



**UTM**  
UNIVERSITI TEKNOLOGI MALAYSIA

**UNIVERSITI TEKNOLOGI MALAYSIA**

**FACULTY OF COMPUTING**

**SEMESTER II, SESSION 2023/2024**

**PHASE 3 - REPORT**

**SECD 2613 - SYSTEM ANALYSIS AND DESIGN**

**SECTION 07**

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## **1.0 Overview of the Project**

Universiti Teknologi Malaysia is the 5th best university in Malaysia based on QS World University Rankings that is specialised in engineering and technology. With more than 15000 undergraduates across three different campuses located in Johor Bahru, Kuala Lumpur and Pagoh, it is the top choice for anyone interested to pursue their studies in a wide selection of degree programmes including Computer Science and Engineering.

With such a huge amount of students on campus, there are surely a lot of resources that needs to be managed across multiple parties, including the students, departments and stakeholders. Without a proper system in place to maintain these resources, there would be severe consequences. For instance, miscommunication when reserving facilities for an event can cause higher costs and wasted time.

To prevent such problems from occurring, a centralised platform to manage campus resources should be developed. Therefore, we are proposing a system called Campus Resource Management System. By having a more centralised system, administrative and operational processes are more streamlined and efficiently improves the effectiveness of managing various resources within the campus.

## **2.0 Problem Statement**

### **1. Disorganisation in Facility Booking**

The campus lacks a unified system for facility booking. Currently, students and staff must navigate through multiple platforms to reserve spaces, leading to confusion and inefficiency. For example, booking a classroom requires one system, while reserving a gym or stadium involves separate procedures. This fragmented approach creates barriers to seamless campus resource management, resulting in scheduling conflicts and reduced resource utilisation.

### **2. Ineffective Event Notification and Reminder System**

Students often learn about campus events through the university's central website, UTM.my. However, this platform offers limited customization and doesn't allow users to set reminders for events they are interested in. The absence of a "pin" or "favorite" feature makes it difficult for users to revisit event information, leading to lower event participation and a diminished sense of community engagement.

### **3. Non-User-Friendly Interface for Academic and Administrative Tasks**

Students find the campus management system's user interface challenging to navigate. Accessing academic profiles, registering for courses, or viewing schedules is cumbersome due to poor UI design. This leads to frustration and wasted time as students and administrators struggle to locate the right sections. Administrators also face challenges managing student enrolment, with disorganised data causing delays in processing and administrative tasks.

#### 4. Inadequate Communication Between Students and Faculty

Students often have difficulty reaching faculty members due to a lack of clear communication channels. The existing system does not provide an organised directory for staff contacts, leading to confusion and delays in communication. This problem impedes students from seeking academic guidance or discussing course-related issues, undermining the quality of education and academic support.

#### 5. Insufficient Staff Management Tools.

The campus HR administrators face significant challenges in managing faculty and staff information. Data is spread across multiple systems, resulting in disorganisation and inefficiency. There is no integrated solution for recruitment, scheduling, performance evaluation, and leave management. This lack of centralization leads to errors, time delays, and difficulties in maintaining accurate staff records.

### **3.0 Proposed Solutions**

The Campus Resource Management System (CRMS) is a comprehensive system for streamlining administrative and operational operations at university and college campuses. Its primary goal is to improve efficiency, communication channels, and resource allocation by consolidating several processes onto a single, centralised platform. By combining these responsibilities, the CRMS hopes to create a more efficient, responsive, and dynamic campus management ecosystem.

One of the CRMS' most notable features is its facility booking and administration module. This service streamlines the booking procedure for campus facilities such as classrooms, auditoriums, laboratories, and athletic fields. Users can easily search for availability, check facility information, and make bookings based on their requirements. Facility managers, on the other hand, have powerful tools that allow them to create booking rules, manage bookings, and continuously monitor resource consumption. This ensures that campus assets are used to their greatest extent and avoids scheduling problems.

CRMS' event organising skills are equally comprehensive. The system includes full tools for planning and organising campus events, workshops, lectures, and extracurricular activities. Event organisers can handle all aspects of event management, including registration and promotion, participant logistics, and feedback collecting. This streamlined method not only streamlines the administration process, but it also increases audience involvement and participation, resulting in more effective and meaningful events.

In terms of student administration, the CRMS provides a set of tools that allow administrators to easily handle student enrollment, course registration, academic records, and extracurricular activities. Students have access to their academic profiles, which allow them to manage course registrations, check schedules, and track their academic progress via the integrated CRMS system. This holistic strategy ensures that both students and administrators may move through academic processes with simplicity and efficiency.

CRM systems also excel at enhancing stakeholder communication and notification. Users are sent timely announcements, reminders, and alerts about forthcoming events, bookings, and deadlines via email, texting, and notifications. This function guarantees that essential information is distributed efficiently across campus, hence improving overall communication and collaboration. By keeping all stakeholders informed and up to date, the CRMS promotes a more connected and active campus community.

From a technical aspect, the CRMS is intended to combine various processes into a single system, considerably enhancing overall efficiency, communication, and resource allocation. The platform has a large database, complex sorting methods, and external API integration to support a variety of functionalities. Continuous monitoring and preventive maintenance methods are critical for addressing any issues and ensuring the system runs smoothly. This technical robustness ensures that the CRMS can efficiently address the various needs of campus management.

Operational feasibility is similarly important for the CRMS's effective implementation. Effective operation necessitates strong Information System (IS) support in order to keep the system's different functions running smoothly. With so many features, such as a robust database system, sophisticated sorting methods, and integration with external APIs, careful oversight is required to anticipate and address potential faults or anomalies. Continuous monitoring and preventive maintenance methods are required to guarantee that the CRMS runs smoothly and consistently, enhancing its efficacy in streamlining campus resource management activities.

## **4.0 Current business process (scenarios, workflow)**

Here are the scenarios and workflow of current business process for CRMS :

### **For Students**

1. Login to the System
2. Main Menu Options are displayed.
3. Option for Facility Booking
  - 3.1. Select the option for Facility Booking.
  - 3.2. Choose the type of facility (e.g., classroom, gym, stadium).
  - 3.3. Search for available time slots for the chosen facility.
  - 3.4. Book the facility.
  - 3.5. Receive booking confirmation and any further instructions.
4. Option for Academic Information
  - 4.1. Select the option for Checking Academic Information.
  - 4.2. View academic profile, including grades and personal details.
  - 4.3. Register for courses for the upcoming semester.
  - 4.4. View class schedules and timetables.
  - 4.5. Track academic progress and milestones.
5. Option for Event Notification
  - 5.1. Select the option for Event Notification.
  - 5.2. Pin events of interest to have them displayed on the home screen.
  - 5.3. Set reminders for upcoming events to receive notifications in advance.

6. Option for Communication with Faculty
  - 6.1. Select the option for Communication with Faculty.
  - 6.2. Search for faculty contact information in a centralised directory.
  - 6.3. Send emails or make phone calls directly through the system.
  - 6.4. Receive and manage responses from faculty for guidance or support.

## **For Faculty**

1. Login to the System
2. Main Menu Options are displayed.
3. Option for Managing Course Information
  - 3.1. Select the option for Managing Course Information.
  - 3.2. Update course content, such as syllabus and lecture notes.
  - 3.3. Post assignments and grades for students.
  - 3.4. Communicate with students through the system's messaging feature.
4. Option for Scheduling Office Hours
  - 4.1. Select the option for Scheduling Office Hours.
  - 4.2. Set available times for office hours.
  - 4.3. Allow students to book appointments during these times.
  - 4.4. Receive notifications of booked appointments.
5. Option for Accessing Student Records
  - 5.1. Select the option for Accessing Student Records.
  - 5.2. View academic profiles of students.

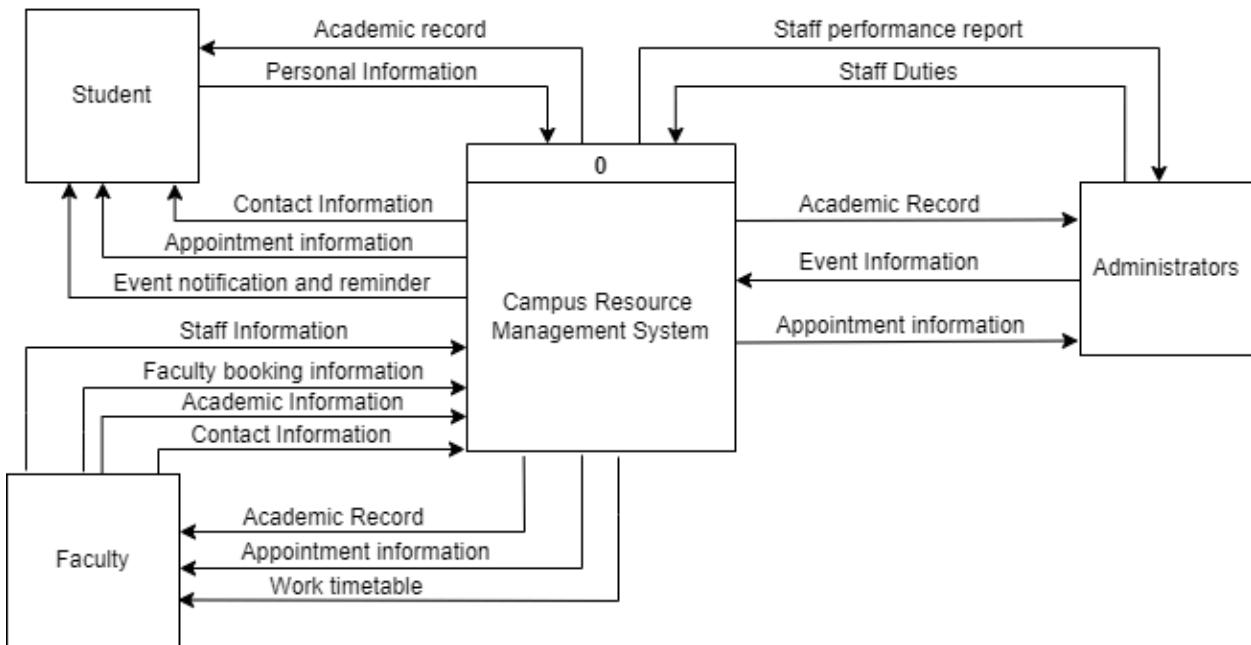
- 5.3. Track student progress and performance.
- 5.4. Provide feedback and support through the system.

## **For Administrators**

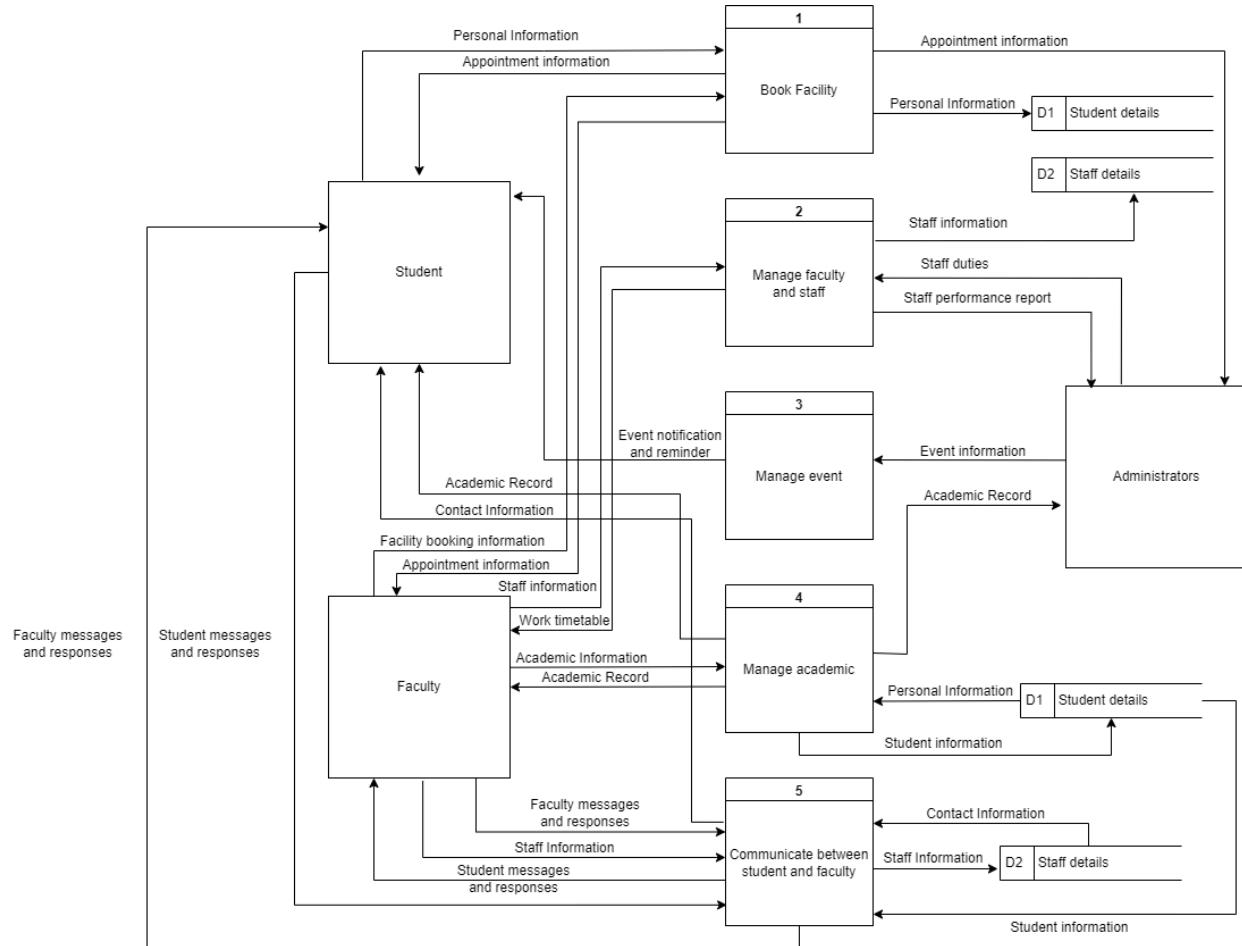
1. Login to the System
2. Main Menu Options are displayed.
1. Managing Facility Booking
  - 1.1. Select the option for Managing Facility Booking.
  - 1.2. Oversee all facility bookings made by students and staff.
2. Handling Event Notifications
  - 2.1. Select the option for Handling Event Notifications.
  - 2.2. Post events on UTM.my.
  - 2.3. Send reminders and updates to the campus community.
3. Managing Academic Records
  - 3.1. Select the option for Managing Academic Records.
  - 3.2. Oversee student enrollment and course registration processes.
  - 3.3. Maintain accurate and up-to-date academic records.
4. Faculty and Staff Management
  - 4.1. Select the option for Faculty and Staff Management.
  - 4.2. Manage recruitment processes and new hires.
  - 4.3. Schedule duties for faculty and staff.
  - 4.4. Evaluate performance and handle leave management.

## **5.0 Logical DFD AS-IS system (Context Diagram, Diagram 0, Child)**

### **5.1 Context Diagram**

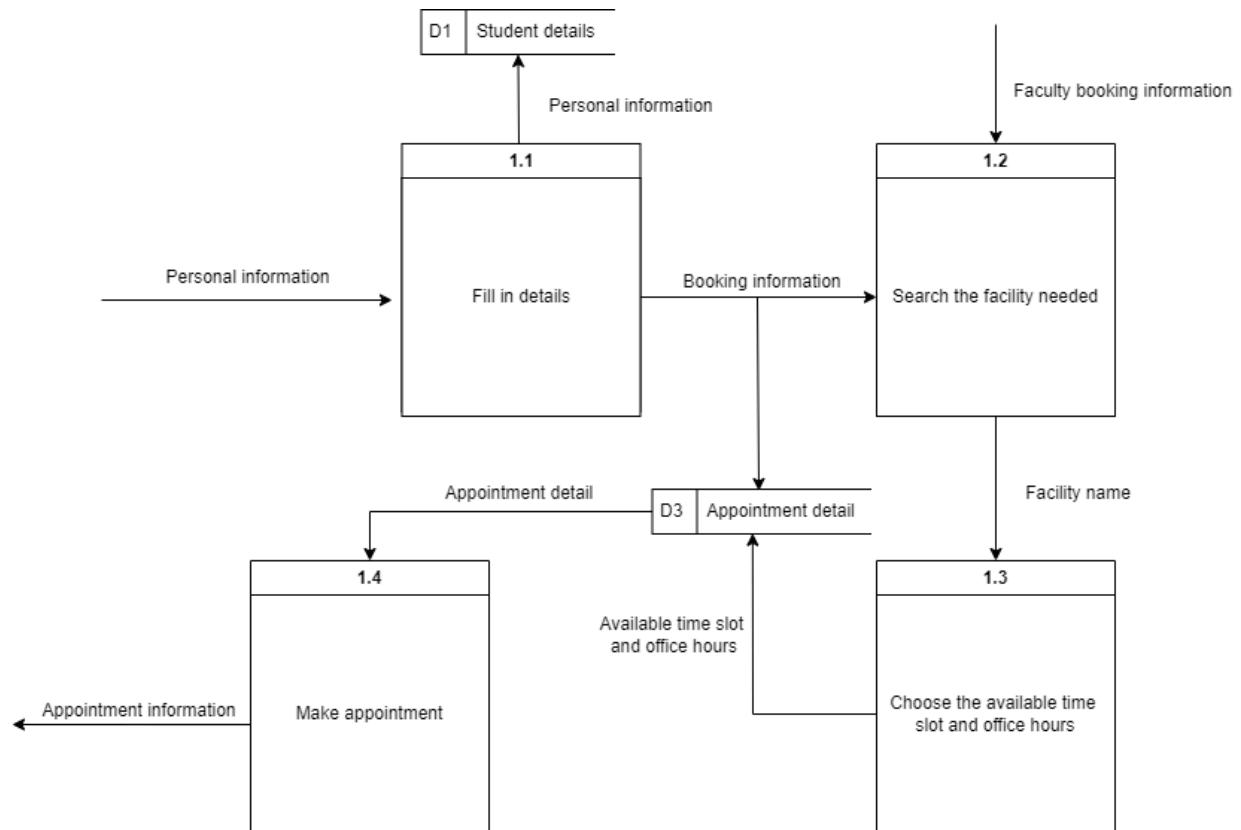


## 5.2 Level 0 Diagram

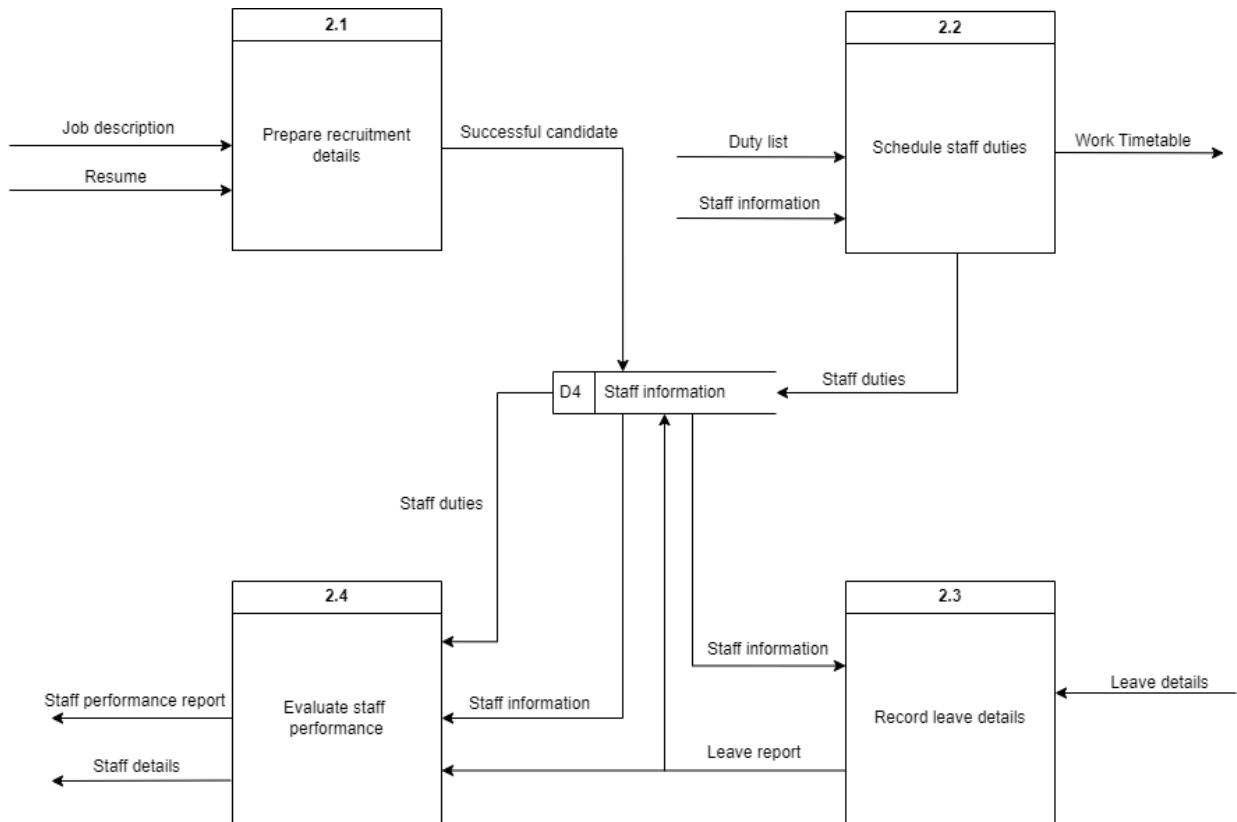


## 5.3 Level 1 Diagram

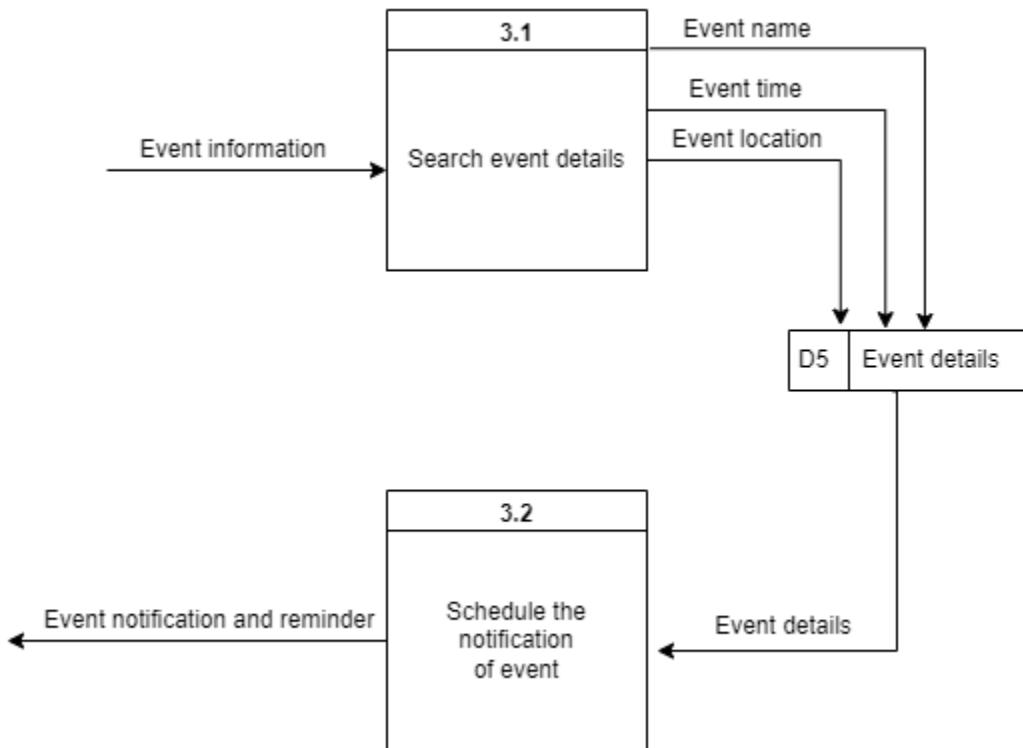
### 5.3.1 Process 1 : Book Facility



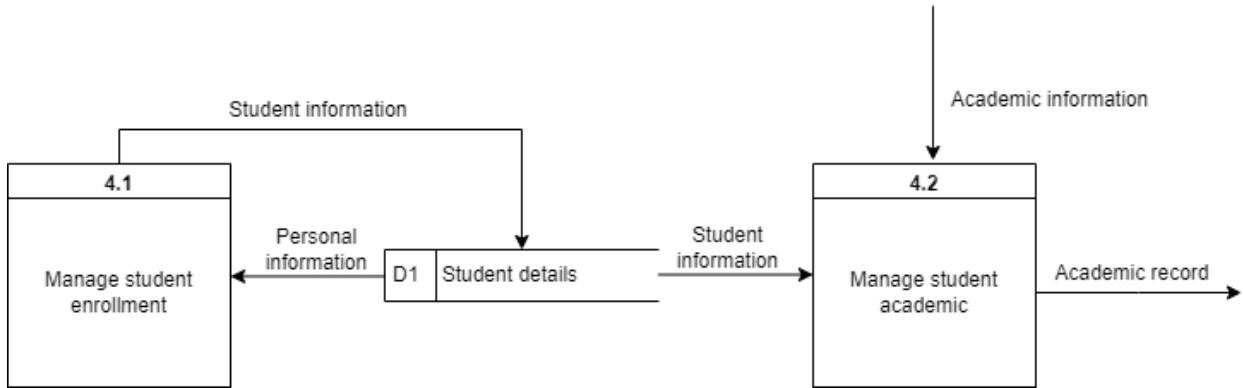
### 5.3.2 Process 2: Manage faculty and staff



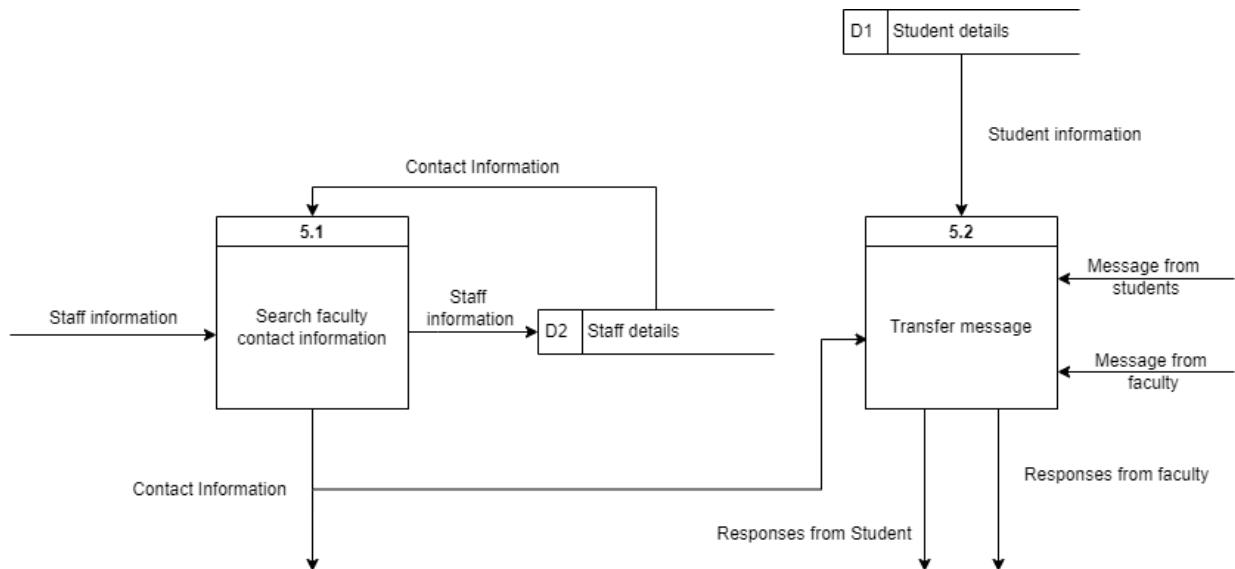
### 5.3.3 Process 3 : Manage event



### 5.3.4 Process 4 : Manage academic



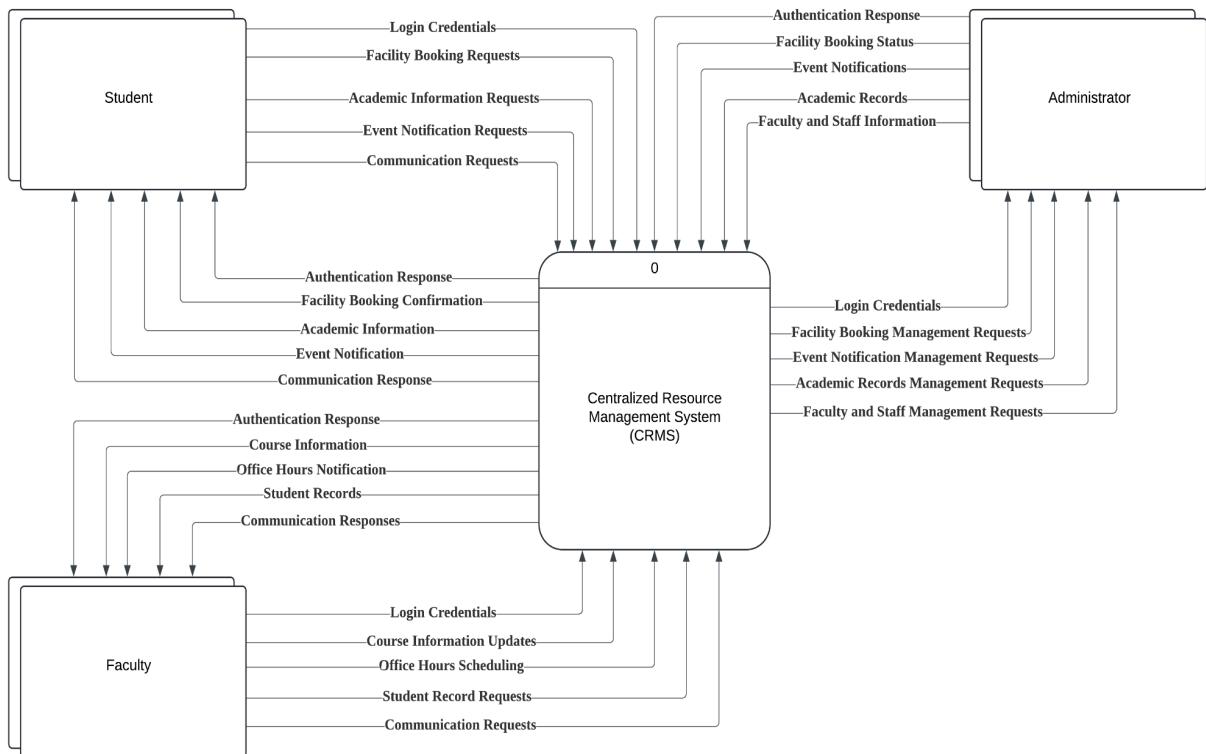
### 5.3.5 Process 5: Communicate between students and faculty



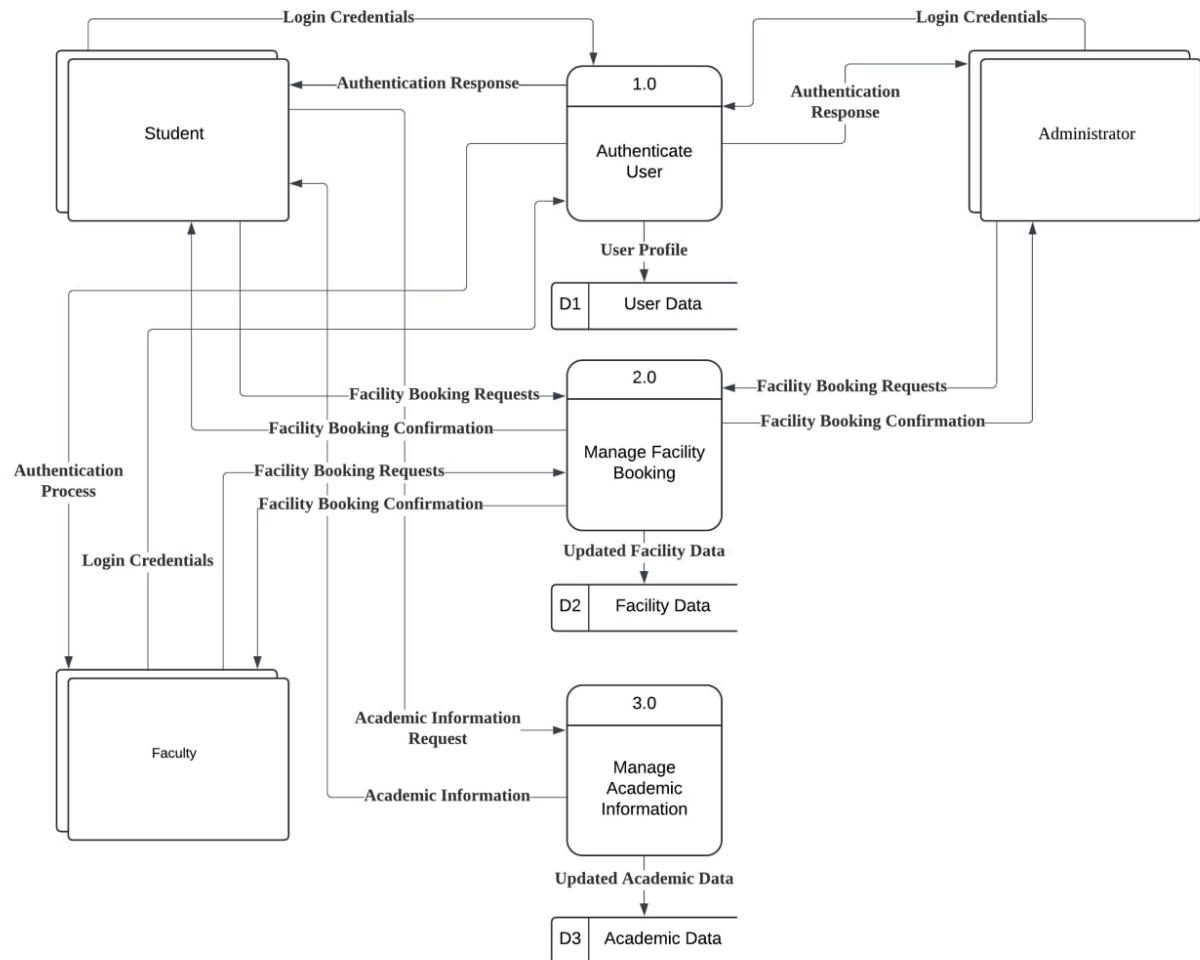
## **6.0 System Analysis and Specification**

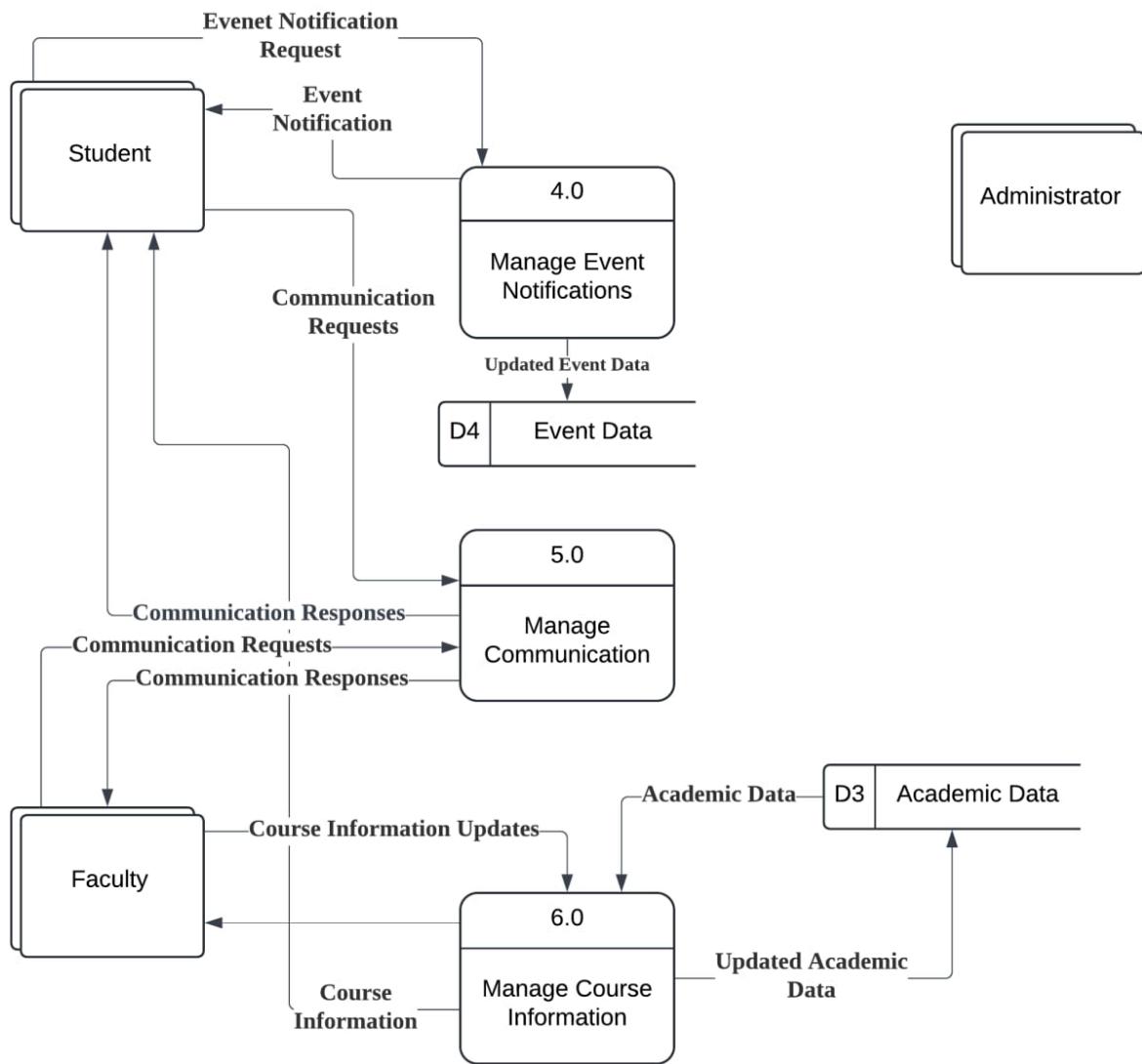
### **6.1 Logical DFD TO-BE system (Context Diagram, Diagram 0, Child)**

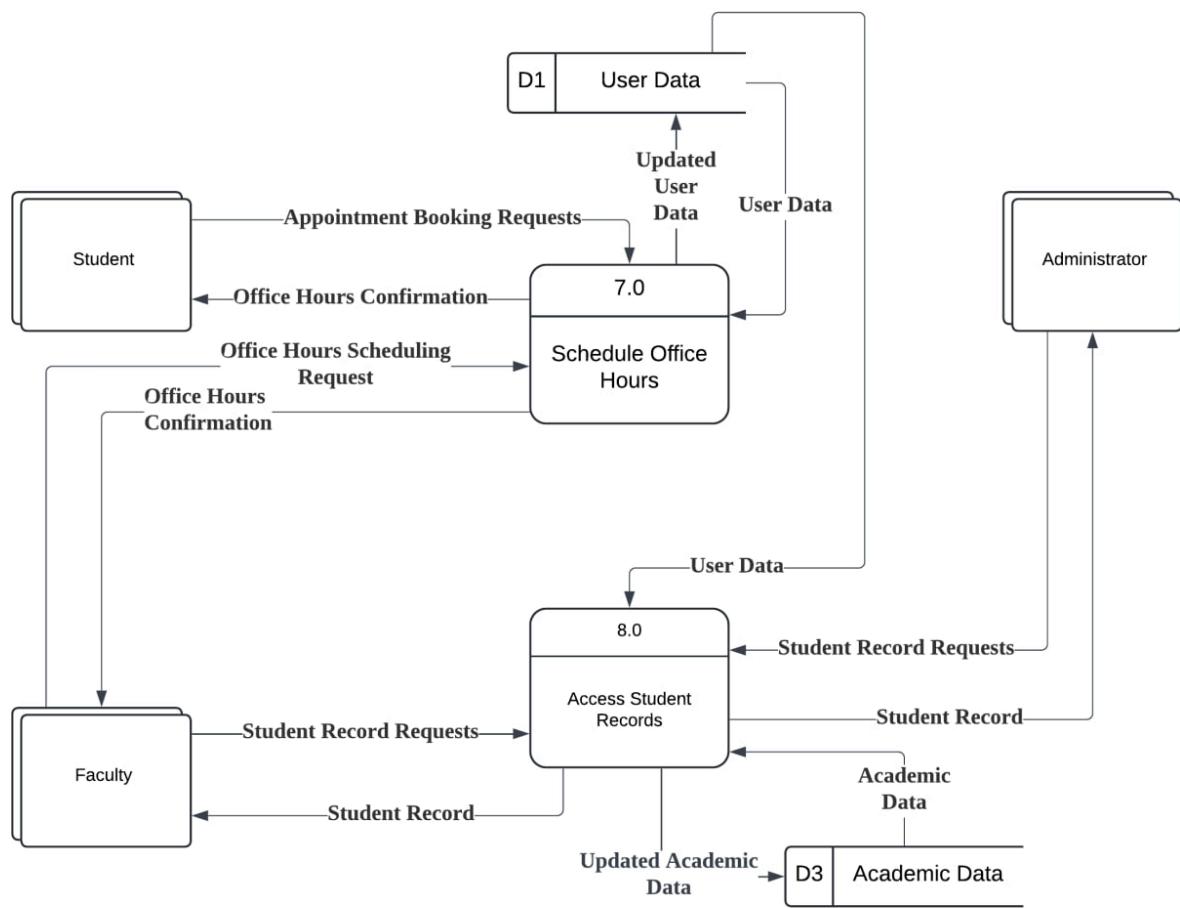
#### **6.1.1 Context Diagram of TO-BE System**



### 6.1.2 Level 0 Diagram of TO-BE System

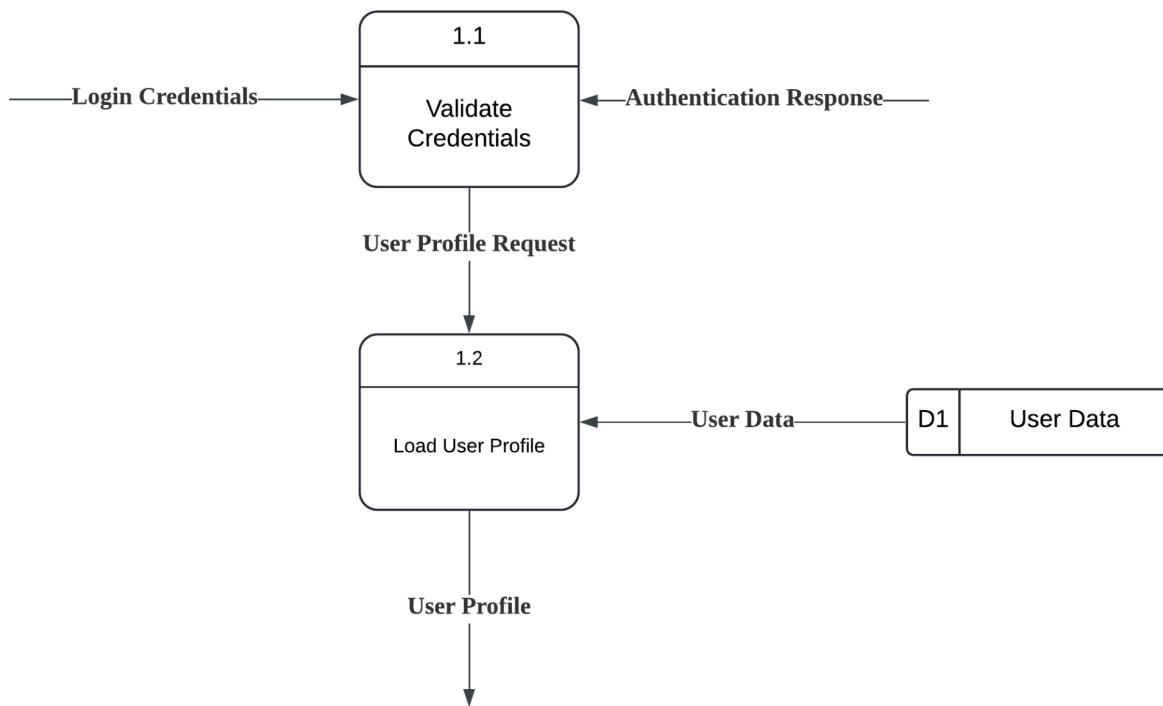




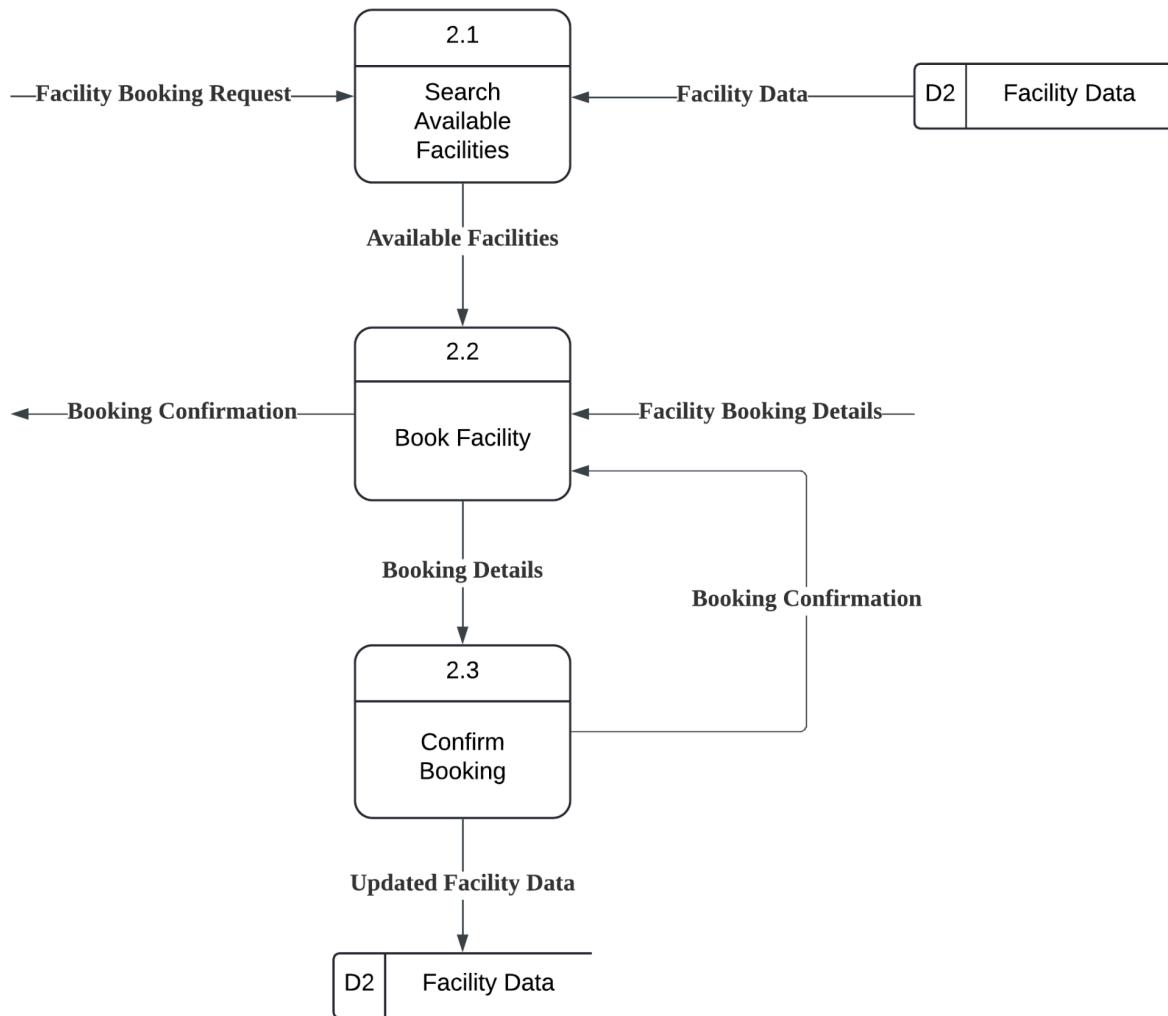


### 6.1.3 Child Diagram

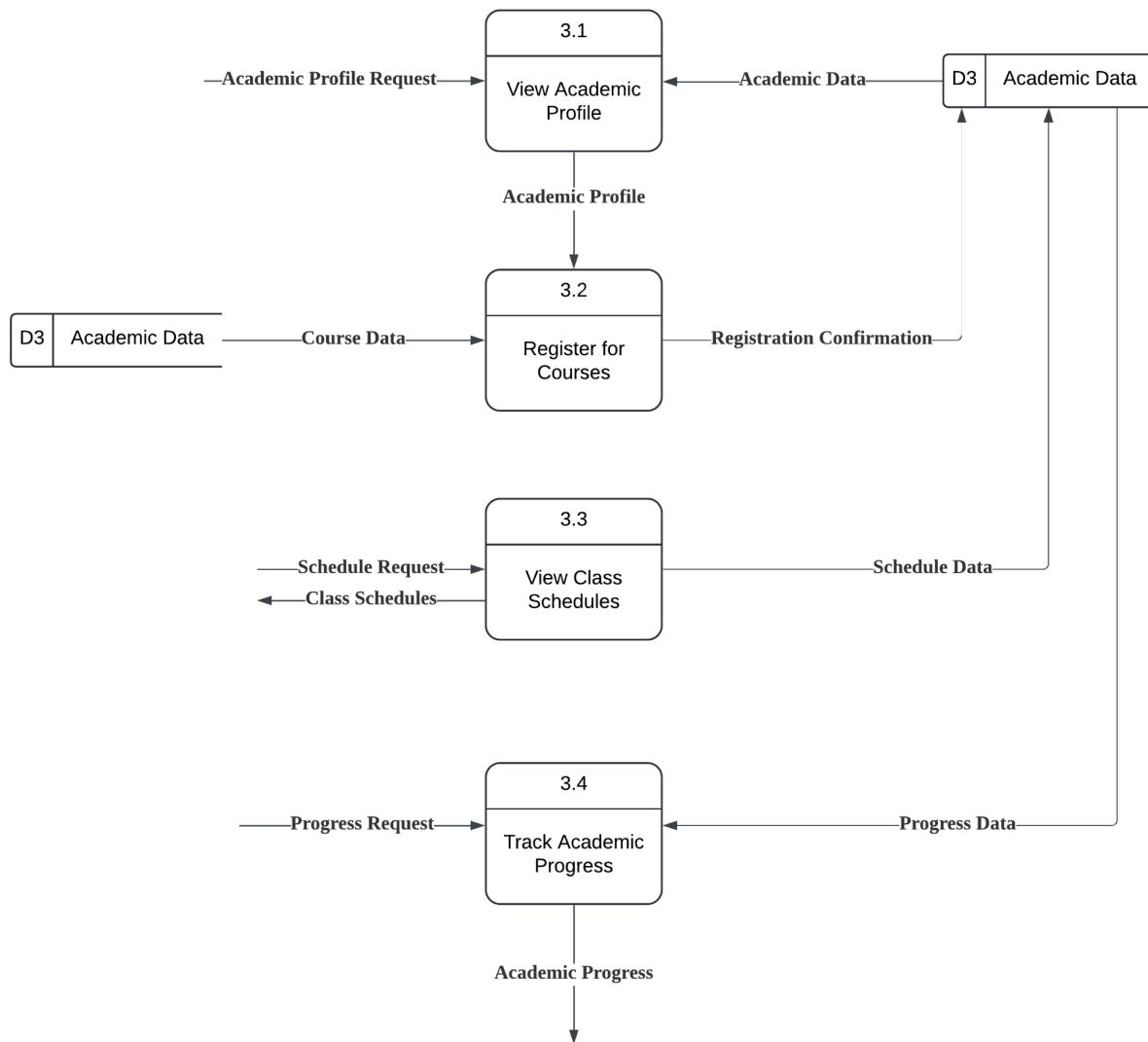
#### 6.1.3.1 Child Diagram of Authenticate User Process



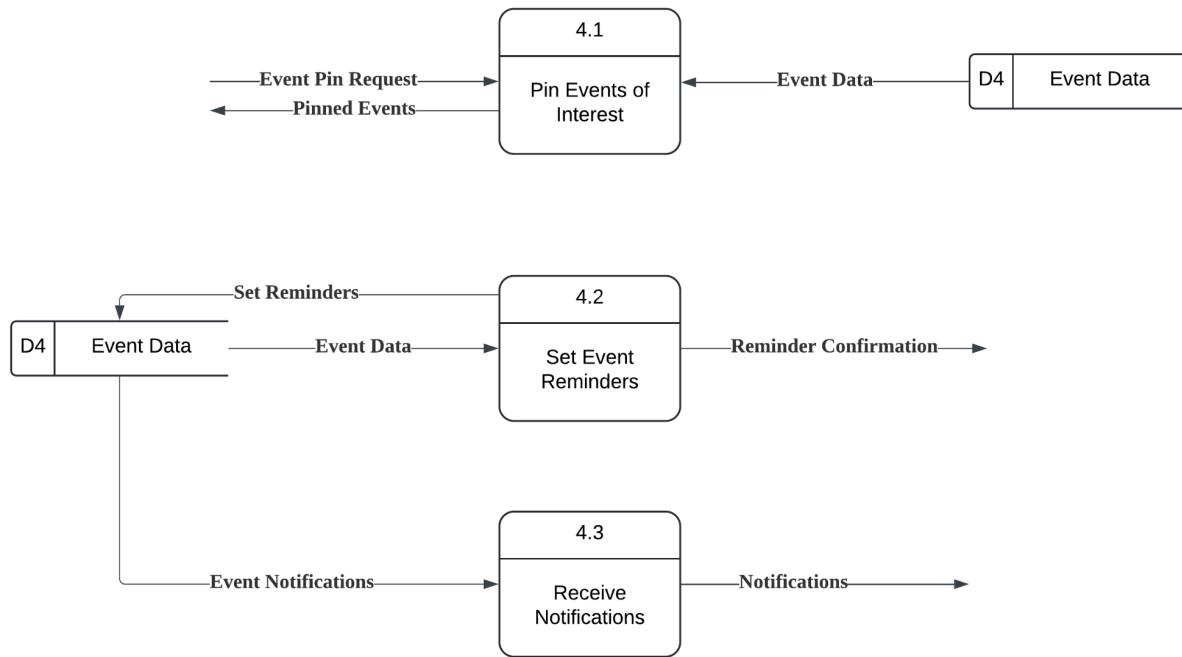
#### 6.1.3.2 Child Diagram of Manage Facility Booking Process



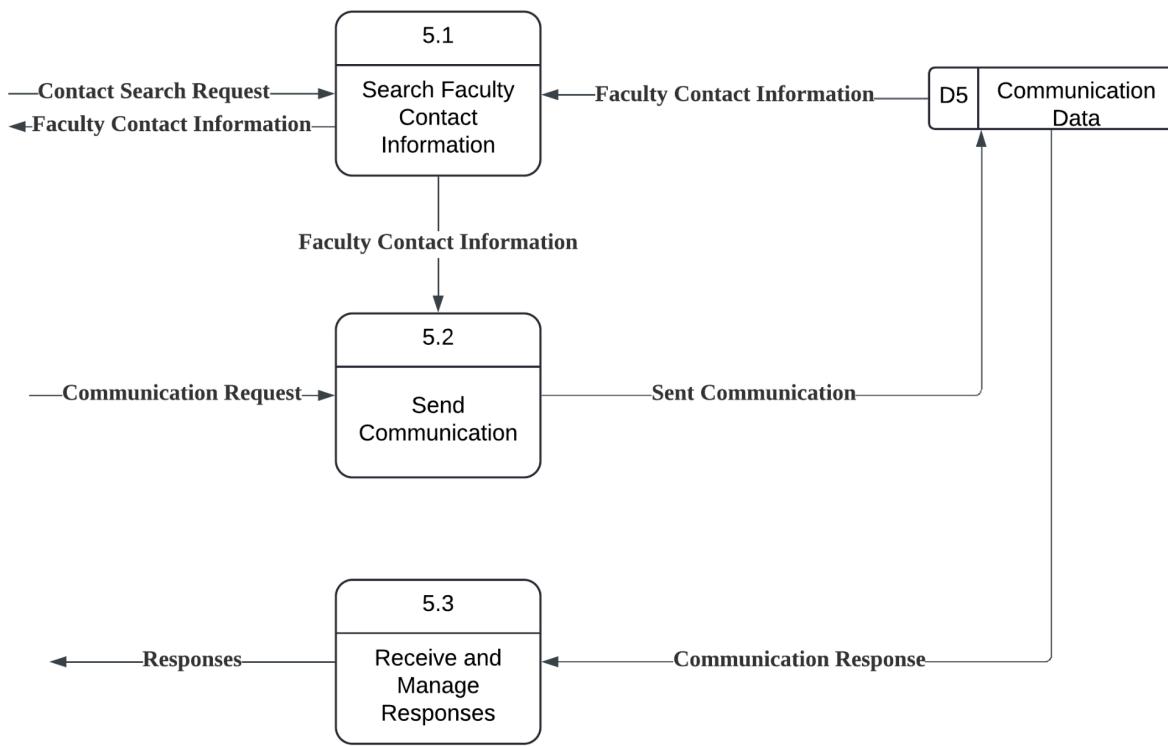
### 6.1.3.3 Child Diagram of Manage Academic Information Process



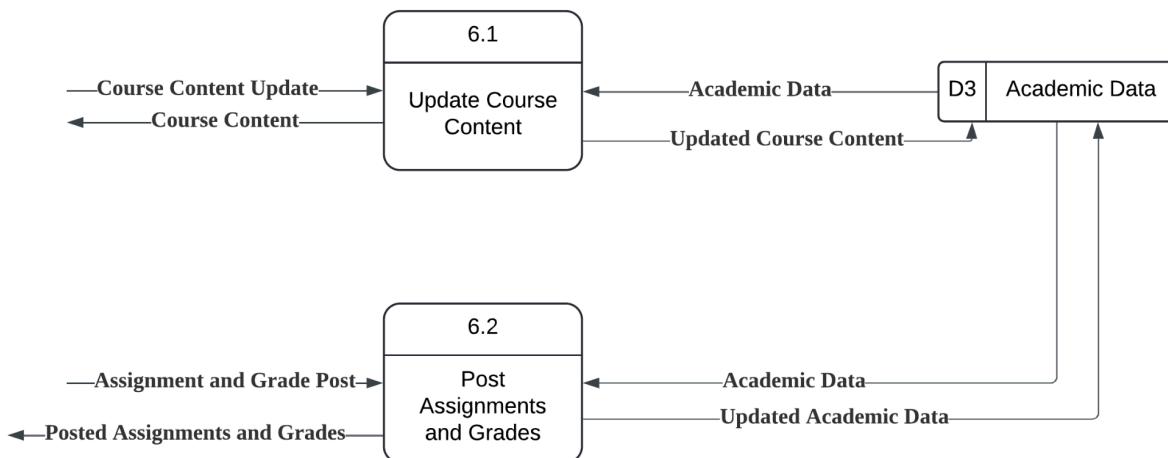
#### 6.1.3.4 Child Diagram of Manage Event Notification Process



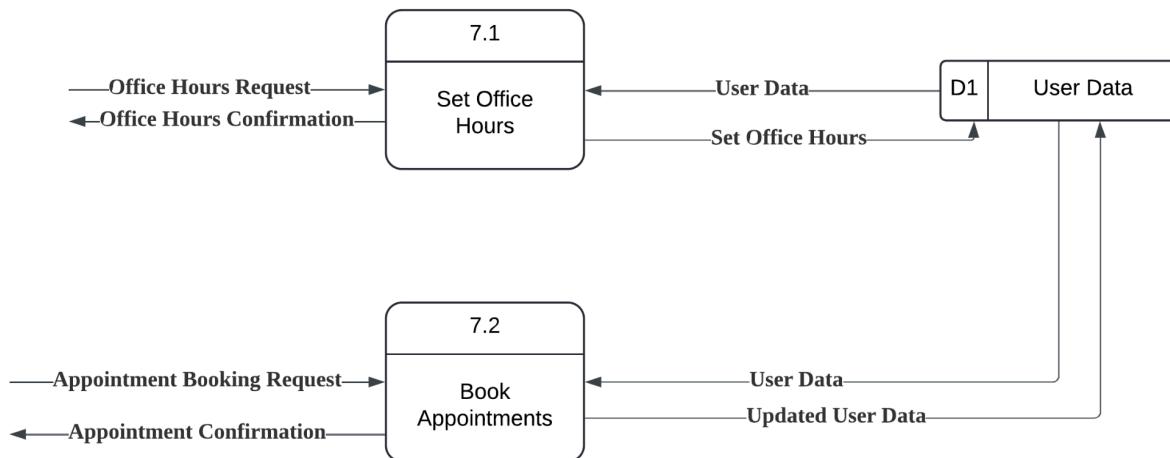
#### 6.1.3.5 Child Diagram of Manage Communication Process



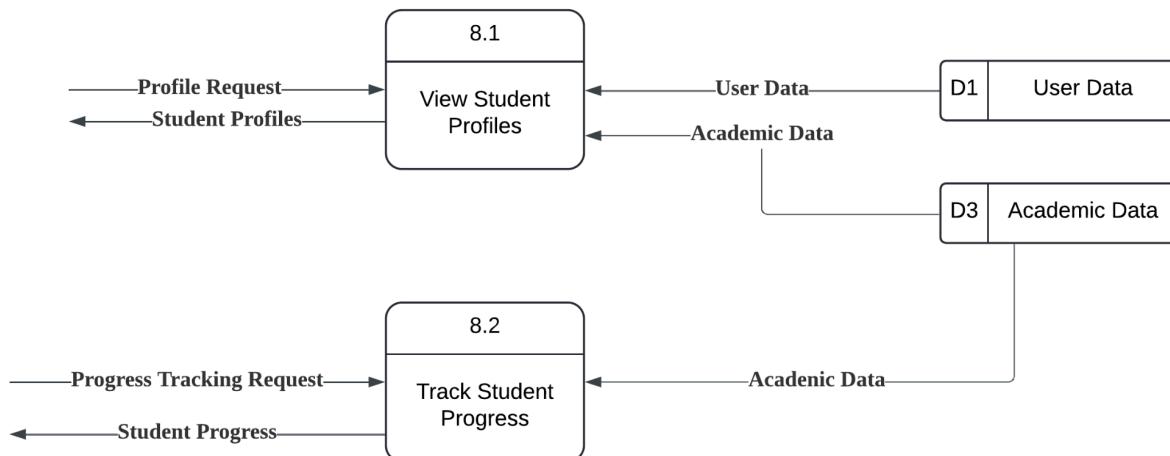
#### 6.1.3.6 Child Diagram of Manage Course Information Process



#### 6.1.3.7 Child Diagram of Schedule Office Hours Process



#### 6.1.3.8 Child Diagram of Access Student Records Process



## 6.2 Process Specification (based on Logical DFD TO-BE)

|  |
|--|
| <p>Process number:1</p> <p>Process Name: Authenticate user</p> <p>Process Description:</p> <p>This process facilitates the authentication of users, involving validating credentials and loading user profiles.</p>  |
| <p>Input Data Flow:</p> <ul style="list-style-type: none"><li>● Login Credentials</li><li>● Authentication Response</li><li>● User data</li></ul>  |
| <p>Output Data Flow:</p> <ul style="list-style-type: none"><li>● User Profile Request</li><li>● User Profile</li></ul>   |
| Type of process: Online  |
| <p>Process Logic :</p> <p>INPUT Login Credentials</p> <p>INPUT Authentication Response</p> <p>IF Validate Credentials THEN</p> <p>    OUTPUT User Profile Request</p> <p>ELSE notify user “Invalid credentials”</p> <p>RETURN</p> <p>END IF</p> <p>INPUT Users Profile Request</p> <p>INPUT User Data</p> <p>IF Load User Profile THEN</p> <p>    OUTPUT User Profile</p> <p>ELSE notify user “Error happened”</p> <p>RETURN</p> <p>END IF</p> |
| <p>Refer to name:</p> <p><input type="checkbox"/> Decision Table      <input type="checkbox"/> Decisions Tree      <input checked="" type="checkbox"/> Structured English</p>  |
| Unresolved Issues : NONE   |

Process number: 2

Process Name: Manage Facility Booking Process

Process Description:

This process facilitates the management of facility booking, involving searching available facilities, booking facilities, confirming booking

Input Data Flow:

- Facility Booking Request
- Facility Data
- Facility Booking Details

Output Data Flow:

- Available Facilities
- Booking Confirmation
- Booking Details
- Updated Facility Dta

Type of process: Online

Process Logic :

INPUT Facility Booking Request

INPUT Facility Data

IF Search Available Facilities THEN

    OUTPUT Available Facilities

ELSE notify user "No available facilities"

RETURN

END IF

INPUT Available Facilities

IF Book Facility THEN

    OUTPUT Booking Details

ELSE notify user "Error happened"

RETURN

END IF

INPUT Booking Details

IF Confirm Booking THEN

    OUTPUT Updated Facility Data

    UPDATE Updated Facility Data

ELSE

    OUTPUT Booking Confirmation

RETURN to the Book Facility

END IF

Refer to name:

Decision Table

Decisions Tree

Structured English

Unresolved Issues : NONE

|  |
|--|
| <p>Process number: 3</p> <p>Process Name: Manage Academic Information Process</p> <p>Process Description:</p> <p>This process facilitates the management of academic information, involving viewing academic profiles, registering for courses, viewing class schedules and tracking academic progress.</p>  |
| <p>Input Data Flow:</p> <ul style="list-style-type: none"> <li>● Academic Profile Request</li> <li>● Academic Data</li> <li>● Course Data</li> <li>● Schedule Request</li> <li>● Progress Request</li> <li>● Progress Data</li> </ul>  |
| <p>Output Data Flow:</p> <ul style="list-style-type: none"> <li>● Academic Profile</li> <li>● Registration Confirmation</li> <li>● Class Schedule</li> <li>● Schedule Data</li> <li>● Academic Progress</li> </ul>   |
| <p>Type of process: Online</p>   |
| <p>Process Logic :</p> <p>INPUT Academic Profile Request</p> <p>INPUT Academic Data</p> <p>IF View Academic Profile THEN</p> <p>    OUTPUT Academic Profile</p> <p>ELSE notify user “Error happened”</p> <p>RETURN</p> <p>END IF</p> <p>INPUT Academic Profile</p> <p>INPUT Course Data</p> <p>IF Register for Courses THEN</p> <p>    OUTPUT Registration Confirmation</p> <p>    UPDATE Registration Confirmation</p> <p>ELSE notify user “Error happened”</p> <p>RETURN</p> <p>END IF</p> <p>INPUT Schedule Request</p> <p>IF View Class Schedules THEN</p> <p>    OUTPUT Class Schedule</p> <p>    SEND Class Schedule</p> <p>    OUTPUT Schedule Data</p> |

```
UPDATE Schedule Data
ELSE notify user "Error happened"
RETURN
END IF
INPUT Progress Data
INPUT Progress Request
IF Track Academic Progress THEN
    OUTPUT Academic Progress
ELSE notify user "Error happened"
RETURN
END IF
```

Refer to name:

Decision Table

Decisions Tree

Structured English

Unresolved Issues : NONE

Process number: 4  
 Process Name: Manage Event Notification Process  
 Process Description:  
 This process facilitates the management of event notification process, involving pinning event of interest, setting event reminders and receiving notifications.

**Input Data Flow:**

- Event Pin Request
- Event Data
- Event Notification

**Output Data Flow:**

- Pinned Events
- Set Reminders
- Reminder Confirmation
- Notifications

Type of process: Online

Process Logic :

INPUT Event Data

INPUT Event Pin Request

IF Pin Events of Interest THEN

    OUTPUT Pinned Events

ELSE notify user "No event of interest"

RETURN

END IF

INPUT Event Data

IF Set Event Reminders THEN

    OUTPUT Set Reminders

    UPDATE Set Reminders

    OUTPUT Reminder Confirmation

ELSE notify user "No reminders"

RETURN

END IF

INPUT Event Notification

IF Receive Notifications THEN

    OUTPUT Notifications

    SEND Notifications

ELSE notify user "No notifications"

RETURN

END IF

Refer to name:

Decision Table

Decisions Tree

Structured English

Unresolved Issues : NONE

Process number: 5

Process Name: Manage Communication Process

Process Description:

This process facilitates the management of communication Process, involving searching faculty contact information and receiving and managing responses.

Input Data Flow:

- Contact Search Request
- Faculty Contact Information
- Communication Request
- Communication Response

Output Data Flow:

- Faculty Contact Information
- Sent Communication
- Responses

Type of process: Online

Process Logic :

INPUT Contact Search Request

INPUT Faculty Contact Information

IF Search Faculty Contact Information THEN  
    OUTPUT Faculty Contact Information  
ELSE notify user “Error happened”  
RETURN  
END IF

INPUT Faculty Contact Information

INPUT Communication Request

IF Send Communication THEN  
    OUTPUT Sent Communication  
    UPDATE Sent Communication  
ELSE notify user “No communication”  
RETURN  
END IF

INPUT Communication Response

IF Receive and Manage Responses THEN  
    OUTPUT Responses  
    SEND Responses  
ELSE notify user “No responses”  
RETURN  
END IF

Refer to name:

Decision Table

Decisions Tree

Structured English

Unresolved Issues : NONE

Process number: 6

Process Name: Manage Course Information Process

Process Description:

This process facilitates the management of the course information process, involving updating course content and posting assignments and grades.

Input Data Flow:

- Course Content Update
- Academic Data
- Assignment and Grade Post

Output Data Flow:

- Course Content Update
- Updated Course Content
- Posted Assignments and Grades
- Updated Academic Data

Type of process: Online

Process Logic :

INPUT Contact Content Update

INPUT Academic Data

```
IF Update Course Content THEN
    OUTPUT Course Content
    OUTPUT Updated Course Content
    UPDATE Updated Course Content
ELSE notify user "Error happened"
RETURN
END IF
```

INPUT Assignment and Grade Post

INPUT Academic Data

```
IF Post Assignments and Grades THEN
    OUTPUT Posted Assignments and Grades
    OUTPUT Updated Academic Data
    UPDATE Updated Academic Data
ELSE notify user "Error happened"
RETURN
END IF
```

Refer to name:

Decision Table

Decisions Tree

Structured English

Unresolved Issues : NONE

Process number: 7

Process Name: Schedule Office Hour Process

Process Description:

This process facilitates the schedule office hour process, involving setting office hours and booking appointments.

Input Data Flow:

- Office Hours Request
- User Data
- Appointment Booking Request

Output Data Flow:

- Office Hours Confirmation
- Set Office Hours
- Appointment Confirmation
- Updated User Data

Type of process: Online

Process Logic :

INPUT Office Hours Request

INPUT User Data

```
IF Set Office Hours THEN
    OUTPUT Office Hours Confirmation
    OUTPUT Set Office Hours
    UPDATE Set Office Hours
ELSE notify user "Error happened"
RETURN
END IF
```

INPUT Appointment Booking Request

INPUT User Data

```
IF Book Appointment THEN
    OUTPUT Appointment Confirmation
    OUTPUT Updated User Data
    UPDATE Updated User Data
ELSE notify user "Error happened"
RETURN
END IF
```

Refer to name:

Decision Table

Decisions Tree

Structured English

Unresolved Issues : NONE

Process number: 8

Process Name: Access Student Records Process

Process Description:

This process facilitates the access student records process, involving viewing student profiles and tracking student progress.

Input Data Flow:

- Profile Request
- User Data
- Academic Data
- Progress Tracking Request

Output Data Flow:

- Student Profiles
- Student Progress

Type of process: Online

Process Logic :

INPUT Profile Request

INPUT Academic Data

INPUT User Data

```
IF View Student Profile THEN
    OUTPUT Student Profiles
ELSE notify user "Error happened"
RETURN
END IF
```

INPUT Academic Data

INPUT Progress Tracking Request

```
IF Track Student Progress THEN
    OUTPUT Student Progress
ELSE notify user "Error happened"
RETURN
END IF
```

Refer to name:

Decision Table

Decisions Tree

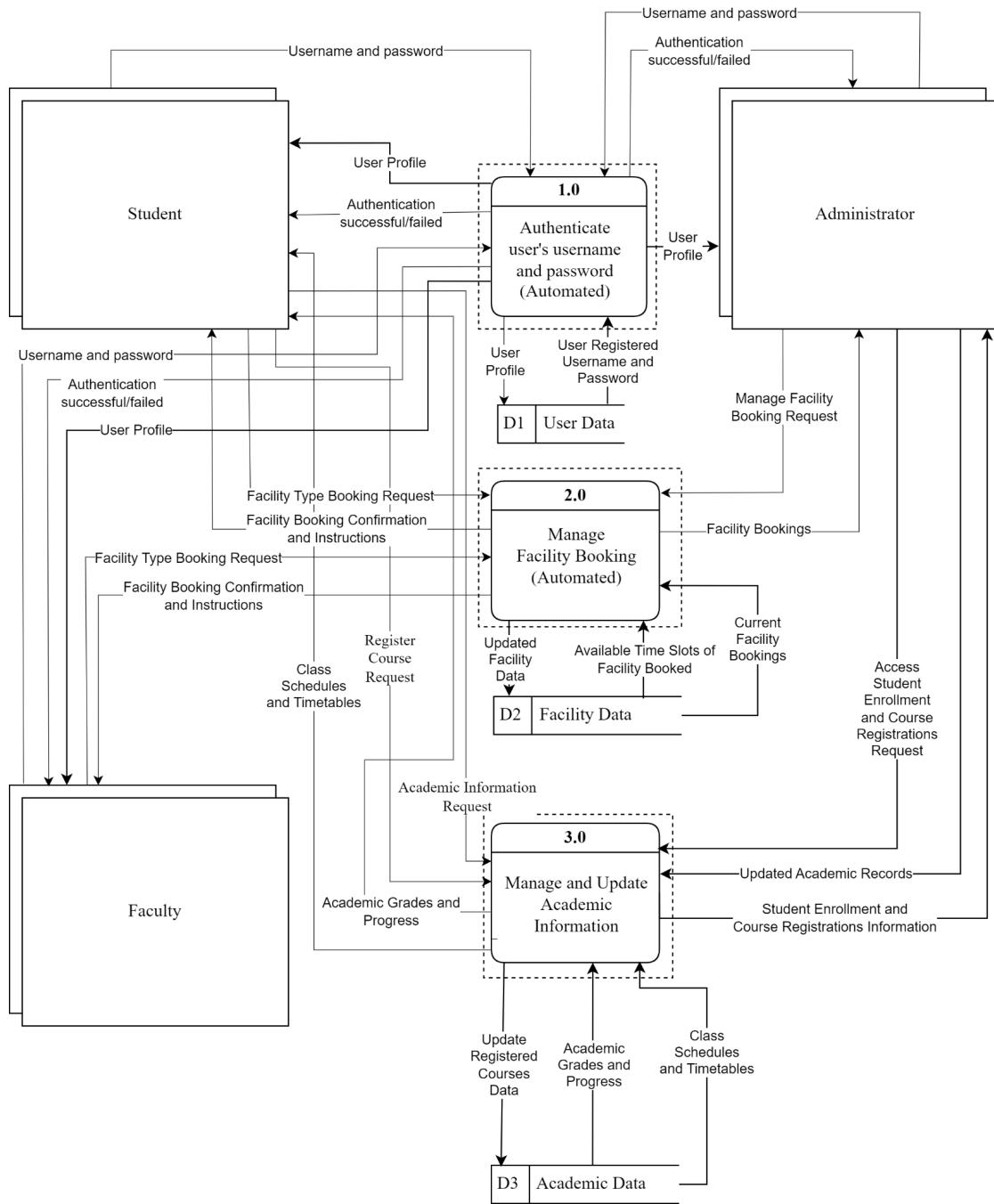
Structured English

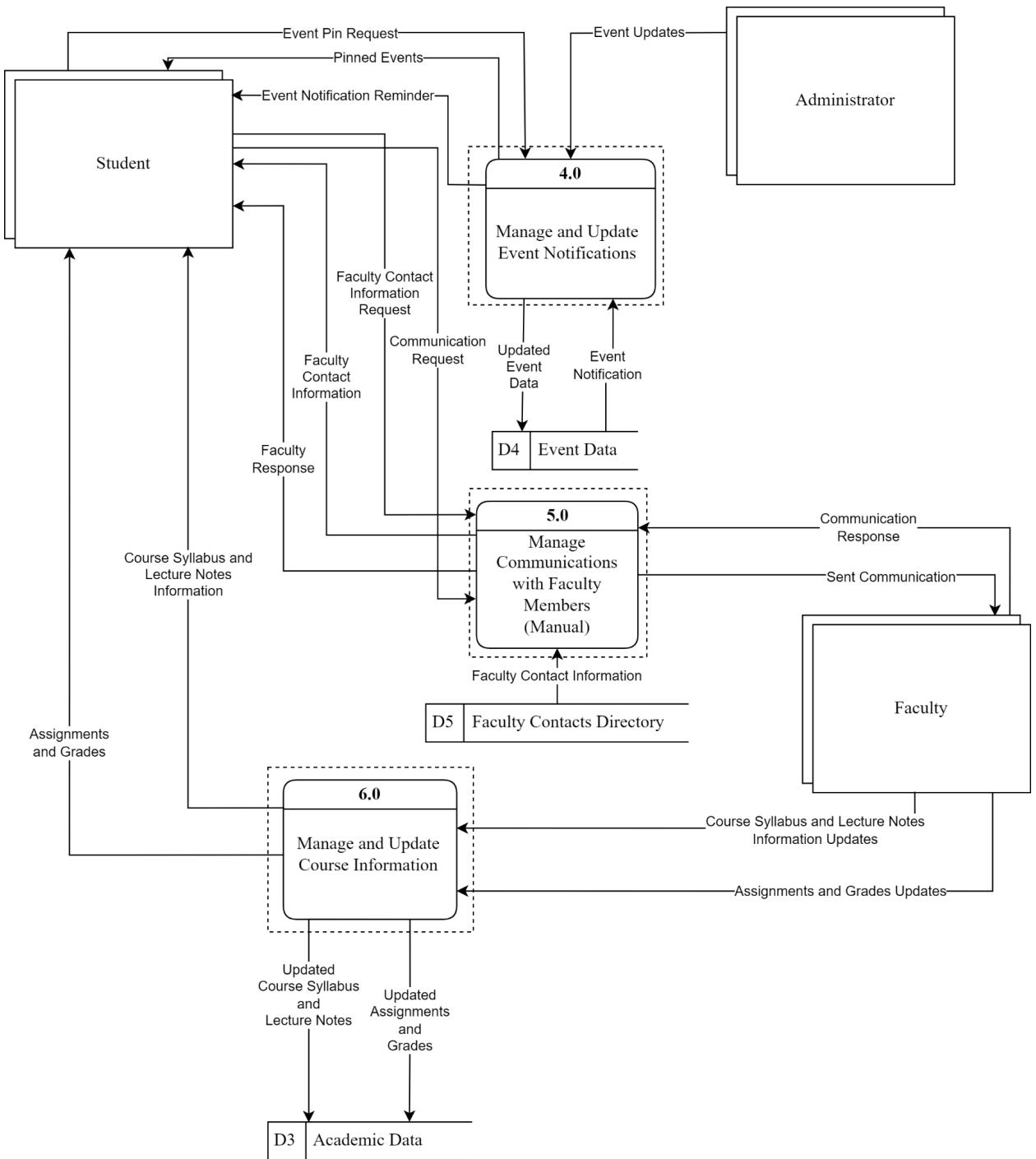
Unresolved Issues : NONE

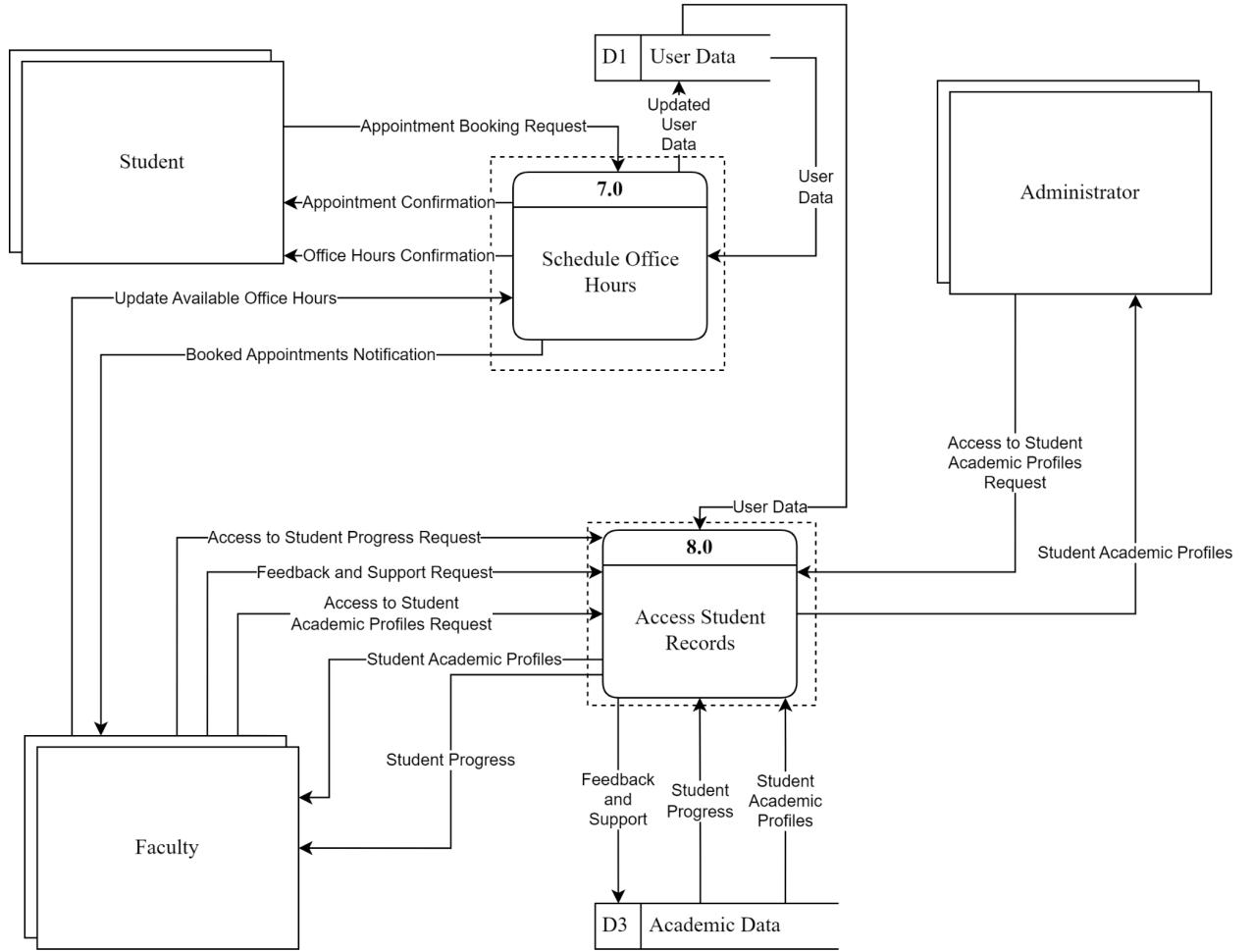
## 7.0 Physical System Design

### 7.1 Physical DFD TO-BE System

#### 7.1.1 Level 0 Diagram

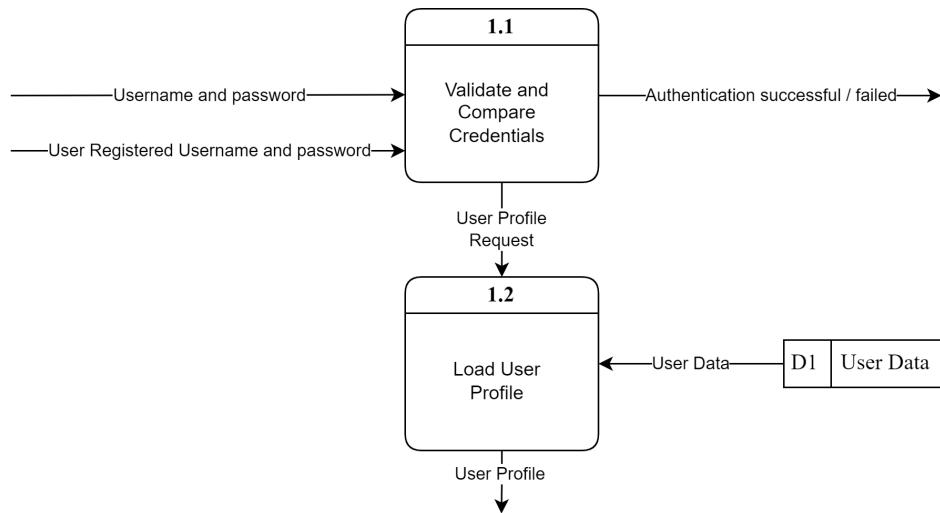




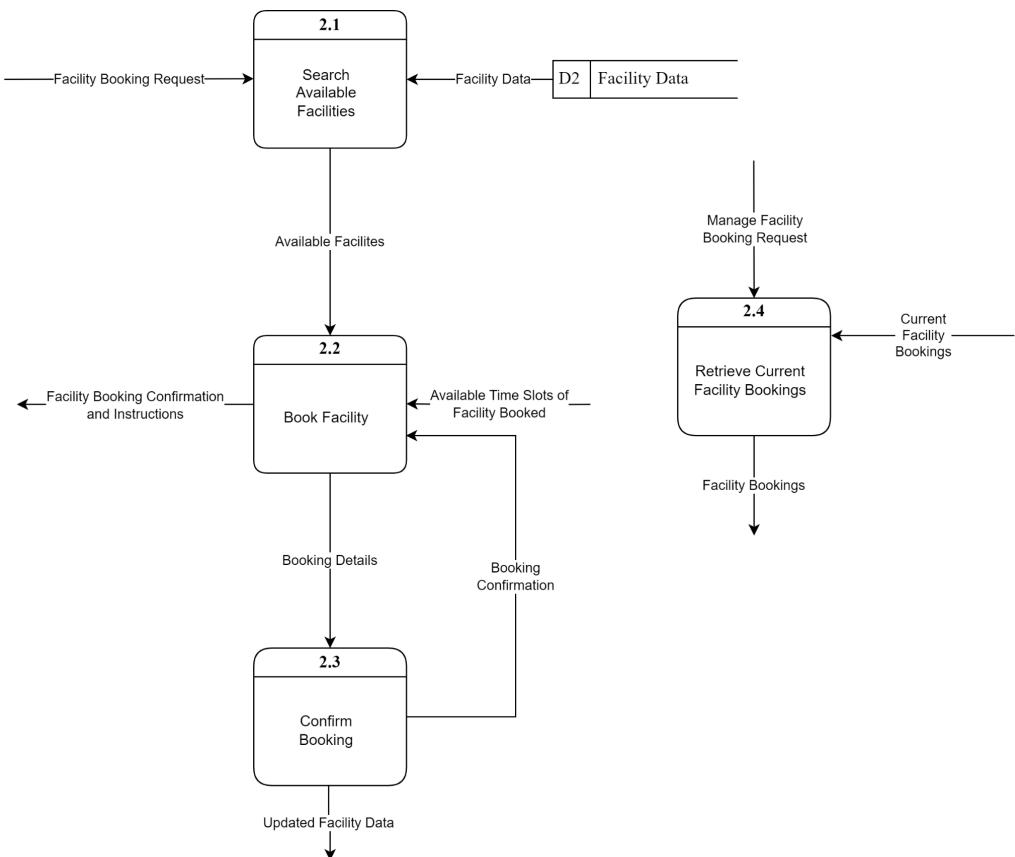


## 7.1.2 Child Diagram

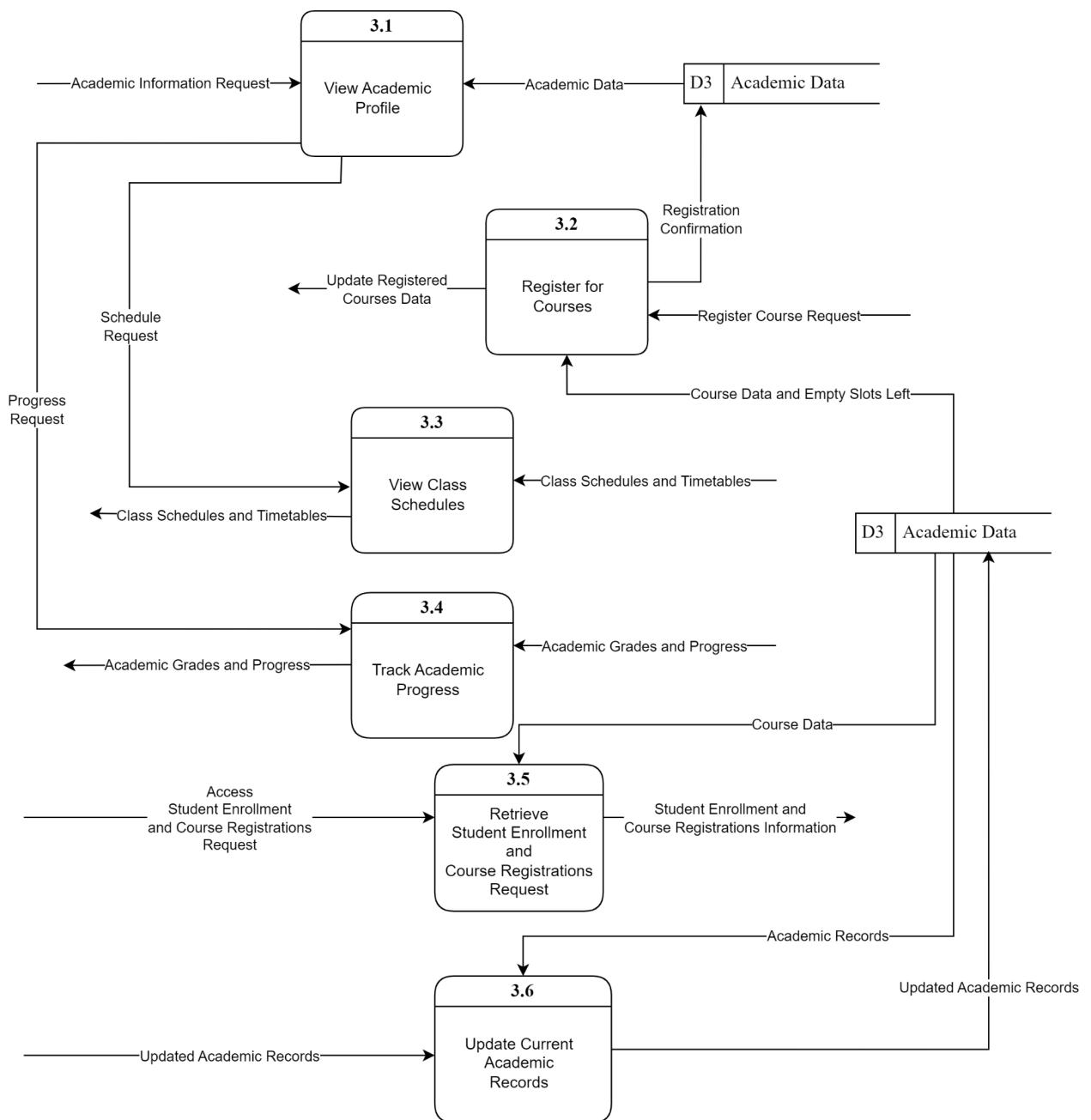
### 7.1.2.1 Process 1



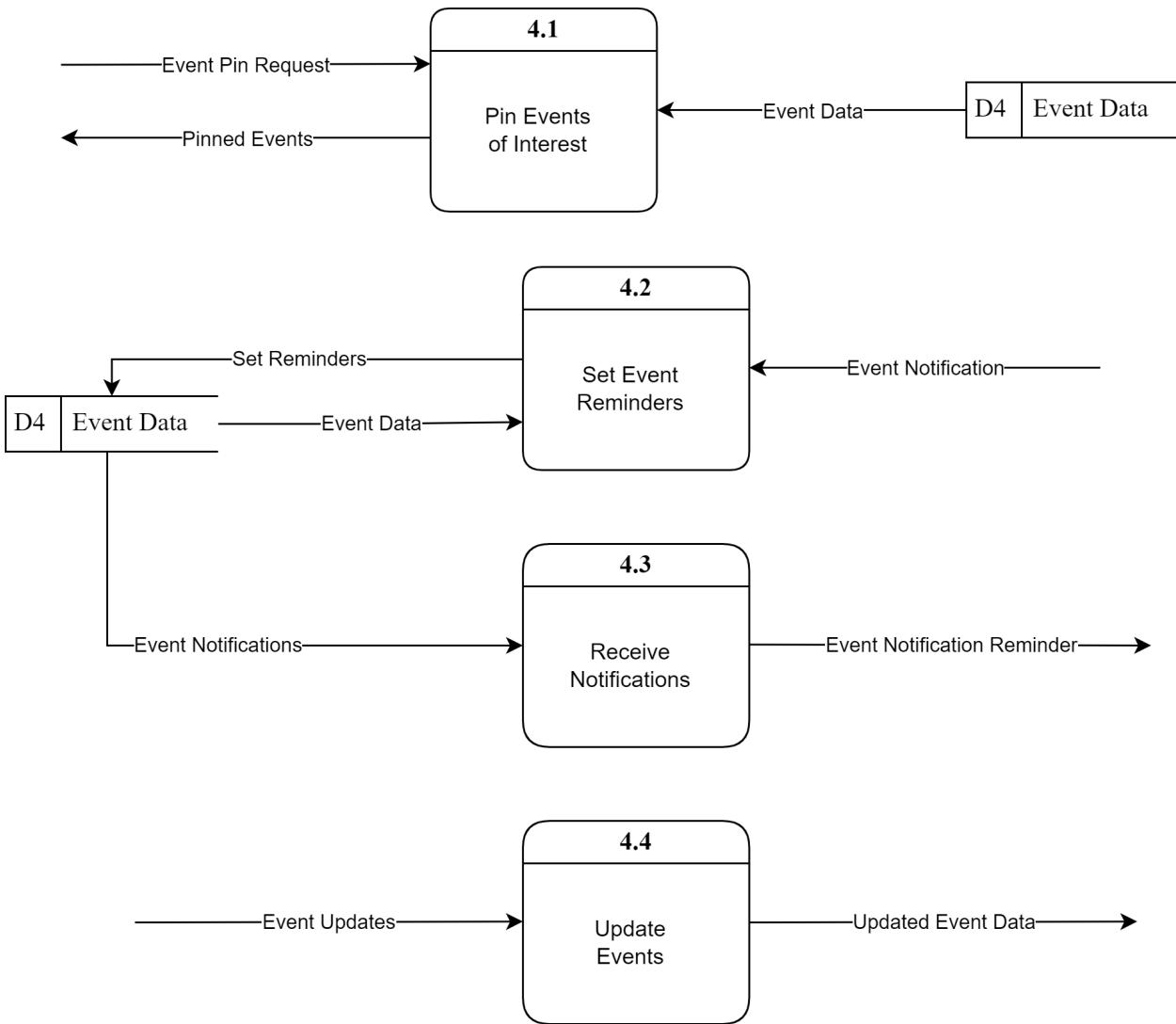
### 7.1.2.2 Process 2



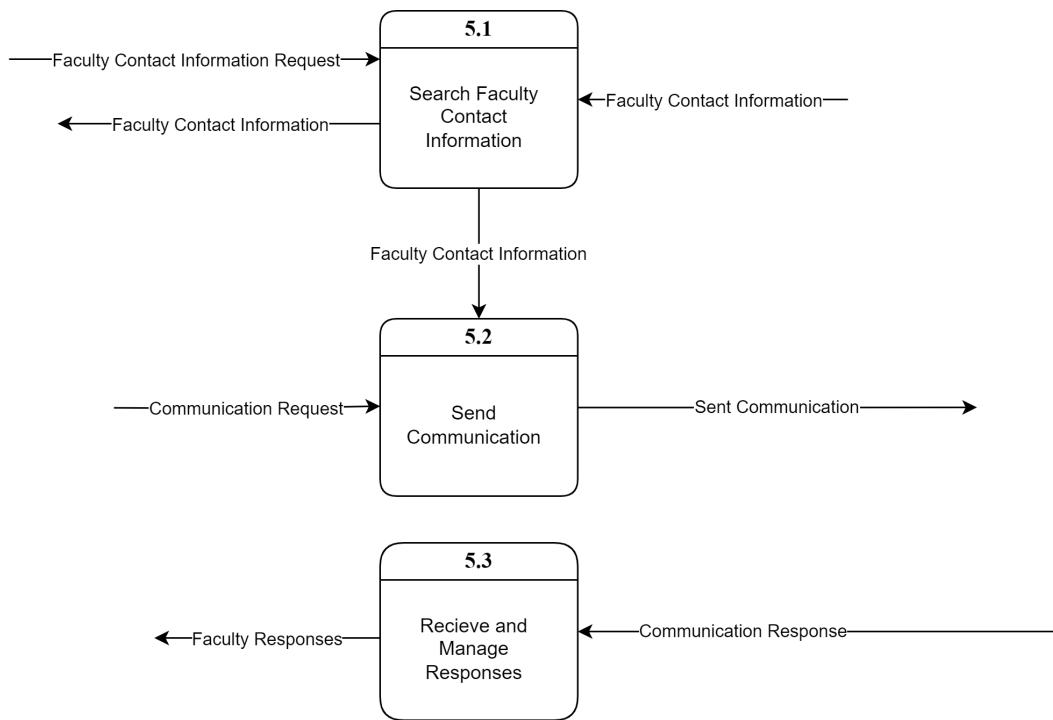
### 7.1.2.3 Process 3



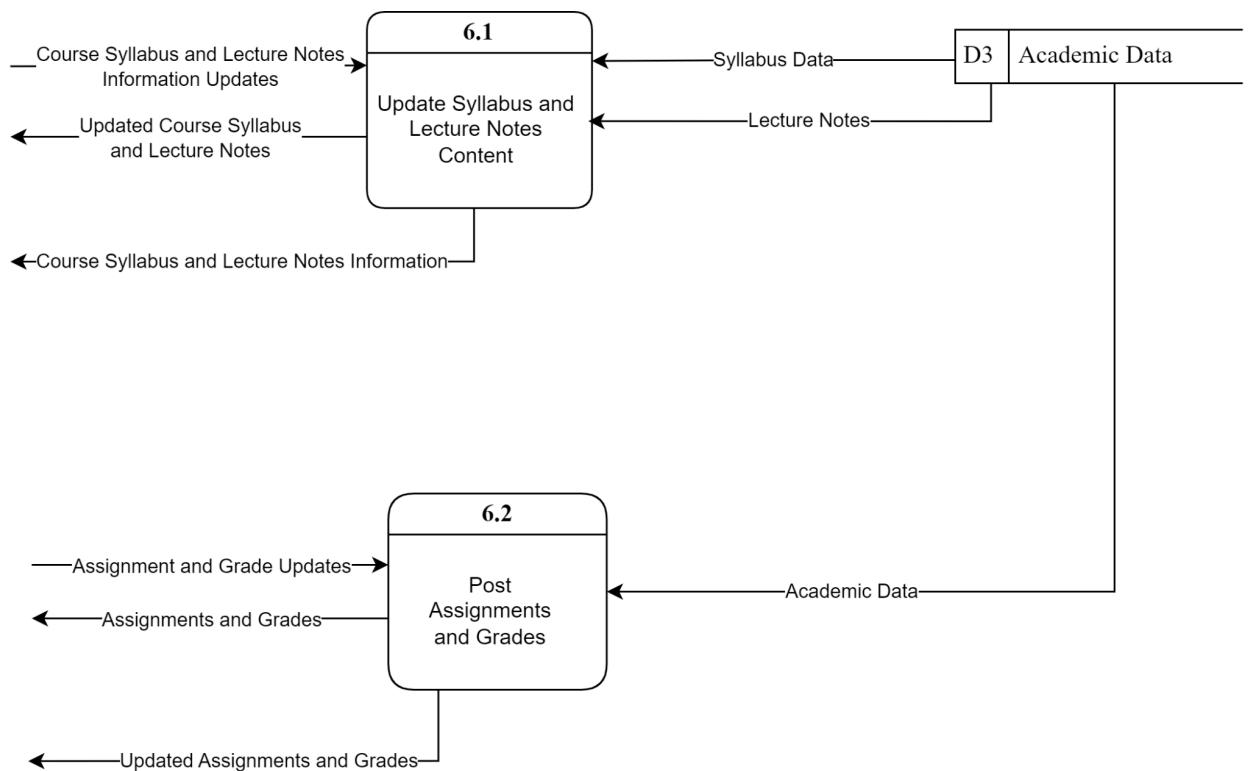
#### 7.1.2.4 Process 4



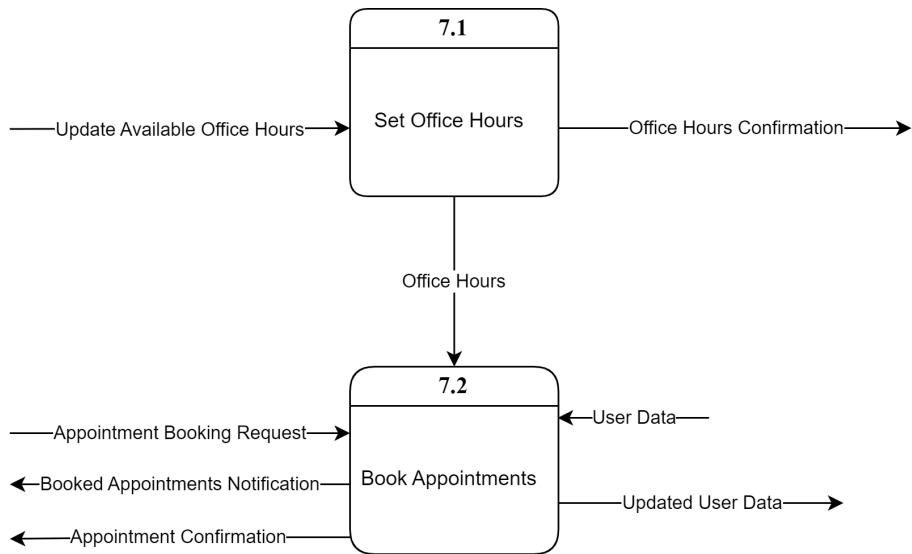
#### 7.1.2.5 Process 5



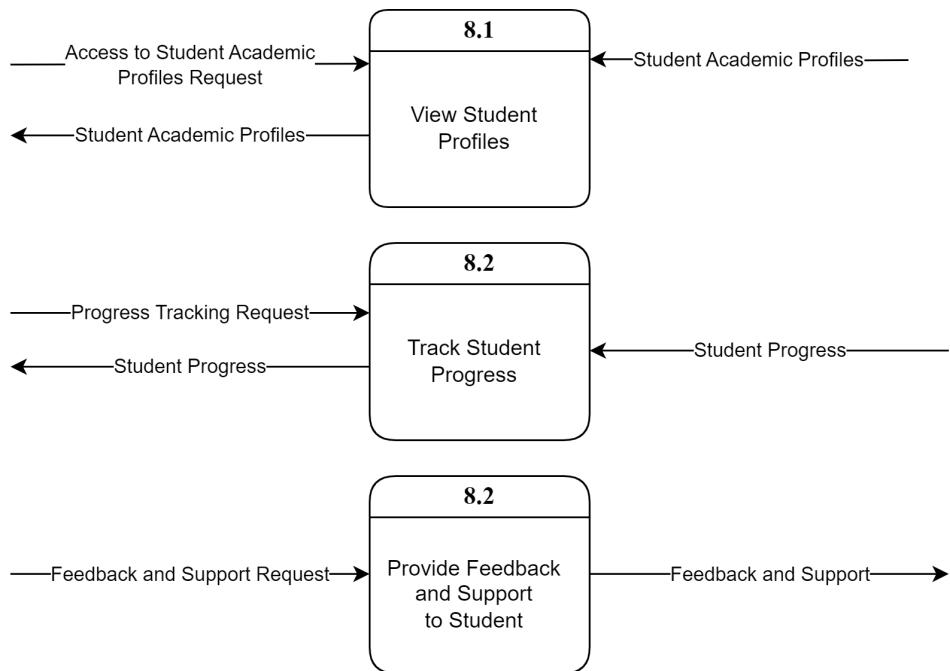
#### 7.1.2.6 Process 6



#### 7.1.2.7 Process 7



#### 7.1.2.8 Process 8



### 7.1.3 CRUD Matrix

| <b>Activity</b>             | <b>Student</b> | <b>Administrator</b> | <b>Faculty</b> |
|-----------------------------|----------------|----------------------|----------------|
| Authenticate User           | R              | R                    | R              |
| Manage Facility Booking     | C              | CR                   | C              |
| Manage Academic Information | CR             | RU                   |                |
| Manage Event Notifications  | CR             | RU                   |                |
| Manage Communication        | CR             |                      | CR             |
| Manage Course Information   | R              |                      | UD             |
| Schedule Office Hours       | CR             |                      | RU             |
| Access Student Records      |                | R                    | CRUD           |

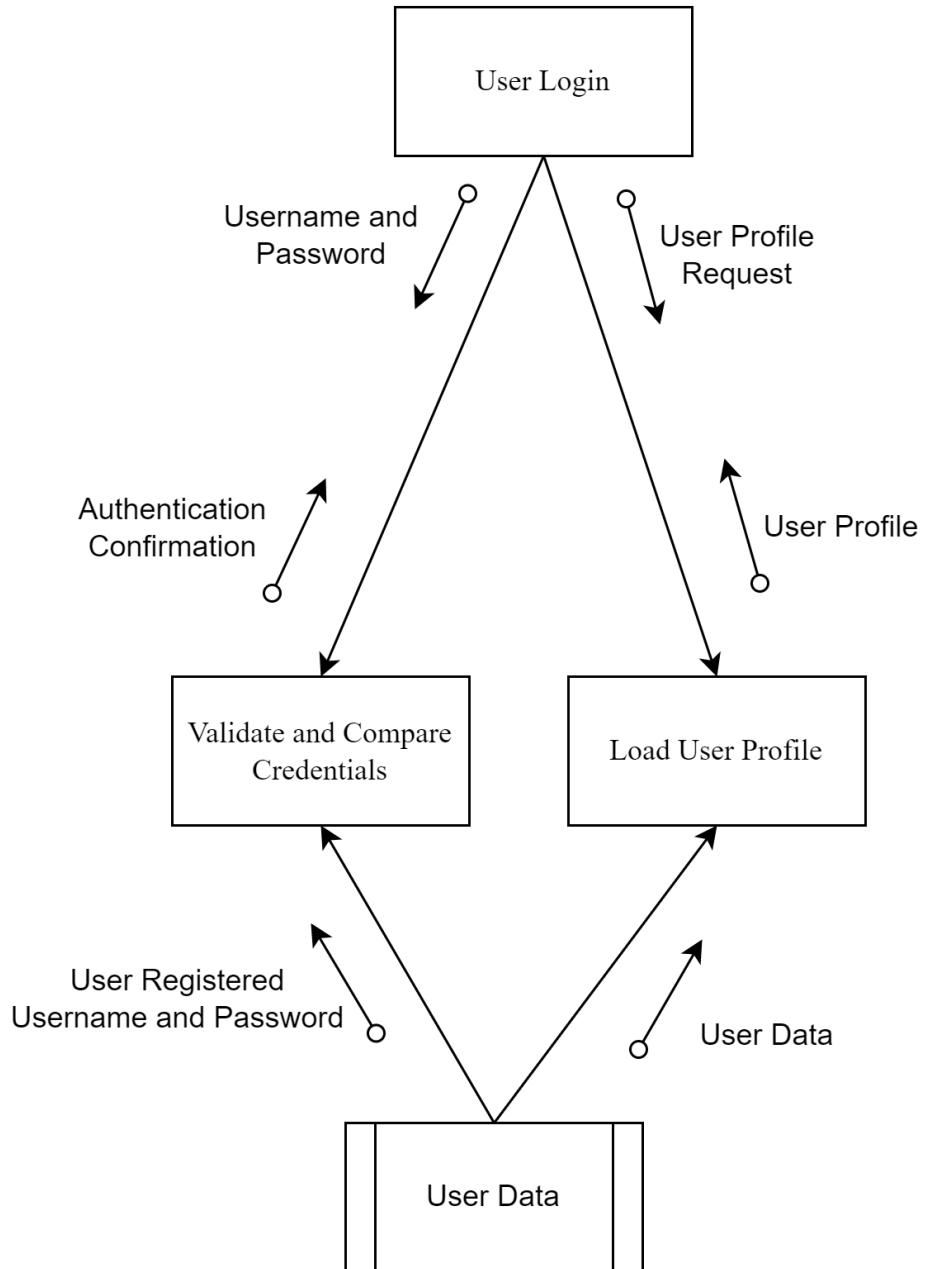
#### 7.1.4 Event Response Table

| Event                       | Source                          | Trigger  | Activity   | Response   | Destination                   |
|-----------------------------|---------------------------------|--|--|--|-------------------------------|
| Authenticate User           | Student, Administrator, Faculty | User's username and password   | Validate and compare credentials, Load user profile  | Authentication successful / failed, Load user profile  | Student Administrator Faculty |
| Manage Facility Booking     | Student, Administrator, Faculty | Facility booking request   | Search available facilities, Book facility, Confirm Booking                                | Facility Booking Confirmation and Instructions   | Student Administrator Faculty |
|                             | Administrator                   | Manage Facility Booking Request  | Retrieve Current Facility Bookings   | Facility Bookings  | Administrator                 |
| Manage Academic Information | Student                         | Academic Information request, Register course request                                | View academic profile, View class Schedules, Track Academic Progress, Register for Courses | Class schedules and timetables, Academic grades and progress, Updated Registered Course Data | Student Academic Data         |
|                             | Administrator                   | Access Student Enrollment and Course Registrations Request, Updated Academic Records | Retrieve Student Enrollment and Course Registrations, Update Current Academic Records      | Student Enrollment and Course Registrations Information, Updated Academic Records            | Administrator Academic Data   |
| Manage Event Notifications  | Student                         | Event Pin Request  | Pin events of interest, Set event reminders, Receive notifications                         | Pinned Events, Event Notification Reminder   | Student                       |
|                             | Administrator                   | Event Updates  | Update Events  | Updated Event Data   | Event Data                    |
| Manage Communication        | Student                         | Faculty Contact Information Request  | Search faculty contact information, Send communication, Receive and manage responses       | Faculty contact information, Sent communication, Faculty Responses                           | Student Faculty               |
| Manage Course Information   | Faculty                         | Course syllabus and lecture notes information updates,                               | Update syllabus and lecture notes content, Post assignments                                | Course syllabus and lecture notes information, Assignments and                               | Student                       |

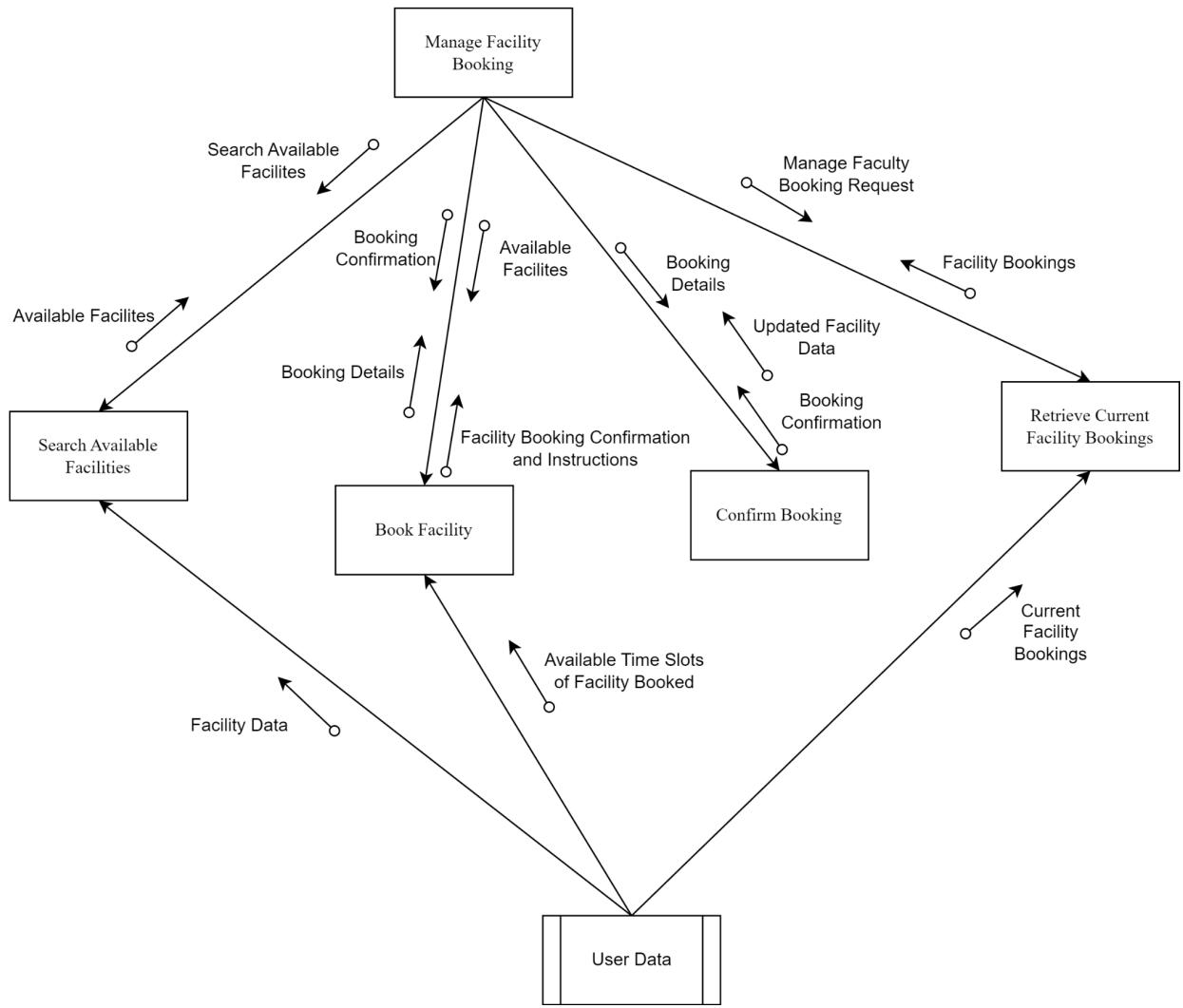
|                        |                        | Assignment and grade updates  | and grades   | grades  |                       |
|------------------------|------------------------|---|--|---|-----------------------|
| Schedule Office Hours  | Faculty, Student       | Update available office hours, Appointment booking request  | Set office hours, Book appointments  | Office hours confirmation, Appointment confirmation, Booked appointments notification | Student Faculty       |
| Access Student Records | Faculty, Administrator | Access to student academic profiles request, Access to student progress request, Feedback and support request | View student profiles, Track student progress, Provide feedback and support to student | Student academic profiles, Student progress   | Faculty Administrator |

### 7.1.5 Structure Chart

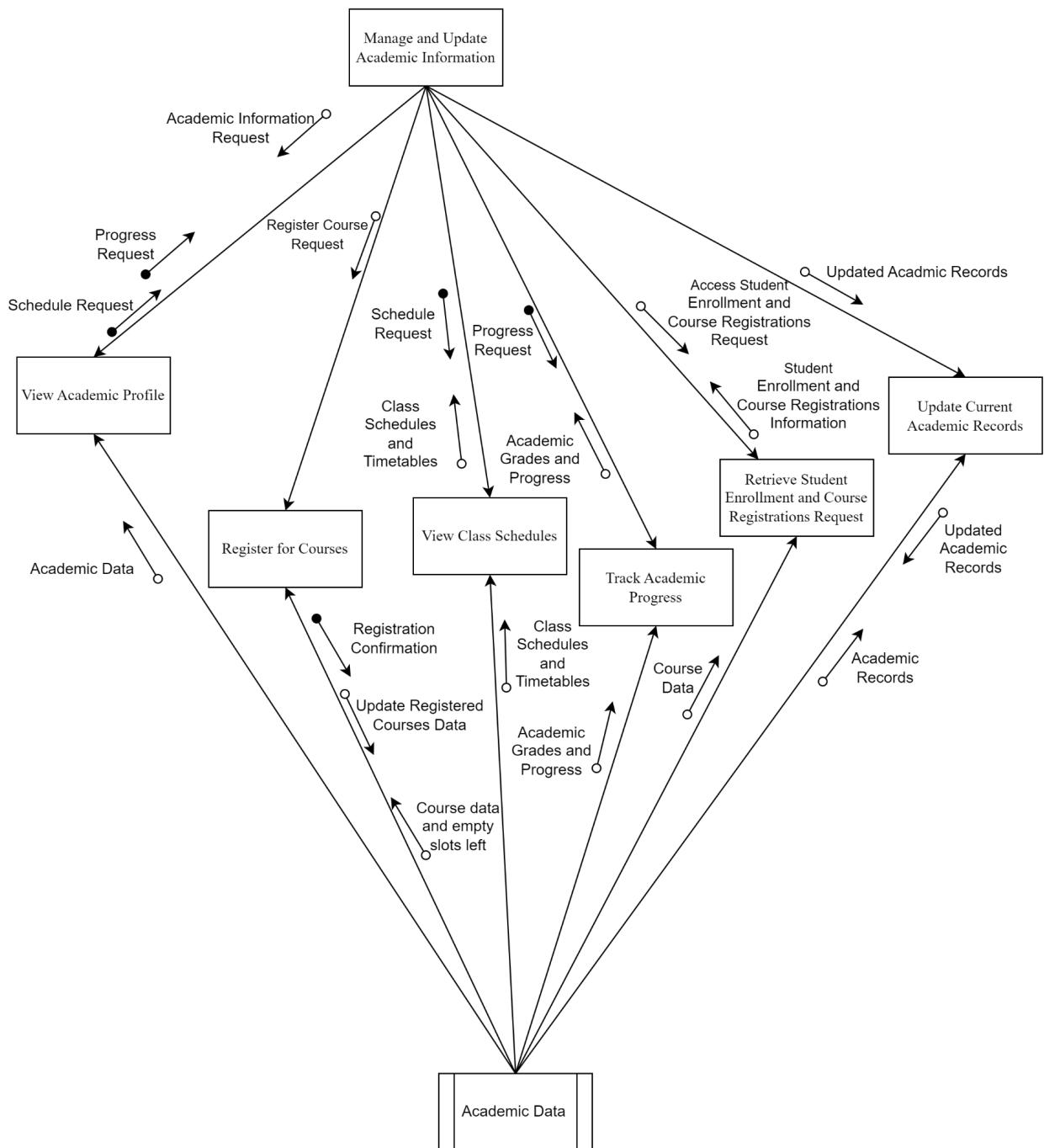
#### 7.1.5.1 Process 1



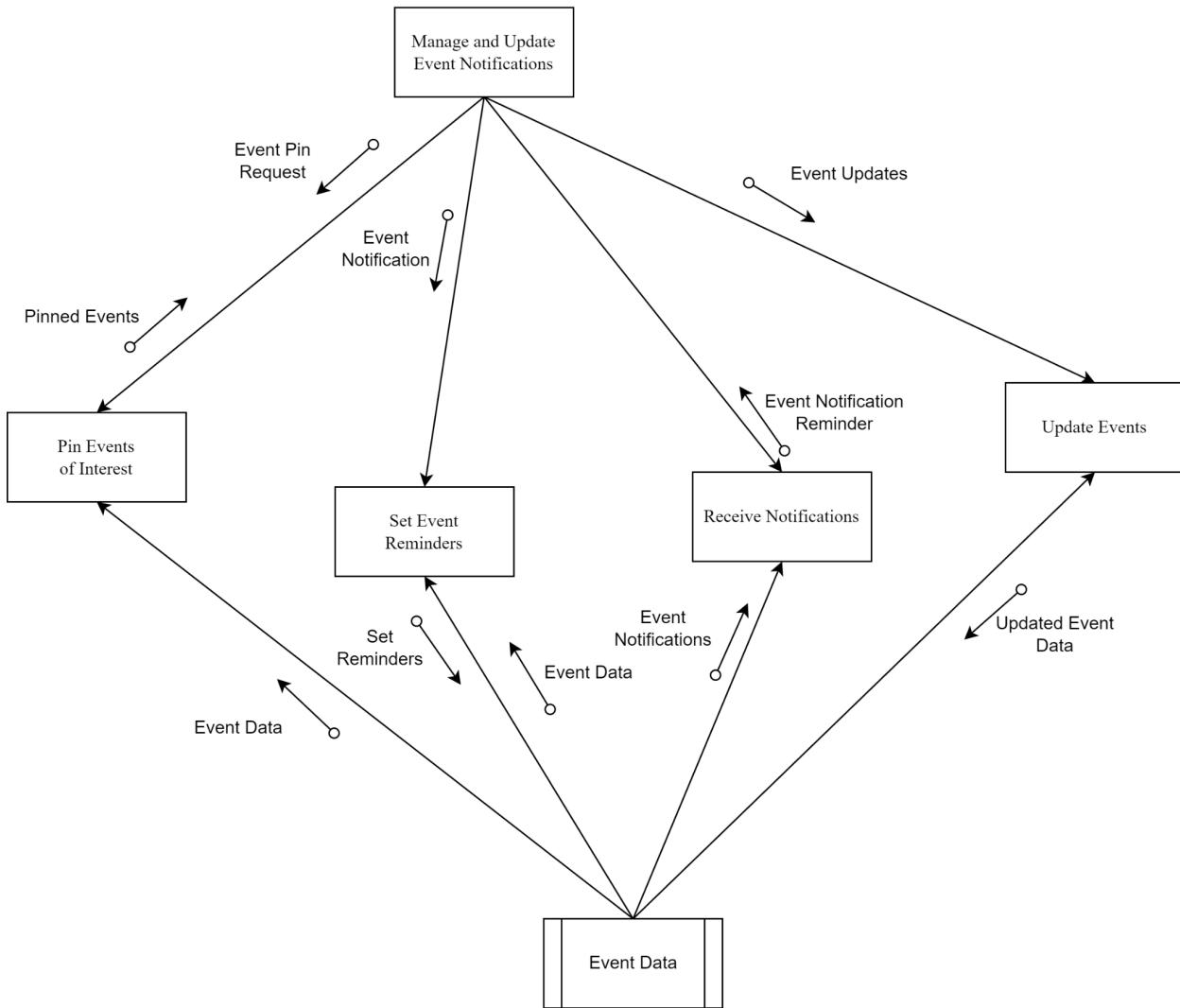
### 7.1.5.2 Process 2



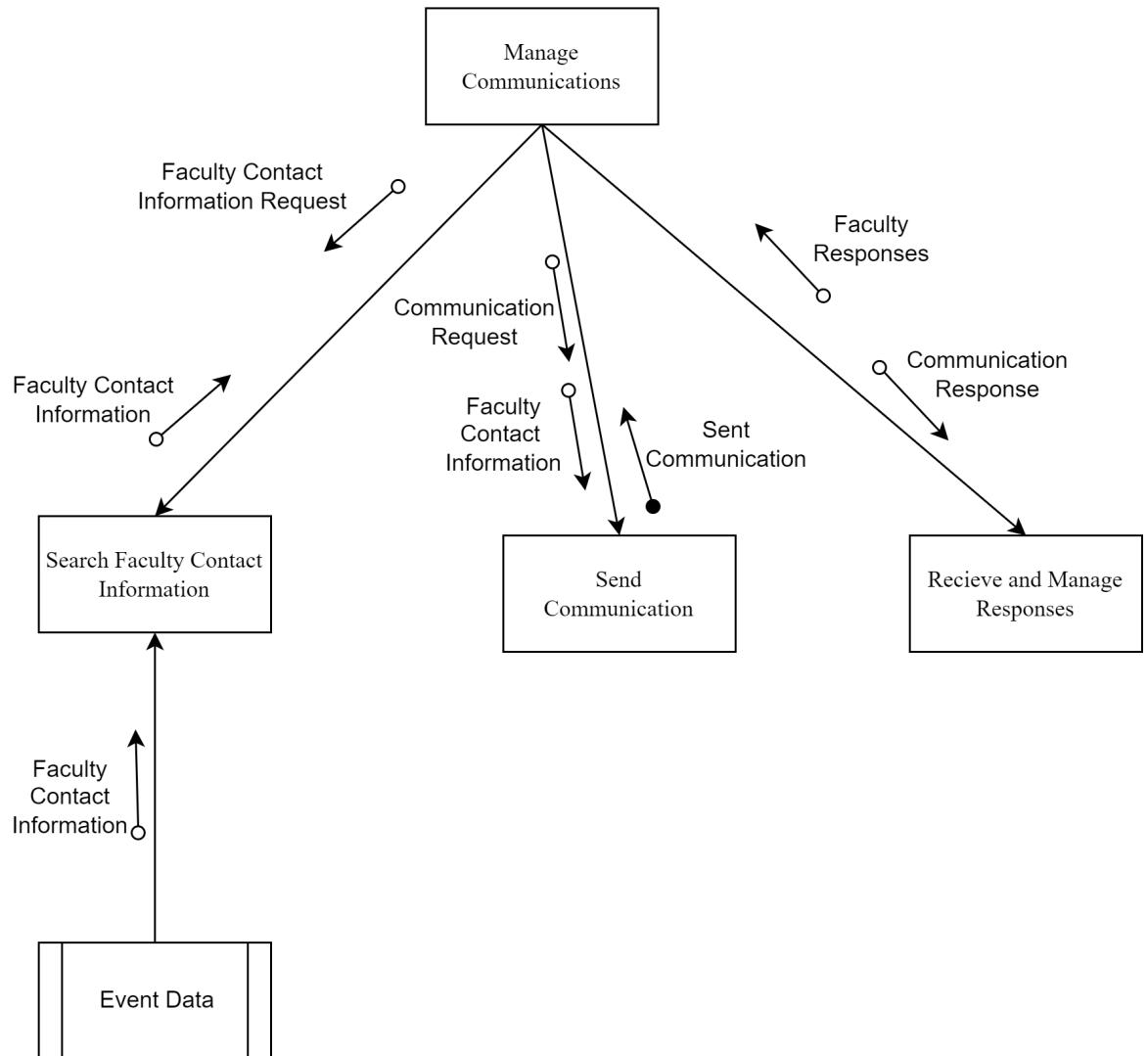
### 7.1.5.3 Process 3



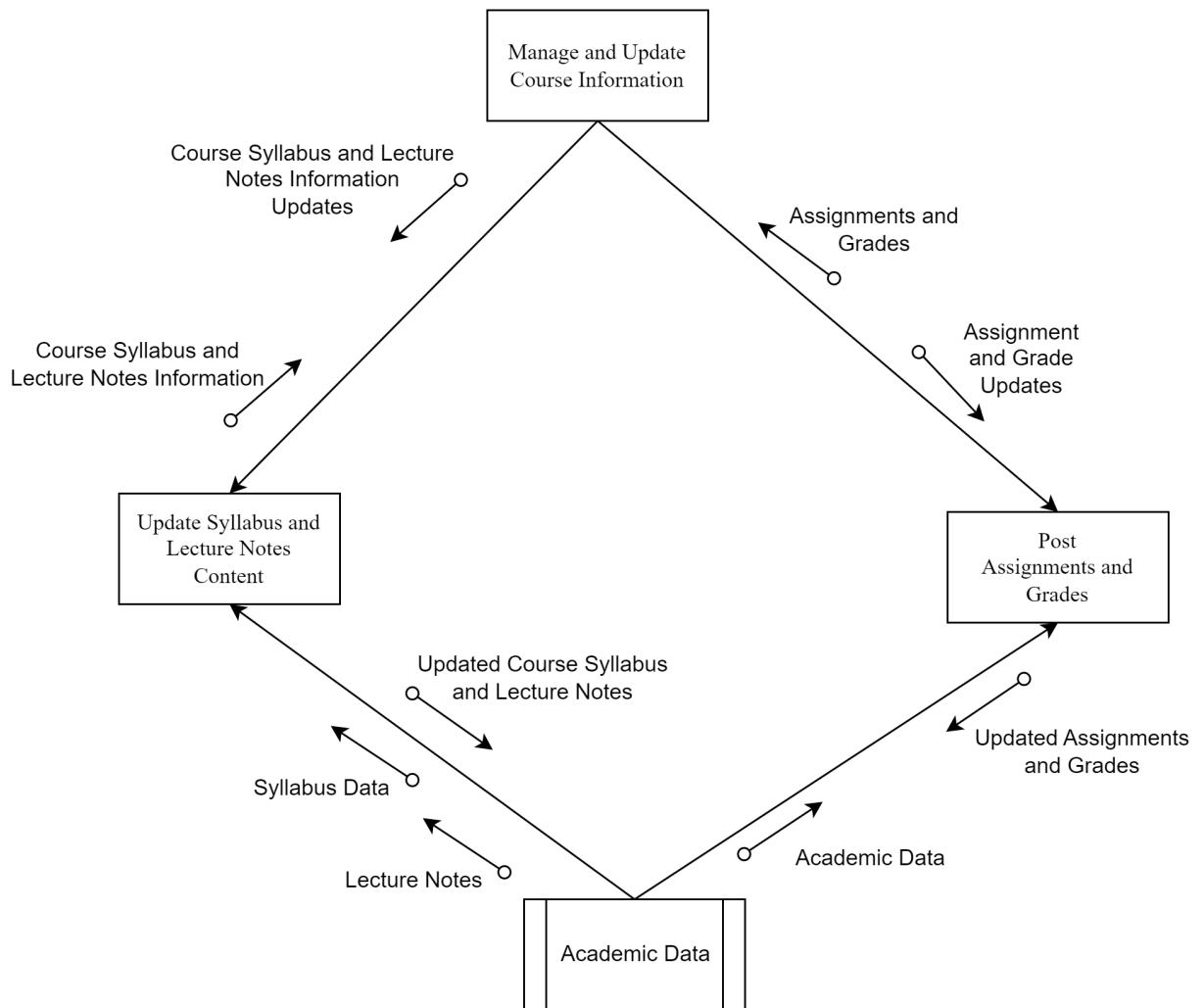
#### 7.1.5.4 Process 4



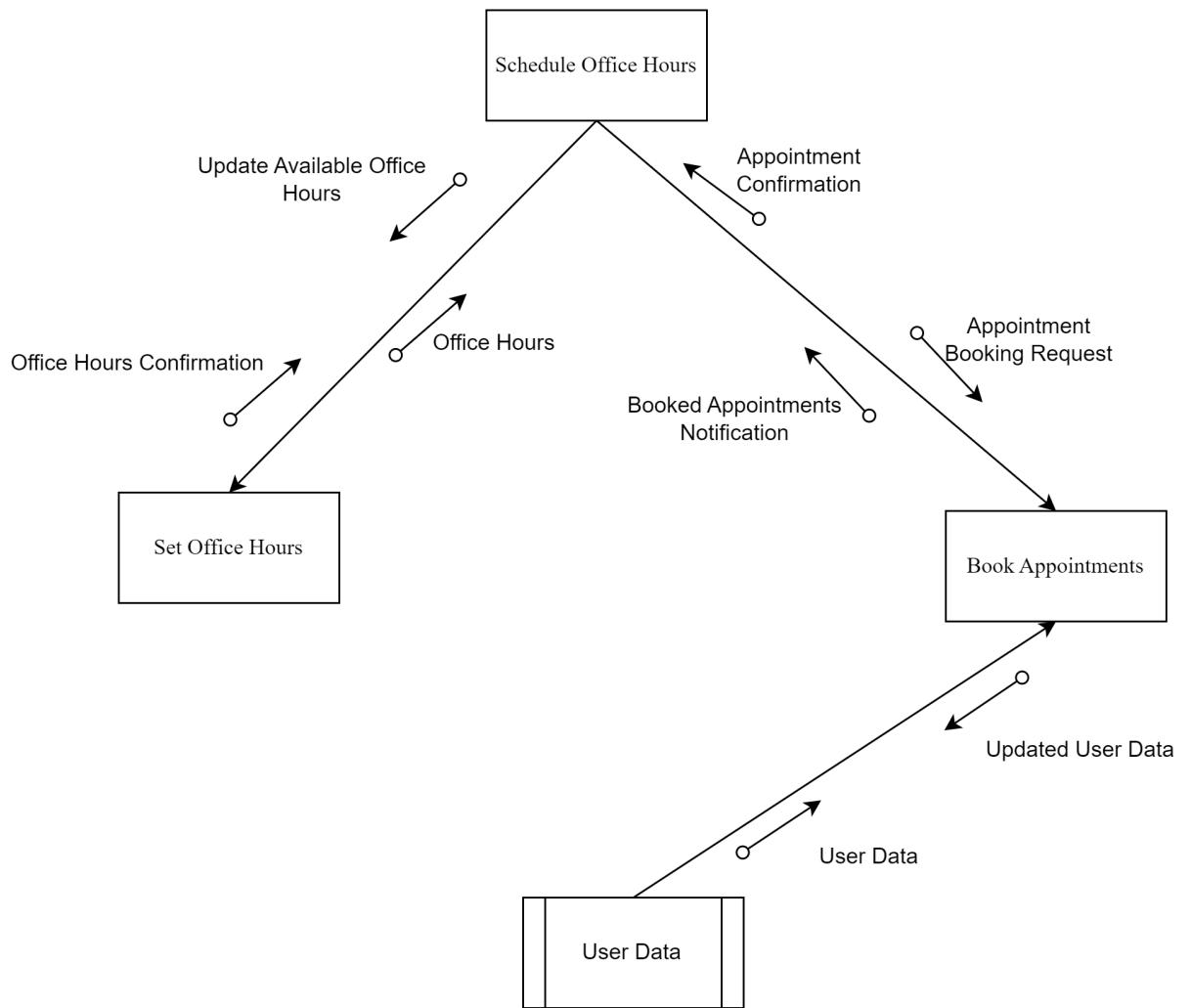
#### 7.1.5.5 Process 5



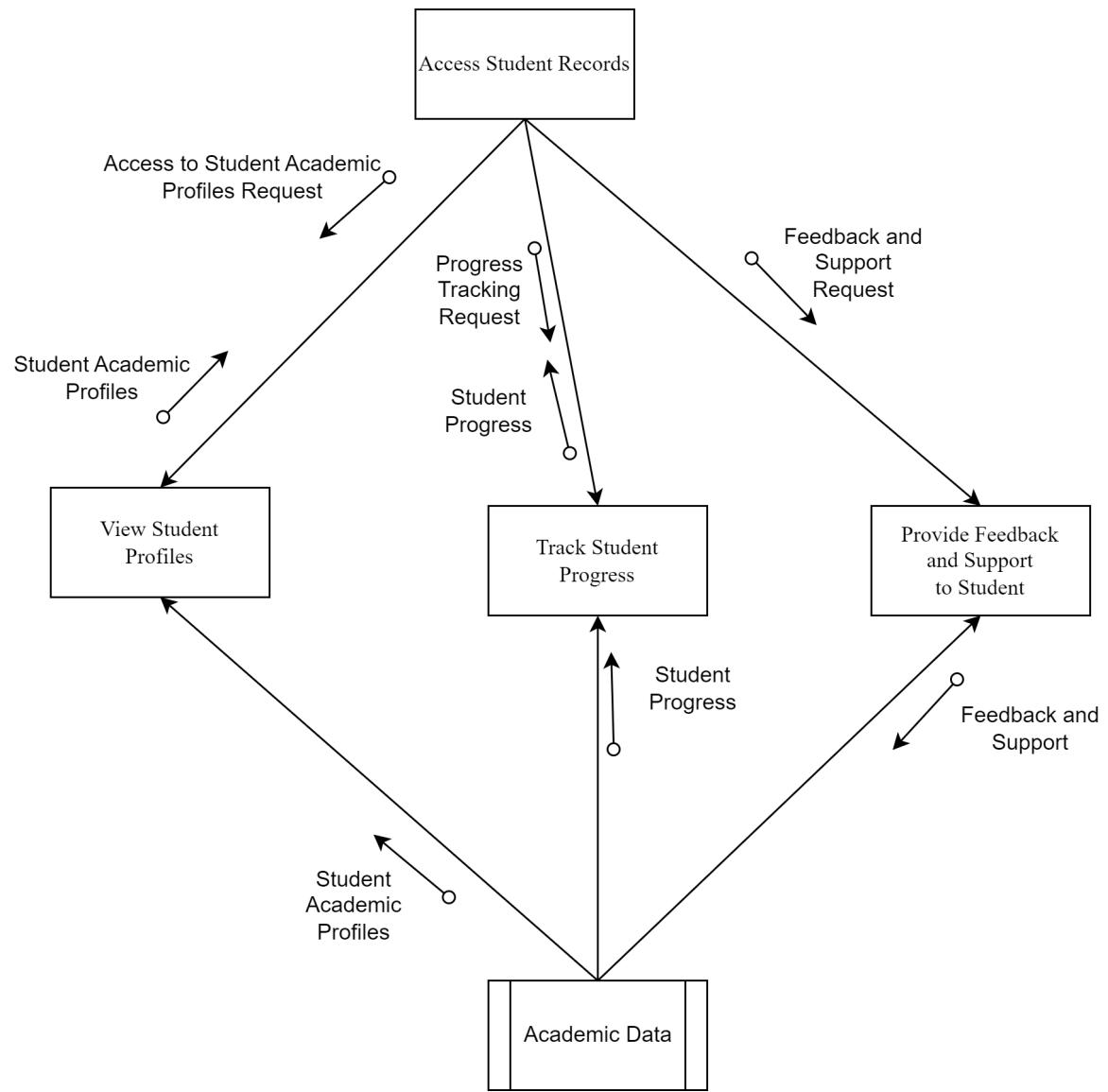
#### 7.1.5.6 Process 6



#### 7.1.5.7 Process 7



#### 7.1.5.8 Process 8



### 7.1.6 System Architecture

The functional requirements of this system are the users, specifically students, faculty members and administrators of the university. Based on previous systems that have been discussed in the problem statement, the quality considerations for this system is having a centralised platform with a focus on efficiency and better performance when viable. To achieve this, we planned to implement a 3-tier architecture such as shown below:

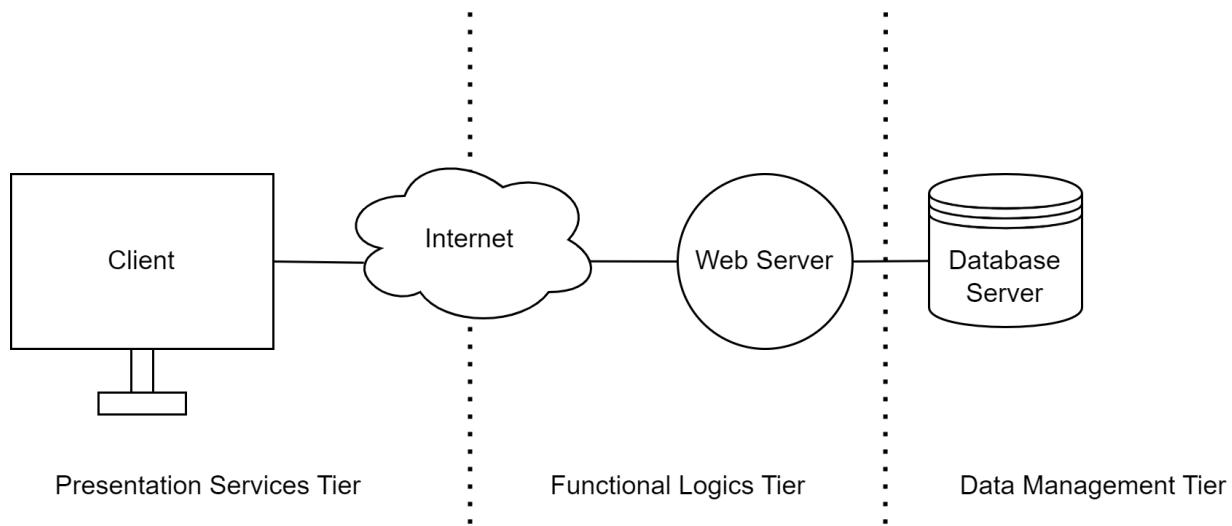


Figure 1: 3-Tier Architecture

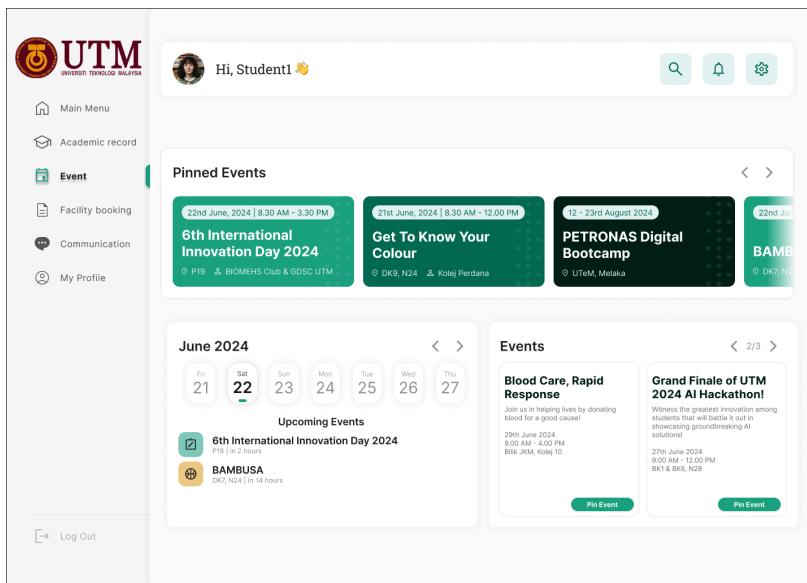
On the presentation services tier, it shows the user interface with the purpose to display and collect information from users. This is further shown in the wireframe design of the system. Functional logics tier processes the information collected from the presentation services tier through usage of business logic. Lastly, the data of the system lies on the data management tier, such as academic data and user data.

## **8.0 System Wireframe (Input Design and Output Design)**

### 8.1 Student as user



The login page for UTM MY CRMS. It features the UTM logo and the text "MY CRMS". Below this is a section titled "Are you?" with three options: "Student" (unchecked), "Faculty staff" (checked), and "Admin" (unchecked). There are input fields for "Email address" and "Password", and a "Login" button.



The home page of the UTM MY CRMS system. At the top, it greets the user "Hi, Student1" and includes a search bar and settings icons. On the left, a sidebar lists "Main Menu" items: Academic record, Event (selected), Facility booking, Communication, and My Profile. The main content area shows "Pinned Events" for June 2024, including "6th International Innovation Day 2024", "Get To Know Your Colour", "PETRONAS Digital Bootcamp", and "BAMBUSA". Below this is a calendar for June 2024 with the 22nd highlighted. The "Upcoming Events" section lists "6th International Innovation Day 2024" and "BAMBUSA". The "Events" section displays details for "Blood Care, Rapid Response" and "Grand Finale of UTM 2024 AI Hackathon!". At the bottom left is a "Log Out" button.

**Type of facility**

Main Menu Academic record Event Facility booking My Profile Log Out

Hi, Student1 🌟

Search Bell Gear

**Classroom** **Gym** **Stadium** **Hall**

**Timetable** See all 26 July 2024

|             | 8.00 am~10.00am | 10.00 am~12.00pm | 12.00pm~1.00pm |
|-------------|-----------------|------------------|----------------|
| Gym Meranti | Available       | Full             | Available      |
| Gym Angkasa | Full            | Full             | Full           |
| Gym Cengal  | Full            | Available        | Full           |

**Booking History** See all

- Badminton court 1 Inv. 28-05-2024
- Gym Meranti Inv. 18-04-2024

**Communication**

Main Menu Academic record Event Facility Booking My Profile Log Out

Hi, Student1 🌟

Search

Lecturers Staffs

**Dr. Tan Xiao Ting** online

how about yesterday's science.... 13.00

**Dr. Jason Noel**

Thank you Dr 12.00

**Dr. Angie Wong**

I ask again if something is not clear 12.00

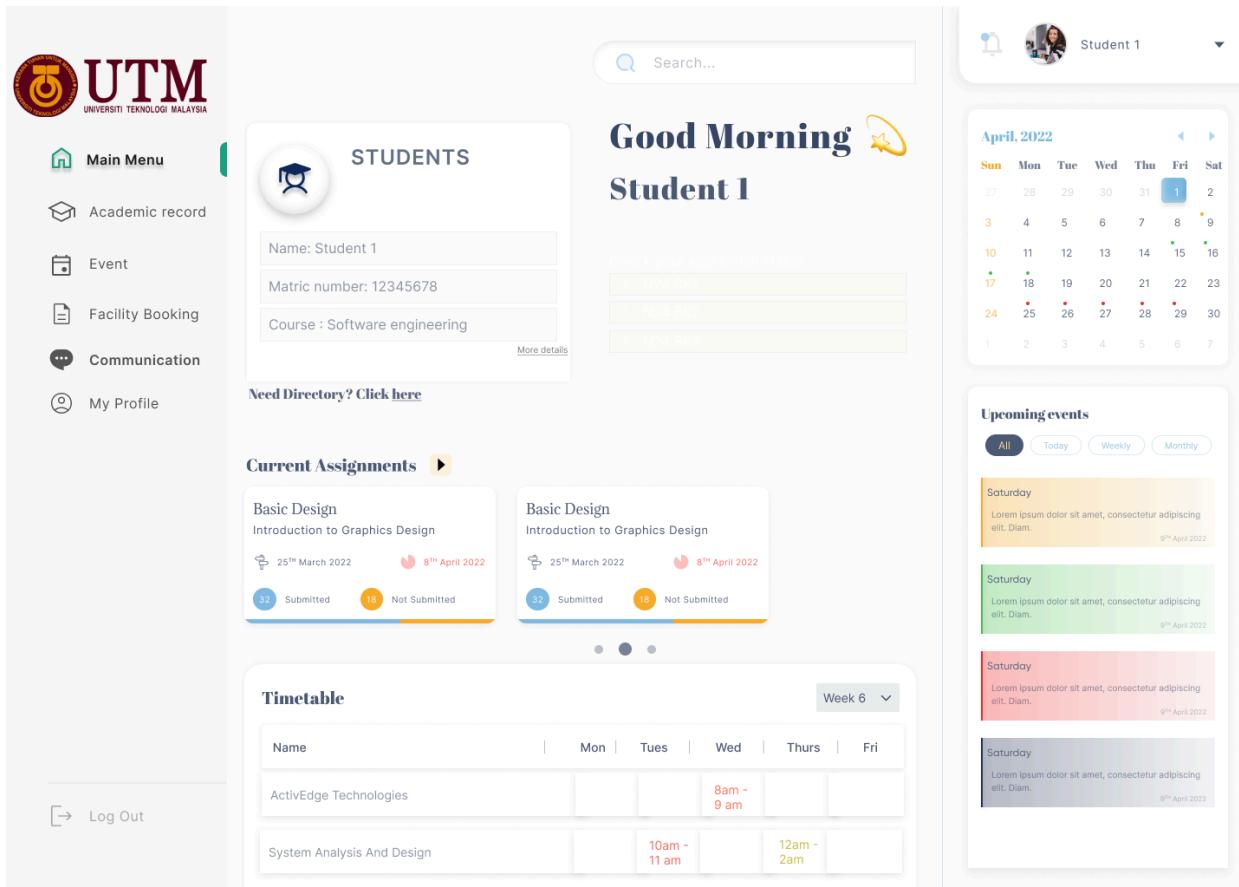
**Dr. Zheng Yu**

Science, science, or science is a conscious effort to in... 12.05

**Dr. Ivor Barrie**

If there is a problem during the process you can ask 12.05

Reply



The image shows a screenshot of the UTM (Universiti Teknologi Malaysia) Student Portal. The top navigation bar includes links for Main Menu, Academic record, Event, Facility Booking, Communication, and My Profile. A search bar is located at the top right.

**STUDENTS**

Name: Student 1  
Matric number: 12345678  
Course : Software engineering

**Current Assignments**

**Basic Design**  
Introduction to Graphics Design  
Due: 25<sup>th</sup> March 2022  
Submitted: 32 / Not Submitted: 16

**Basic Design**  
Introduction to Graphics Design  
Due: 8<sup>th</sup> April 2022  
Submitted: 32 / Not Submitted: 16

**Timetable**

| Name                       | Mon | Tues         | Wed       | Thurs      | Fri |
|----------------------------|-----|--------------|-----------|------------|-----|
| ActivEdge Technologies     |     |              | 8am - 9am |            |     |
| System Analysis And Design |     | 10am - 11 am |           | 12am - 2am |     |

**Good Morning Student 1**

**April, 2022**

| Sun | Mon | Tue | Wed | Thu | Fri | Sat |
|-----|-----|-----|-----|-----|-----|-----|
| 27  | 28  | 29  | 30  | 31  | 1   | 2   |
| 3   | 4   | 5   | 6   | 7   | 8   | 9   |
| 10  | 11  | 12  | 13  | 14  | 15  | 16  |
| 17  | 18  | 19  | 20  | 21  | 22  | 23  |
| 24  | 25  | 26  | 27  | 28  | 29  | 30  |
| 1   | 2   | 3   | 4   | 5   | 6   | 7   |

**Upcoming events**

- All Today Weekly Monthly
- Saturday: Lorem ipsum dolor sit amet, consectetur adipiscing elit. Diam. 9<sup>th</sup> April 2022
- Saturday: Lorem ipsum dolor sit amet, consectetur adipiscing elit. Diam. 9<sup>th</sup> April 2022
- Saturday: Lorem ipsum dolor sit amet, consectetur adipiscing elit. Diam. 9<sup>th</sup> April 2022
- Saturday: Lorem ipsum dolor sit amet, consectetur adipiscing elit. Diam. 9<sup>th</sup> April 2022

 **UTM**  
UNIVERSITI TEKNOLOGI MALAYSIA

Main Menu    Academic Record    Facility booking    My Profile

Academic Information    Course Registration      



# Student

STATUS Active    SEMESTER 202320242    MUET 4.0 - 2022  
COURSE 1 / SECJH    FACULTY COMPUTING    FACULTY COMPUTING

Academic Achievement: 3.90 CGPA

ACTIVITIES: 20 ACTIVITIES JOINED

AWARD: -

### Academic History

| MATERIAL                      | CONDITION | HOURS |
|-------------------------------|-----------|-------|
| Digital Logic                 | Active    | 3     |
| Programming Technique I       | Active    | 3     |
| Technology Information System | Active    | 6     |
| Discrete Structure            | Active    | 3     |

### Course Tracker

SECJ02 ( 14 / 131 )

| MATERIAL   |        |
|------------|--------|
| Faculty    | 7 / 15 |
| Programme  | 5 / 11 |
| Curriculum | 6 / 15 |

### Course Progress

BSC. COMPUTER SCIENCE  
Ult. act. december 2023

28 / 41

 Log Out

The screenshot shows the UTM Academic Record System interface. At the top left is the UTM logo and name. The top navigation bar has two 'Course Registration' buttons, a search icon, a bell icon, and a settings icon. On the left, a sidebar lists 'Main Menu', 'Academic record' (which is selected and highlighted in green), 'Event', 'Facility booking', and 'My Profile'. The main content area features three tabs: 'Registration' (selected), 'Course Offered', and 'Schedule'. Below this is a section titled 'Enter Course' with a search bar and a dropdown menu for 'Section'. A table titled '20242025 - 1' lists courses with columns for Code, Course, Section, and Approval status (indicated by green squares). At the bottom left is a 'Log Out' button.

| CODE | COURSE                       | SECTION | APPROVAL       |
|------|------------------------------|---------|----------------|
| 2523 | DATABASE                     | 03      | [Green Square] |
| 2013 | DATA STRUCTURE AND ALGORITHM | 11      | [Green Square] |
| 2203 | SOFTWARE ENGINEERING         | 09      | [Green Square] |
| 1213 | NETWORK COMMUNICATIONS       | 09      | [Green Square] |

## 8.2 Faculty staff as user



# MY CRMS

Are you?

- Student
- Faculty staff
- Admin

Email address

Password

[forgot password](#)  


Good Morning Mrs. Staff 1

Main Menu

- Academic record
- Event
- Facility Booking
- My Profile

Syllabus Guide

Basic Design Introduction to Graphics Design

25<sup>th</sup> March 2022 8<sup>th</sup> April 2022

Submitted Not Submitted

Basic Design Introduction to Graphics Design

25<sup>th</sup> March 2022 8<sup>th</sup> April 2022

Submitted Not Submitted

STUDENTS

M MALE (61%) F FEMALE (39%)

308

Student Rankings

- ActivEdge Technologies
- ActivEdge Technologies
- ActivEdge Technologies

Search...

Staff 1

April, 2022

| Sun | Mon | Tue | Wed | Thu | Fri | Sat |
|-----|-----|-----|-----|-----|-----|-----|
| 27  | 28  | 29  | 30  | 31  | 1   | 2   |
| 3   | 4   | 5   | 6   | 7   | 8   | 9   |
| 10  | 11  | 12  | 13  | 14  | 15  | 16  |
| 17  | 18  | 19  | 20  | 21  | 22  | 23  |
| 24  | 25  | 26  | 27  | 28  | 29  | 30  |

Upcoming events

Saturday

Saturday

Saturday

Saturday

Log Out

This screenshot shows the UTM Staff Communication interface. At the top, there's a header with the UTM logo and a greeting "Hi, Staff1". Below the header is a search bar and three small icons. On the left, a sidebar lists "Main Menu", "Academic record", "Course Information", and "Communication". The "Communication" tab is selected, showing tabs for "Students" and "Staffs". Under "Students", a list of messages from students like Tan Xiao Ting, Jason Noel, Angie Wong, Zheng Yu, and Ivor Barrie is displayed with their profile pictures and timestamps. On the right, a list of messages from staff like Tan Xiao Ting is shown. At the bottom left is a "Log Out" button.

This screenshot shows the UTM Staff Profile and Assignments interface. At the top, it displays the UTM logo and a search bar. The main area features a profile picture of "Staff1" with the name "Staff1" below it. It shows "STATUS Active" and "DATE OF STARTING 01-04-2013". Below this, under "COURSE TAUGHT", it lists courses: Discrete Structure (SECTION 09, YEAR 20232024 - 1, STUDENT 49, VENUE N28 BK5, TIME MONDAY 9 AM to 11 AM) and Computational Mathematics (SECTION 02, YEAR 20232024 - 1, STUDENT 30, VENUE N28a - BK1, TIME THURSDAY 9 AM to 11 AM). At the bottom, there are three buttons: "Course Information" (green), "Student Record" (light blue), and "Contact Student" (orange). On the right, a sidebar titled "Assignments" lists tasks: Assignment 1 (03-03-2023), Inicio de trámite (28-02-2023), Inicio de trámite (18-02-2023), Assignment 2 (14-02-2023), Lab Manual (16-01-2023), Practical Exam (20-12-2022), and Final Exam (18-12-2022). A green "Update" button is located above the assignment list. At the bottom left is a "Log Out" button.

The screenshot shows the UTM Academic Record system interface. On the left is a sidebar with the UTM logo and navigation links: Main Menu, Academic record (selected), Event, Facility booking, My Profile, and Log Out. The main area has a header "Hi, Staff1 🙌" with search and filter buttons. It displays two large green boxes: "Submitted Assignment" with the number 10 and "Active Students" with the number 20. Below is a table of student records with columns: REF ID, FIRST NAME, STATUS, COURSE, and SECTION. The table shows 10 rows of data. At the bottom are navigation arrows and page numbers 1 through 7. At the bottom of the screen are three buttons: Course Information (light blue), Student Record (green), and Contact Student (orange).

| REF ID    | FIRST NAME | STATUS     | COURSE | SECTION |
|-----------|------------|------------|--------|---------|
| STU432101 | Micheal    | Active     | Male   | 09      |
| STU432101 | Michelle   | Active     | Female | 09      |
| STU432101 | Micheal    | Not Active | Male   | 09      |
| STU432101 | Michelle   | Active     | Female | 09      |
| STU432101 | Michelle   | Active     | Female | 09      |
| STU432101 | Michelle   | Active     | Female | 09      |
| STU432101 | Micheal    | Not Active | Male   | 09      |
| STU432101 | Michelle   | Active     | Female | 09      |

### 8.3 Admin as User

 **UTM**  
UNIVERSITI TEKNOLOGI MALAYSIA

# MY CRMS

Are you?

Student

Faculty staff

Admin

Email address

Password  
 [forgot password](#)

**Login**



...Administrator/Dashboard

Admin 1

Main Menu

Academic record

Event Management

Facility Booking

Staff Management

# Good Morning

## Admin 1

### Attendance Summary



Monthly Students

| Month | Students |
|-------|----------|
| Jan   | 80       |
| Feb   | 75       |
| Mar   | 10       |
| Apr   | 85       |
| May   | 0        |
| Jun   | 0        |

### Recently registered users

| Name                   | ID          | Role    | Gender | Email                          |
|------------------------|-------------|---------|--------|--------------------------------|
| ActivEdge Technologies | AET154-5671 | Teacher | Male   | activedgetechnologies@gmail... |
| ActivEdge Technologies | AET154-5671 | Teacher | Male   | activedgetechnologies@gmail... |
| ActivEdge Technologies | AET154-5671 | Teacher | Male   | activedgetechnologies@gmail... |

view all users

Log Out

Search...

April.2022

| Sun | Mon | Tue | Wed | Thu | Fri | Sat |
|-----|-----|-----|-----|-----|-----|-----|
| 27  | 28  | 29  | 30  | 31  | 1   | 2   |
| 3   | 4   | 5   | 6   | 7   | 8   | 9   |
| 10  | 11  | 12  | 13  | 14  | 15  | 16  |
| 17  | 18  | 19  | 20  | 21  | 22  | 23  |
| 24  | 25  | 26  | 27  | 28  | 29  | 30  |
| 1   | 2   | 3   | 4   | 5   | 6   | 7   |

Upcoming events

Saturday

Sunday

Saturday

Sunday

Saturday

Sunday

The screenshot shows the UTM Event Management System interface. On the left, there's a sidebar with links: Main Menu, Academic record, Event Management (which is selected), Facility booking, and Staff Management. The main area has a header with a user profile picture and the greeting "Hi, Admin1 🌟". It features a search bar and three icons for search, notifications, and settings.

**Posted Events**

- 22nd June, 2024 | 8:30 AM - 3:30 PM  
6th International Innovation Day 2024  
P19, BIOMEHS Club & GDSC UTM
- 21st June, 2024 | 8:30 AM - 12:00 PM  
Get To Know Your Colour  
OK9, N24, Kolej Perdana
- 12 - 23rd August 2024  
PETRONAS Digital Bootcamp  
UTeM, Melaka
- 22nd June, 2024 | 8:30 AM - 12:00 PM  
BAMBUSA  
DK7, N24

**June 2024**

|     |    |     |           |     |    |     |    |     |    |     |    |     |    |
|-----|----|-----|-----------|-----|----|-----|----|-----|----|-----|----|-----|----|
| Fri | 21 | Sat | <b>22</b> | Sun | 23 | Mon | 24 | Tue | 25 | Wed | 26 | Thu | 27 |
|-----|----|-----|-----------|-----|----|-----|----|-----|----|-----|----|-----|----|

**Upcoming Events**

- 6th International Innovation Day 2024  
P19 | In 2 hours
- BAMBUSA  
DK7, N24 | In 14 hours

**Publish an Event**

**Title:**

Description:  
Date:  
Time:  
Location:

**Post Event**

[Log Out](#)

The screenshot shows the 'Type of facility' section of the UTM Facility Booking system. At the top, there are four icons: Classroom, Gym (selected), Stadium, and Hall. Below this, a table titled 'Available Slots' shows availability for three locations: Gym Meranti, Gym Angkasa, and Gym Cengal, across three time slots: 8.00am-10.00am, 10.00am-12.00pm, and 12.00pm-10pm on July 26, 2024. The 'Gym' icon is highlighted in green, indicating it is the selected facility type.

|             | 8.00am-10.00am | 10.00am-12.00pm | 12.00pm-10pm |
|-------------|----------------|-----------------|--------------|
| Gym Meranti | Available      | Full            | Available    |
| Gym Angkasa | Full           | Full            | Full         |
| Gym Cengal  | Full           | Available       | Full         |

**Booking Information:**

- NAME: Tan Zheng Yu
- USER TYPE: Student
- EMAIL: tanzhengyu@gmail.com
- MATRIC NO: A23CE2200
- SLOT: 10.00am-12.00pm
- DATE: 26-07-2024
- TYPE OF FACILITY: Gym

The screenshot shows the Student Management System. On the left, there are three summary cards: STUDENTS (308), STAFF (100), and SUBJECTS (50). The main area displays a list of students under the 'PRESENT' tab. The table includes columns for REF ID, FIRST NAME, LAST NAME, GENDER, and DEPARTMENT. The first few rows show entries for Micheal Armstrong and Michelle Livingston, both in Science.

| REF ID    | FIRST NAME | LAST NAME  | GENDER | DEPARTMENT |
|-----------|------------|------------|--------|------------|
| STU432101 | Micheal    | Armstrong  | Male   | Science    |
| STU432101 | Michelle   | Livingston | Female | Technology |
| STU432101 | Micheal    | Armstrong  | Male   | Science    |
| STU432101 | Michelle   | Livingston | Female | Technology |
| STU432101 | Michelle   | Livingston | Female | Technology |
| STU432101 | Micheal    | Armstrong  | Male   | Science    |

**Upcoming events:**

A calendar for April 2022 shows several days with scheduled events. The events are listed as follows:

- Saturday: [Event description] on 28/04/2022
- Saturday: [Event description] on 04/05/2022
- Saturday: [Event description] on 11/05/2022
- Saturday: [Event description] on 18/05/2022
- Saturday: [Event description] on 25/05/2022
- Sunday: [Event description] on 05/05/2022
- Sunday: [Event description] on 12/05/2022
- Sunday: [Event description] on 19/05/2022
- Sunday: [Event description] on 26/05/2022
- Sunday: [Event description] on 02/06/2022

The screenshot shows the UTM Academic Record interface. On the left is a sidebar with icons for Main Menu, Academic record (selected), Event, Facility booking, and My Profile. The main area has a header with a user profile picture, the text "Hi, Admin! 🌟", and search/filter buttons for Status, Course, and Faculty. Below this is a table showing student records:

| REF ID    | FIRST NAME | STATUS     | COURSE | FACULTY    |
|-----------|------------|------------|--------|------------|
| STU432101 | Micheal    | Active     | Male   | Computing  |
| STU432101 | Michelle   | Active     | Female | Computing  |
| STU432101 | Micheal    | Not Active | Male   | Mechanical |
| STU432101 | Michelle   | Active     | Female | Built Env. |
| STU432101 | Michelle   | Active     | Female | Science    |
| STU432101 | Michelle   | Active     | Female | Education  |
| STU432101 | Micheal    | Not Active | Male   | Science    |
| STU432101 | Michelle   | Active     | Female | Built Env. |

Below the table is a search result card for "Michael - STU432101":

Searched for : Michael - STU432101

|      |      |            |    |          |   |
|------|------|------------|----|----------|---|
| CGPA | 4.00 | ACTIVITIES | 23 | SEMESTER | 4 |
|------|------|------------|----|----------|---|

## **9.0 Summary of proposed system**

The CRMS features a robust facility booking and administration module, simplifying the process for users to check availability and book classrooms, auditoriums, laboratories, and athletic fields. Facility managers can set booking rules, manage reservations, and monitor resource usage to ensure optimal utilisation and prevent scheduling conflicts.

Event organisation is another strong suit of the CRMS, offering comprehensive tools for planning and managing campus events, workshops, lectures, and extracurricular activities. This streamlines the administrative process and enhances audience engagement and participation.

For student administration, the CRMS provides tools to manage enrollment, course registration, academic records, and extracurricular activities. Students can book facilities, access their academic profiles, manage course registrations, view schedules, track progress, receive event notifications, and communicate with faculty. Faculty can manage course information, schedule office hours, and access student records. Administrators can handle facility bookings, event notifications, academic records, and staff management.

The CRMS significantly improves stakeholder communication by delivering timely announcements, reminders, and alerts through email, text messaging, and notifications. This ensures efficient dissemination of information, fostering better communication and collaboration across the campus.

In conclusion, The CRMS enhances campus operations by centralising processes, improving efficiency, communication, and resource allocation. Its comprehensive features support students, faculty, and administrators in managing their tasks effectively, fostering a well-connected and dynamic campus environment.