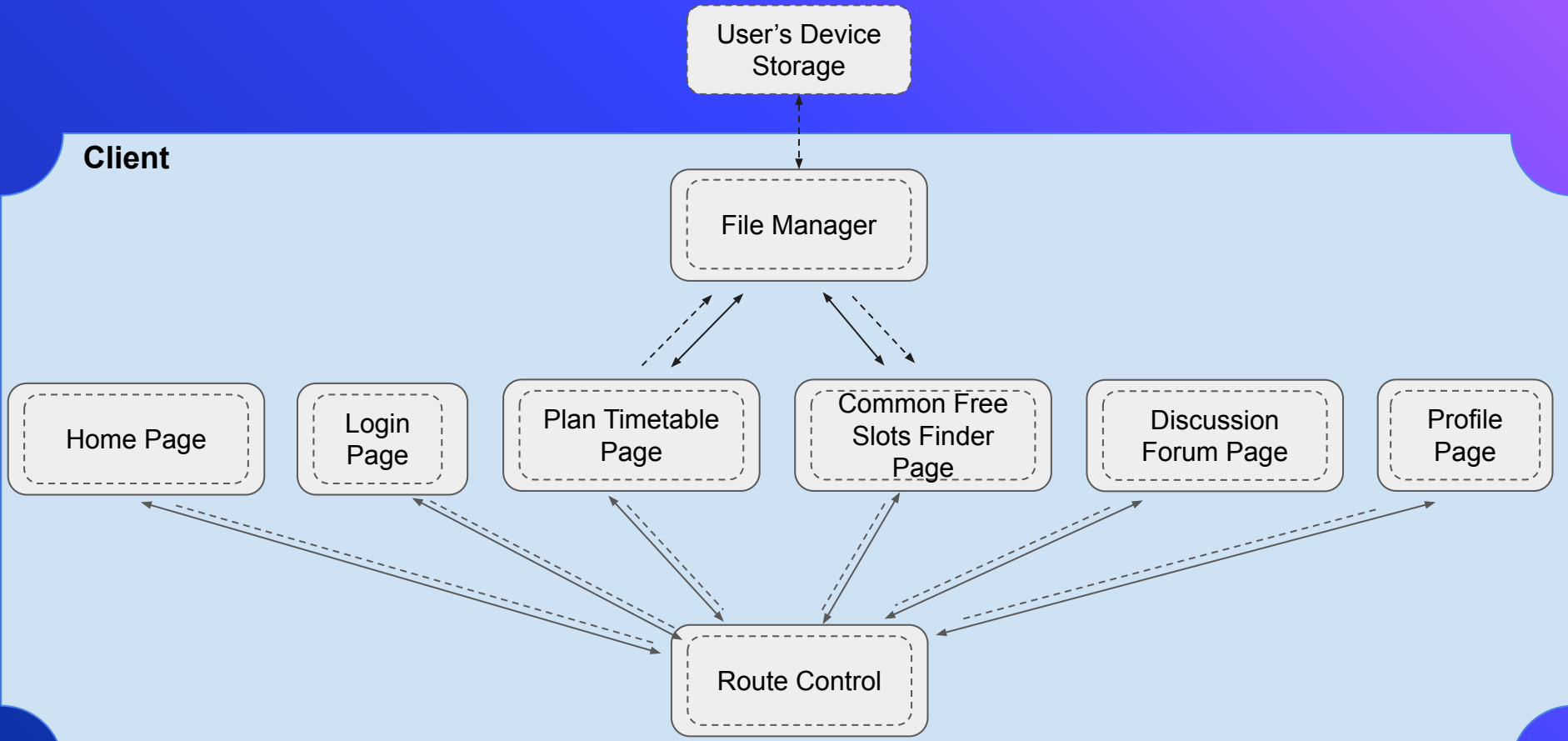


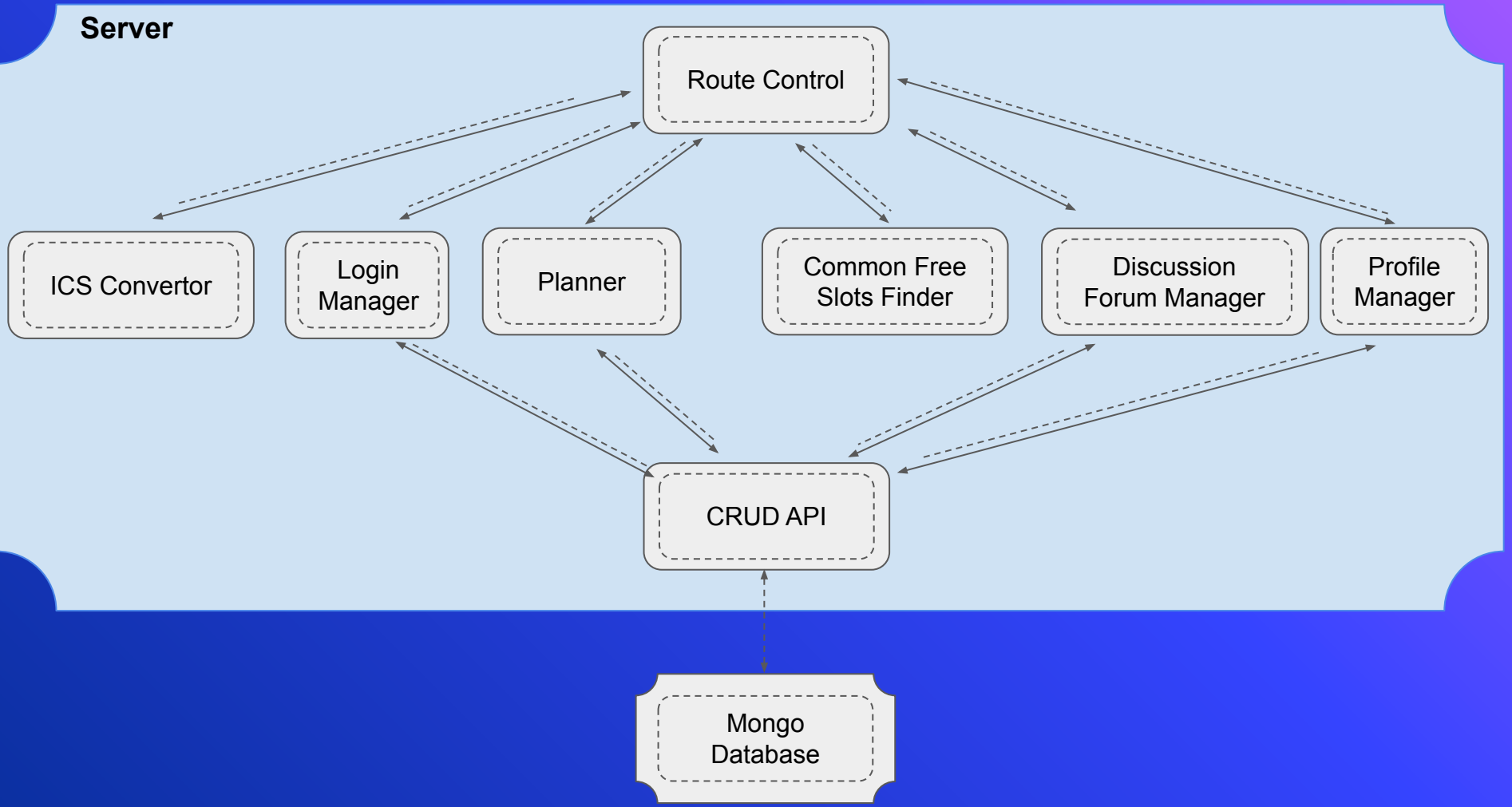
Non Functional Requirements

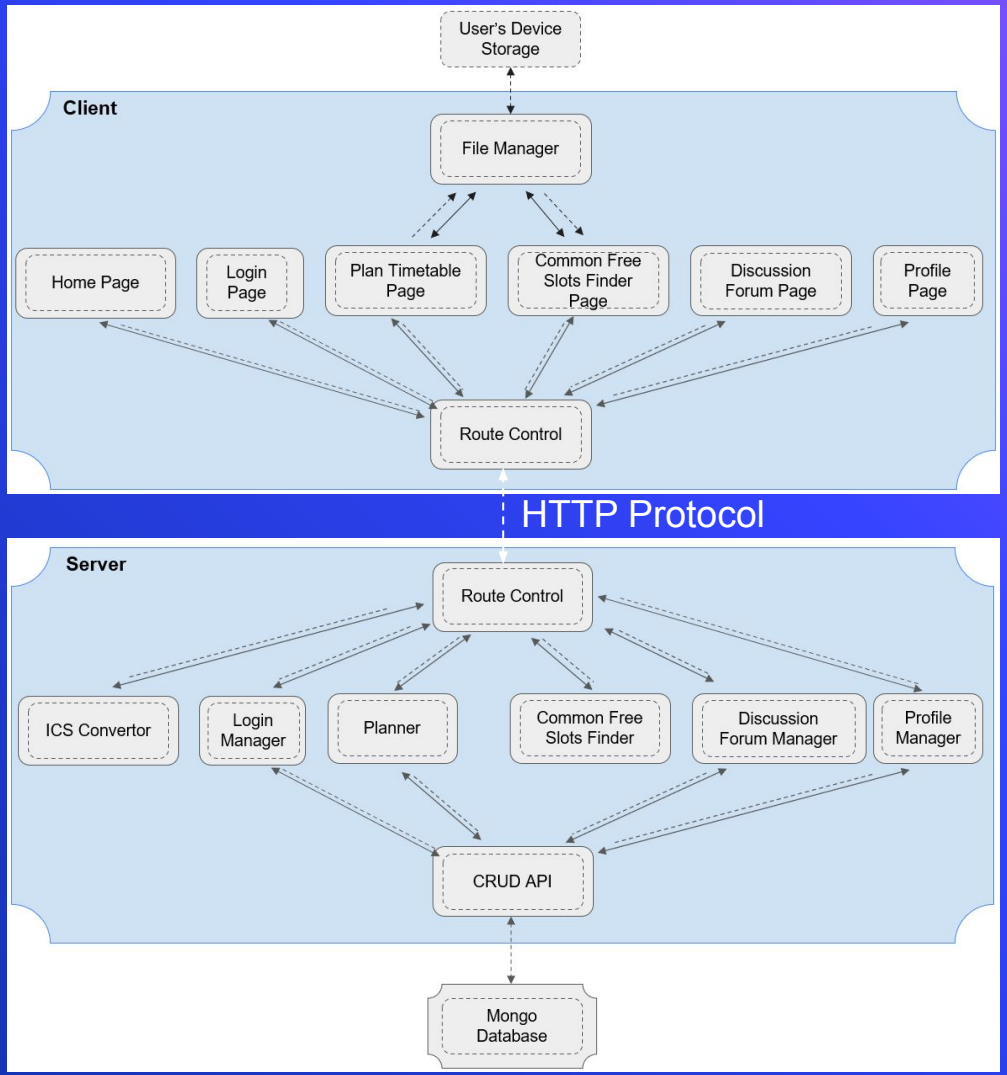
Usability	Security	Performance
The system must allow easy reversal of user's actions. The system must have consistency. The system must provide informative feedback	The system will only store hashed passwords into the database to prevent hacking attempts. The system will store customer data. The data will not be used for purposes other than storage under PDPA	The system must be able to generate and display at least 100 timetables(if the course combinations permits) within 4 seconds. Any maintenance work should be done on a different branch of the codebase to allow users to continue using the main branch.

Demo

System Architecture & Design Pattern


User’s Device Storage
Client
File Manager
Home Page
Login Page
Plan Timetable Page
Common Free Slots Finder Page
Discussion Forum Page
Profile Page
Route Control


Server
Route Control
ICS Convertor
Login Manager
Planner
Common Free Slots Finder
Discussion Forum Manager
Profile Manager
CRUD API
Mongo Database

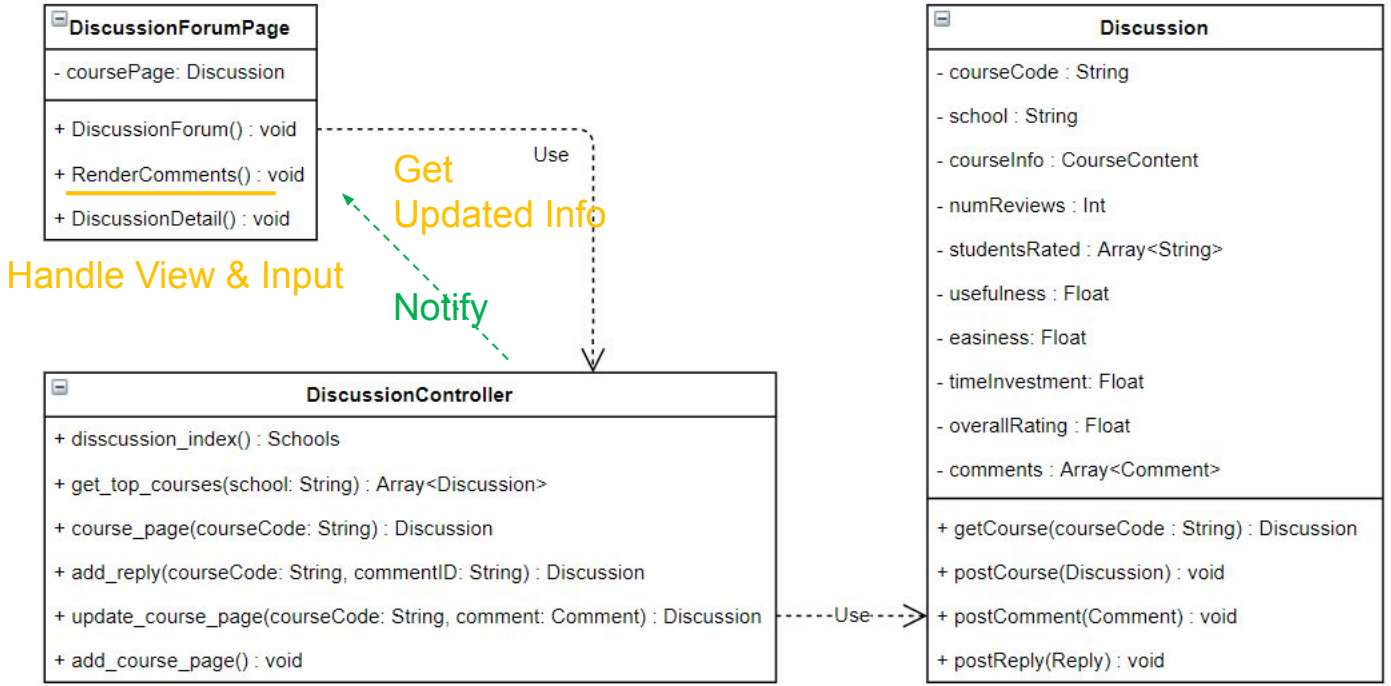

User's Device Storage
Client
File Manager
Home Page
Login Page
Plan Timetable Page
Common Free Slots Finder Page
Discussion Forum Page
Profile Page
Route Control
HTTP Protocol
Server
Route Control
ICS Convertor
Login Manager
Planner
Common Free Slots Finder
Discussion Forum Manager
Profile Manager
CRUD API
Mongo Database

Model-View-Controller (MVC) Architecture

Example : Discussion Forum

Model (Database Entity)

View & Controller



Logic to change Discussion Forum content

Data

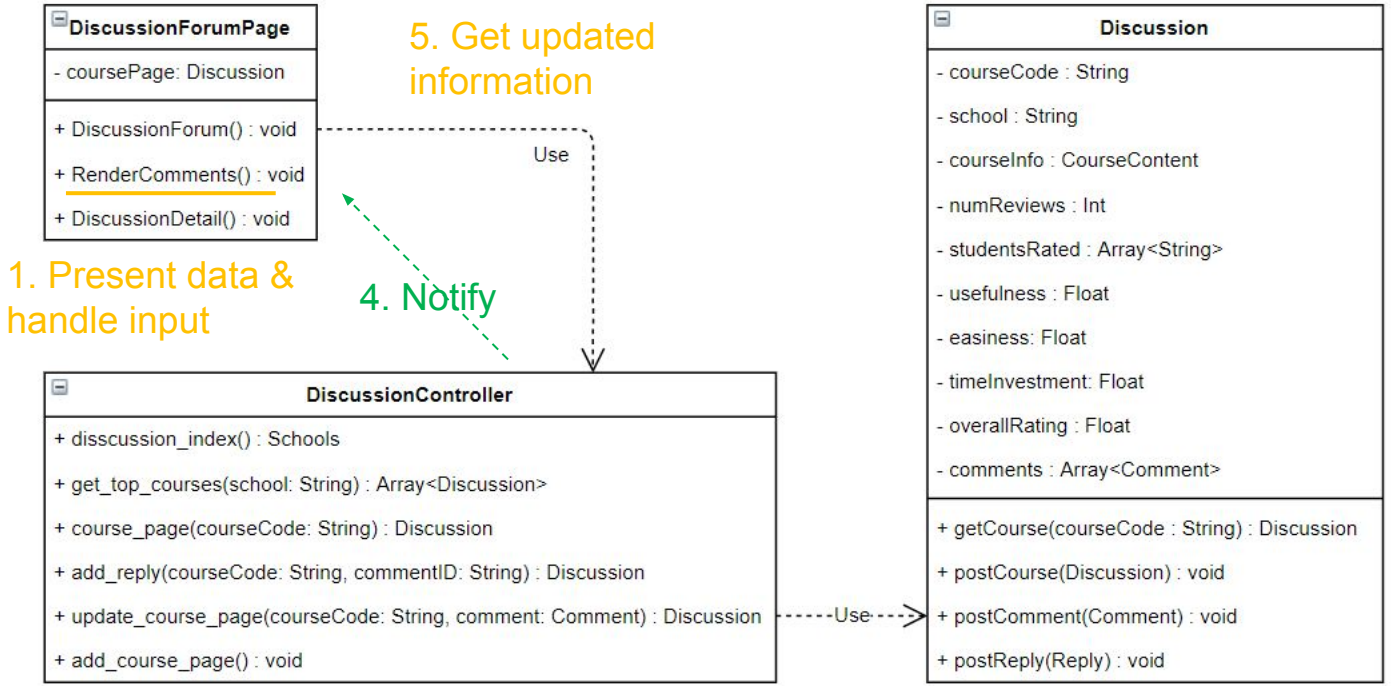
Model-View-Controller (MVC) Architecture

Example : Discussion Forum

Client View & Controller

Server Manager

Server Entity Class



2. Process data

3. Query or update database

Black Box Testing (Login)

Generic Cases

Test Id	Scenario	Expected Result	Actual Result
1	Login with valid email and password	The system displays the planning page.	The system displays the planning page.
2	Login without filling up the required fields	The system prompts the user to fill up the required fields for logging in.	The system prompts the user to fill up the required fields for logging in.
3	Login with invalid email and valid password	The system prompts users to enter email and password again.	The system prompts users to enter email and password again.
4	Login with valid email and invalid password	The system prompts users to enter email and password again.	The system prompts users to enter email and password again.

Black Box Testing (Login)

Specific Cases

Email	Password	Expected Result	Actual Result
asthagarg1611@gmail.com	MyAccount	Successful Login	Successful Login
wrong@gmail.com	ntuadmin123	Invalid email/password	Invalid email/password
testing@gmail.com	**wrongPass**	Invalid email/password	Invalid email/password
Empty	ntuadmin123	Please enter valid email	Please enter valid email
test1@ntu.edu.sg	**Empty**	Please enter password	Please enter password
Empty	**Empty**	Please enter valid email, Please enter password	Please enter valid email, Please enter password

Black Box Testing (Generating Common Free Time Slots)

Equivalence class and boundary value testing for Generating Common Free Time Slots

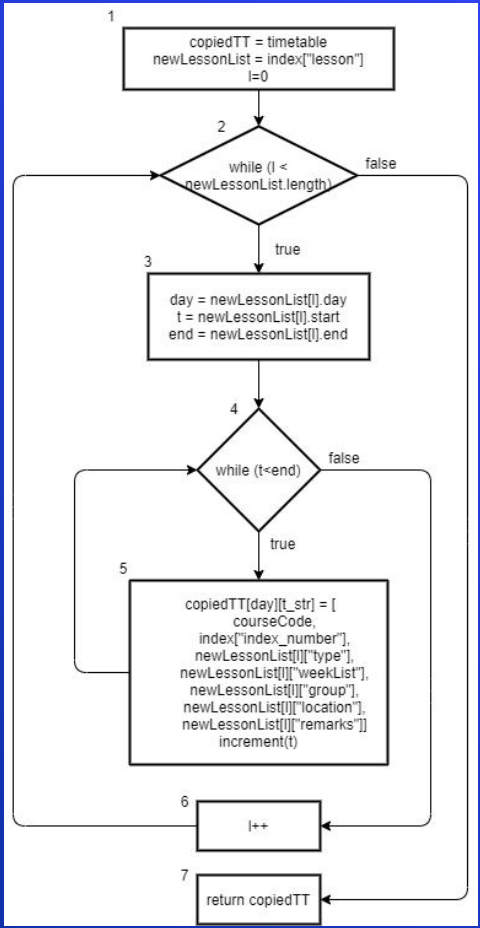
- Number of timetables for valid equivalence class (1<= x <= 10)
  - Lower Boundary : 0, **1**, 2
  - Upper Boundary : 9, **10**, 11

Hence:

- Valid Boundary Values: {1, 10}
- Invalid Boundary Values: {0, 11}

TestID	Number of Timetables uploaded	Expected Result	Actual Result
1.	0	The system displays an alert to upload a timetable.	The system displays an alert to upload a timetable.
2.	1	The common free time slots of the timetable should be displayed.	The common free time slots of the timetable should be displayed.
3.	10	The common free time slots of all the timetables should be displayed.	The common free time slots of all the timetables should be displayed.
4.	11	The system shows an alert that the number of timetables have exceeded the set limit.	The system shows an alert that the number of timetables have exceeded the set limit.

White Box Testing



Cyclomatic Complexity =
|decisionpoint| + 1 = 2 + 1 = 3

Set of basis paths:
i) 1, 2, 7
ii) 1, 2, 3, 4, 6
iii) 1, 2, 3, 4, 5, 6, 7

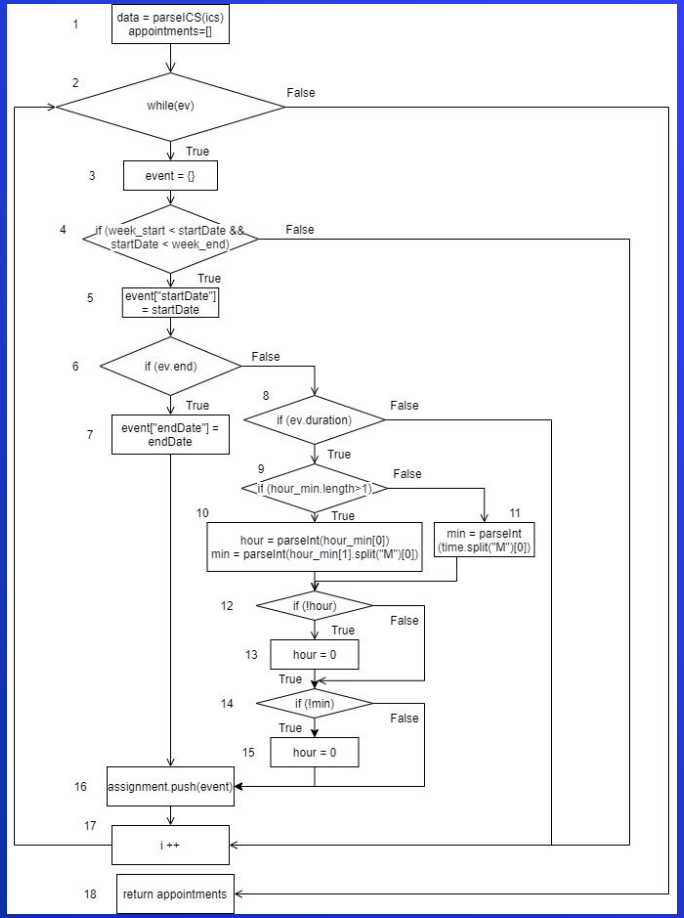
Test cases:
i) l = 1, newLessonList.length=1
ii) l = 0, newLessonList.length=1, t=1230, end = 1230
iii) l = 0, newLessonList.length=2, t=(1030,1130), end = (1100, 1200)

Real execution paths
i) 1, 2, 7
ii) 1, 2, 3, 4, 6, 2, 7
iii) 1, 2, 3, 4, 5, 4, 6, 2, 3, 4, 5, 4, 6, 2, 7

No.	l	t	End	Expected result	Actual result
1	1	-	-	copiedTT is returned with the previous lessons added.	copiedTT is returned with the previous lessons added.
2	0	1230	1230	copiedTT is returned with the previous lessons added.	copiedTT is returned with the previous lessons added.
3	0	(1030, 1130)	(1100, 1200)	2 lessons with the corresponding starting time and ending time are added to copiedTT which is then returned.	2 lessons with the corresponding starting time and ending time are added to copiedTT which is then returned.

Allot_course in Planner controller

White Box Testing



IcsToAppointment

Cyclomatic Complexity = |decisionpoint| + 1 = 7 + 1 = 8

Set of basis paths:

i) 1, 2, 18
ii) 1, 2, 3, 4, 5, 6, 7, 16, 17, 2, 18
iii) 1, 2, 3, 4, 17, 2, 18
iv) 1, 2, 3, 4, 5, 6, 8, 17, 2, 18
v) 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 2, 18
vi) 1, 2, 3, 4, 5, 6, 8, 9, 10, 12, 14, 15, 16, 17, 2, 18
vii) 1, 2, 3, 4, 5, 6, 8, 9, 10, 12, 13, 14, 16, 17, 2, 18
viii) 1, 2, 3, 4, 5, 6, 8, 9, 11, 12, 13, 14, 16, 17, 2, 18

Test cases:

i) no event, week 12
ii) DTEND:20210409T033000Z, DURATION:-, week 12
iii) DTEND:20210409T033000Z, DURATION:-, week 13
iv) DEND:-, DURATION:-, week 12
v) DEND:-, DURATION:PTHM, week 12
vi) DTEND:-, DURATION:PT1HM week 12
vii) DTEND:-, DURATION:PTH30M week 12
viii) DTEND:-, DURATION:PT30MZ week 12

1. []

2. endDate
result: [
{
title: 'CZ3006',
type: 'LAB',
startDate: 2021-04-09T01:30:00.000Z,
endDate: 2021-04-09T03:30:00.000Z,
group: 'TS2',
location: 'SW1',
id: 0
}
]

3. not this week []

4. no end no dur []

5. HM

result: [
{
title: 'CZ3006',
type: 'LAB',
startDate: 2021-04-09T01:30:00.000Z,
endDate: 2021-04-09T01:30:00.000Z,
group: 'TS2',
location: 'SW1',
id: 0
}
]

6. result: [
{
title: 'CZ3006',
type: 'LAB',
startDate: 2021-04-09T01:30:00.000Z,
endDate: 2021-04-09T02:30:00.000Z,
group: 'TS2',
location: 'SW1',
id: 0
}
]
7. result: [
{
title: 'CZ3006',
type: 'LAB',
startDate: 2021-04-09T01:30:00.000Z,
endDate: 2021-04-09T02:00:00.000Z,
group: 'TS2',
location: 'SW1',
id: 0
}
]
8. result: [
{
title: 'CZ3006',
type: 'LAB',
startDate: 2021-04-09T01:30:00.000Z,
endDate: 2021-04-09T02:00:00.000Z,
group: 'TS2',
location: 'SW1',
id: 0
}
]

Future Developments

More ways to recommend courses

- The user's ratings and comments can be further analysed using Machine Learning and NLP.

Responsive design

- Currently the website only works well on a desktop machine and the positioning of the elements have been fixed.
- By making it responsive, it will be able to support multiple devices.

More universities - Smart Nation

- Courses from other universities can be included.
- Enable planning for exchange programs.

Thanks!

Any questions?