FIT3161 Project Design

Group 6

Group Members

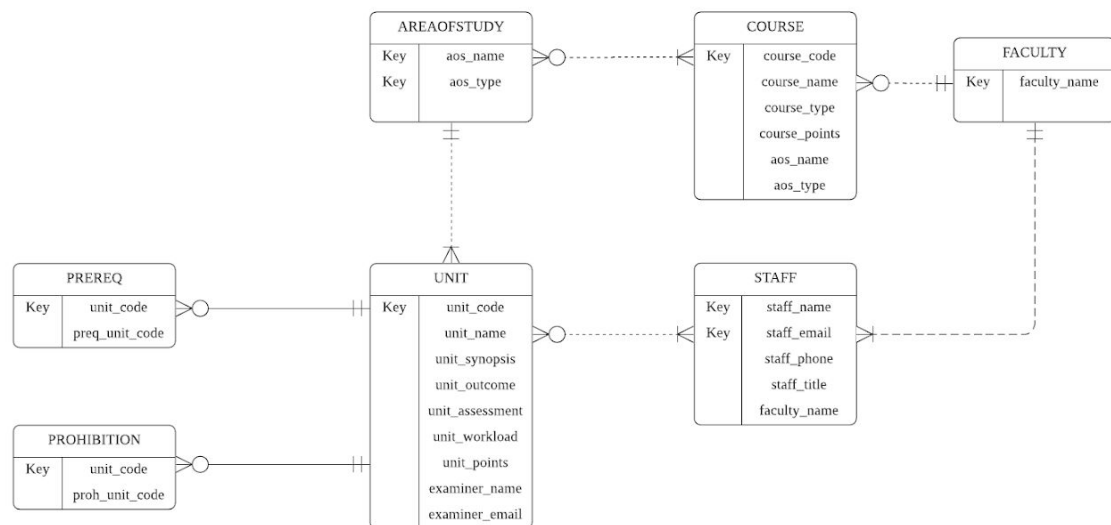Kevan Theo 29270383
Yixuan Zhang 29605970
Runzhao Huang 29604117

1. Representations of design
a) Database Schema

Comment and justification:

We have 7 entities in our Entity-Relationship Diagram (ERD). The main relationship is that a faculty takes charge of multiple courses, such as Bachelor of Computer Science, Bachelor of Information Technology, and a course may contain multiple areas of study, such as Advanced Computer Science and Data Science, students need to complete some certain units to finish an area of study. Some units may contain prerequisite units and prohibitions.

UNIT: contain attributes and features about units, such as code, outcome etc.

PREREQ: one unit could have several prerequisite units.

PROHIBITION: one unit could have some prohibition units. If you take that unit, you cannot take its prohibitions.

FACULTY: different faculties in the University

COURSE: a faculty takes charge of multiple courses, such as Bachelor of Computer Science, Bachelor of Information Technology

AREA OF STUDY: a course may contain multiple areas of study, such as Advanced Computer Science and Data Science

STAFF: referring to a certain staff in the University

b) UI mockup diagrams

1. This is the main page. We created 2 different entrances in the main page, allowing users to compare between different units and adjust their course map respectively.
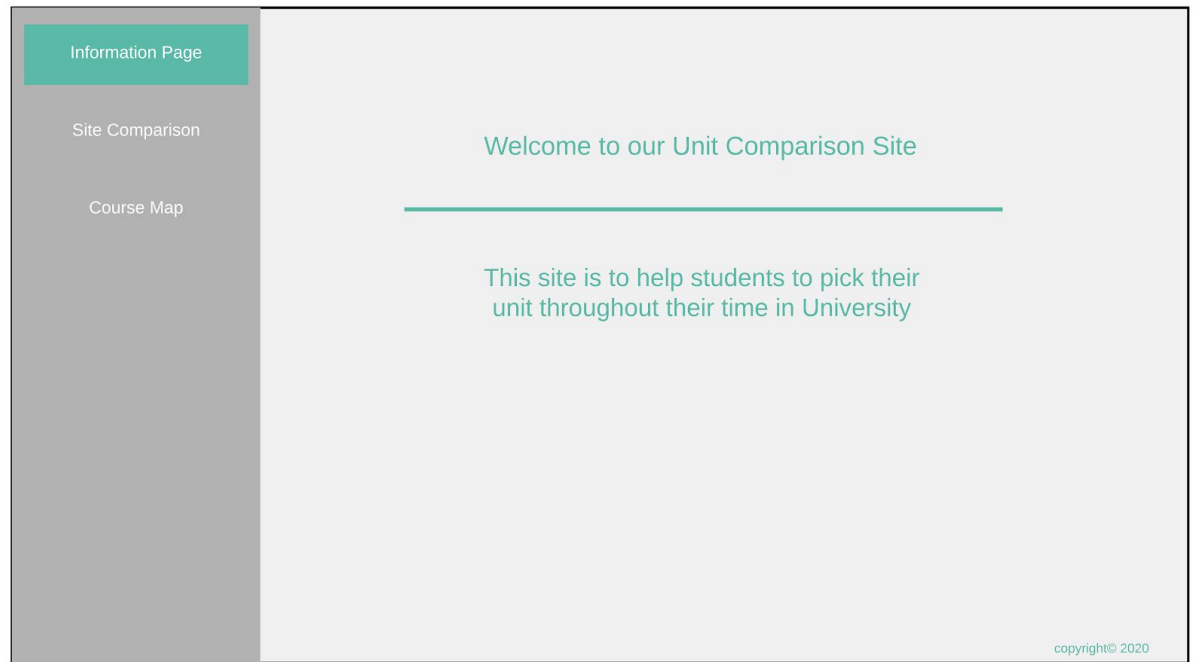
2. This is the page for comparing units. Users can click on 'select unit' and this will bring them to a searching page. In addition, we set many filters for user's convenience, users can tick the fields they want to check with. For example, the user ticks unit code, unit name and workload as his filter, then after successfully selecting the unit, only those three fields will be shown. This will be a pretty convenient user to compare different units with their features. If a user only wants to compare workload between units, he only needs to tick unit code and workload, then a clear comparison will be given.

Information Page	
Site Comparison	
Course Map	

Please select unit

☐ Unit code ☐ Teaching Approach
☐ Unit name ☐ Availability in Areas of Study
☐ Campus ☐ Enrollment rule
☐ Offering ☐ Assessments
☐ Summary ☐ Areas of Study
☐ Workload ☐ Select All

Submit

3. This is the searching page. Users can search by different factors. The advanced search is a challenging task for us. We intend to let users enter keywords to search and we parse the keyword, probably using Natural Language Processing, and present the result. This is not merely looking for units whose title contain a certain keyword. For example, if the user is searching for 'programming', there are many programming units like 'Fundamentals in Java', 'Fundamentals in C++' which do not necessarily contain the keyword 'programming'. We are still thinking how we can implement it, either by adding tags manually or leveraging some Artificial Intelligence technology to parse the word 'programming' so that the server understands 'C++' is a programming language and it should be included in the result.

Information Page		
Site Comparison		
Course Map		

Search By Code   Please Enter Code

Search now

Search By Title   Please Enter Title

Search now

Advanced Search (Please fill at least one field)

Faculty   Please Select Faculty ▼

Keyword   Please Enter Keyword

Search now

copyright© 2020

4. Sample result for searching 'programming'

Advanced Search Result for "Programming"

FIT1045	Algorithm and Programming Fundamentals in Python	Add Unit
FIT1048	Fundamentals of C++	Add Unit
FIT1051	Fundamentals in Java	Add Unit

Information Page
Site Comparison
Course Map

copyright© 2020

5. Sample page for user selecting FIT1045

Information Page
Site Comparison
Course Map

FIT1045   Add Unit

☐ Unit code   ☐ Teaching Approach
◉ Unit name   ☐ Availability in Areas of Study
☐ Campus   ☐ Enrollment rule
◉ Offering   ☐ Assessments
◉ Summary   ☐ Areas of Study
☐ Workload   ☐ Select All

Submit

copyright© 2020

6. Sample page for user comparing FIT1045 and FIT1051

7. The other main functionality for our website is to allow users to access and modify their course map. By selecting a certain course, users can get a base course map and select different units for their electives.

8. Sample course map. After the selection of electives is done, they can export the map for future reference. This can help students explore their study pathway, and have a better understanding of which units to choose.

Information Page

Site Comparison

Course Map

Course Map for Advanced Computer Science   Export

Y1S1

FIT1045
Algorithms and programming fundamentals in python

FIT1047
Introduction to computer systems, networdks and security

MAT1830
Discrete mathematics for computer science

Elective
Select Elective   Add Unit

Y1S2

FIT1008
Introduction to computer science
(FIT1045)

FIT1049
IT professional practice
(12 pts of FIT study)

MAT1841
Continous mathematics for computer science

Elective
Select Elective   Add Unit

Y2S1

FIT2004
Algorithms and data structures
(FIT1008 & 6 pts L1 Maths)

FIT2099
Object-oriented design and implementation
(One of FIT1045, FIT1051, FIT1008)

Eelective
Select Elective

Elective
Select Elective   Add Unit

Y2S2

FIT2014
Theory of computation
(FIT1045 & MAT1830)

FIT2102
Programming paradigms
(FIT1008)

Elective
Select Elective

Elective
Select Elective   Add Unit

Y3S1

FIT3161
Computer science project 1
(FIT2004)

FIT3171
Databases
(One of FIT1045, FIT1048, FIT1051 or ENG1003)

Level 3
Computer Science Approved Elective

Elective
Select Elective   Add Unit

Y3S2

FIT3162
Computer science project 2
(FIT3161)

FIT3155
Advanced data structures and algorithm
(FIT2004)

FIT3143
Parallel computing
(FIT2004)

Elective
Select Elective   Add Unit

Add semester

copyright© 2020

9. Search page for selecting electives.

Information Page

Site Comparison

Course Map

Search By Code   Please Enter Code
Search now

Search By Title   Please Enter Title
Search now

Advanced Search (Please fill at least one field)

Faculty   Please Select Faculty ▼

Keyword   Please Enter Keyword

Search now

copyright© 2020

10. Sample result for searching elective.

Advanced Search Result for "Programming"

Information Page	
Site Comparison	
Course Map	

FIT1045	Algorithm and Programming Fundamentals in Python	Add Unit
FIT1048	Fundamentals of C++	Add Unit
FIT1051	Fundamentals in Java	Add Unit

copyright© 2020

2. Software and Hardware Specifications

Software:
- Front-end Language: HTML, CSS, JavaScript
- Front-end Framework: React
- Back-end language: Python
- Web framework used: Django
- Database: Mysql
- Browsers:

Hardware:
- Computers with IDE's to support Python, JS, HTML such as:
    1. Pycharm
    2. Intellij
    3. PhpStorm
- Ethernet Connection or Wireless Adapter
- Most editors also require at least 2 GB of RAM
- Hard Drive (recommended 32 GB)

3. Justifications

For the decisions we make above, some justifications are needed to be stated.

- Why is UI mock-up diagram and database schema chosen as representation?

  UI mock-up diagram and database schema are the 2 representations in our project. We are designing a web-based unit selection system, so we decided to present the UI of our system. In addition, we are required to provide user comparison between different units and give some recommendations about study pathways, which means we must construct our own database that contains relevant data from the Monash course handbook. In conclusion, choosing a UI mock-up diagram and database schema for representations will be an excellent choice.

- For the front-end programming language we used HTML, CSS and JavaScript

  This is a common practice for front-end development.
  For JavaScript, we also use React, a front-end framework that will be handling the UI and requests for the back-end.

- For the back-end programming language, why do we choose Python other than Java or Ruby.

  Compared to Ruby and Java, although Ruby performs well in its extensive features and flexibility, Python uses simpler and more straightforward syntax which makes it easy for web developers to work with and explain to users. On the other hand, Python has extensive support libraries. A huge number of frequently used programming tasks have already been scripted into Python standard library, which can substantially reduce the amount of code needed in our project. Python's community already includes a large Linux and academic community, which offers many academic usage cases in both math and science, there may be some similar cases which can be applied by our project. Finally, our group members are all very familiar with coding Python so choosing Python would be a good option for us.

- For the web framework choosed, Django is the option.

  Django, a high-level Python web framework that supports rapid development and cleanliness, perfectly suits large complex projects. It is impressively quick, secure, scalable, and versatile. Because In addition, it perfectly fits for Python. So in conclusion, it will fit our project well.

- For database implementation, we chose Mysql.

  Mysql is the most commonly used relational database management system (RDBMS) in the world. It is free and open-source. More importantly, Mysql works well

with Django, which is the framework we use for back end. Although we only have experience in using Oracle sql in the previous units, we found the syntax between Mysql and Oracle is similar and we are confident that we can handle it.