Semester II 2023/2024

Subject : System Analysis and Design (SECD2613)

Section : 08

Task : Phase 3 – Analysis and Design (15%)

Due : 8 June 2024

Lecturer : Dr CIK SUHAIMI BIN YUSOF

Group : 08

Prototype Link :
https://www.figma.com/proto/fF5wvyjxNstFyy7SK9FDaE/ClubHub?node-id=0-1&t=E1K8Yy6bDwOUTbZD-1

Prototype Demo link: https://youtu.be/LFkHdhbXZZY

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1.0 Overview of the Project

In an era where technology permeates every aspect of our lives, it's imperative for educational institutions like UTM to evolve accordingly. The proposed project, titled Clubhub, is a strategic response to the challenges faced by students in accessing timely and relevant information about campus clubs and societies. Led by a dedicated team, Clubhub aims to revolutionize the way students engage in extracurricular activities by providing a centralized platform for event discovery, communication, and participation.

At its core, Clubhub seeks to address three primary issues: the inundation of campus group messages with spam, the lack of a centralized platform for communication, and the limited exposure of niche clubs. By leveraging technology and innovative thinking, Clubhub endeavors to streamline the process of discovering and participating in club activities, making it easier for students to find their interests and actively engage within the campus community.

The project proposal outlines a comprehensive plan for the development of Clubhub, starting with a thorough analysis of the current challenges and needs of the student body. The proposed solution includes the development of a mobile application featuring user-friendly interfaces, personalized club profiles, event registration, attendance tracking, and integrated ticketing systems.

Moreover, the proposal encompasses a detailed feasibility study, including technical, operational, and economic assessments to ensure the sustainability and viability of Clubhub. Through a Cost-Benefit Analysis (CBA), it's demonstrated that Clubhub is not only financially feasible but also promises a favorable return on investment, making it a sound strategic endeavor for UTM.

In summary, Clubhub represents a transformative initiative aimed at enhancing the overall campus experience for students at UTM. By providing a centralized platform for event management and communication, Clubhub fosters a vibrant community of engaged students and clubs, aligning with UTM's vision of a future-ready campus that prioritizes student engagement and academic excellence.

2.0 Problem Statement

1. **Problem 1: Campus group messages are flooded with spam**

   Clubs are trying to find a medium where they can reach students across the campus , unfortunately this leads to them spamming messages and advertisements in campus chat groups in order to get the students attention . through numerous information gathered this was proven to be a common problem across the campus

2. **Problem 2: Uncentralized platform for communication of information**

   Based on information gathered from students, alot indicated that using the same social media group for school announcements, club events, and student businesses makes things confusing for them. Making it hard to find relevant information that they need in the group .

3. **Problem 3: Lack of exposure to niche clubs**

   Due to the limited dissemination of information via social media channels, many smaller clubs and societies struggle to promote their events effectively. This lack of exposure often results in students being unaware of these clubs and their activities, consequently hindering their participation in campus events. Hence , The data collected indicates the lower number of student participation in club activities .

3.0 Proposed Solutions

To address the identified challenges faced by students in accessing timely and relevant information about campus clubs and societies, we propose the development of a mobile application designed specifically for streamlining communication and enhancing engagement within the campus community. This application will serve as a centralized platform, bringing together all club-related information, events, and announcements into one convenient location. By providing a comprehensive hub for students to access club details, activities, and announcements, the application aims to reduce the burden of navigating through multiple social media groups and channels, ultimately reducing the likelihood of missing important event promotions.

The proposed solution includes several key features aimed at optimizing user experience and encouraging active engagement in extracurricular activities. Firstly, the mobile application will boast a user-friendly interface, allowing clubs and societies to effortlessly publish event details while ensuring that users receive only relevant and non-spammy information. By prioritizing ease of use and accessibility, the application aims to enhance overall user engagement and foster a sense of community within the campus.

Additionally, each club or society will have its own dedicated section within the application, enabling them to showcase their history, purpose, membership details, and past activities. This personalized approach not only empowers the students to make informed decisions about which clubs to join but also fosters a deeper understanding and appreciation of the diverse array of opportunities available on campus.

Furthermore, the application will feature a repository of past event records, including photos, reviews, and participant feedback. By providing access to this valuable information, students can gain insights into previous events and activities, aiding them in making informed decisions about future participation and engagement.

To ensure the sustainability and viability of the proposed solution, we recommend implementing profit-making approaches such as commission from registration fees, promotional charges, and ticket sales commission. These revenue streams will not only offset the costs associated with maintaining and operating the application but also provide funding for future enhancements and developments, ensuring the longevity and success of the platform in supporting the campus community's extracurricular endeavors.

4.0 Current business process (scenarios, workflow)

As we mentioned above, we have three specific users to use the system such as the regular user which is the students, organizer, and the administrator. Each of them has a different interface and process to work with the system.

Regular User

1. Existing user **login the system** with their username and password

   1.1 If they are new user, register with their name, matric number, username, password
   1.1.1 New users are required to fill up a survey to understand their interest and preferred club event or activities. They also can edit their profile details like username and portfolio.

2. Users enter to the **main page**. There are some advertisements and promotion banners for the upcoming club activities. Recommended activities based on user interest filterable by date, genre is listed on the main page.

   2.1 If the user chooses the **recommended list,** the user will enter the **event page**.
   2.1.1 Users are able to view the event details such as the title, requirement of joining the activity, cost, description of the activity, total capacity, etc.
   2.1.1.1 If the user chooses to enroll in the activity, the user will redirect to the payment portal (if the user enrolls to a paid event).

   2.2 If the user chooses the **club page**,
   2.2.1 The user is able to view the club description and profile, follow the club page for notifications, view the event organized.

   2.3 If the user chooses the **user profile page**,
   2.3.1 Users manage to view their own profile and portfolios. They also can view the joined events and manage enrollments of the upcoming activities.

Organizer

1. Existing organizer **login** with their username and password.
   1.1 If they are new organizers, they require their profile details, username and password.

2. Organizer enters the main page.
   2.1 If the organizer enters the **event creation page**, (if they want to create an event)

2.1.1 They are able to create new events with details like title, description, requirement, cost, capacity, date and time. They can also specify the event categories and upload event images.

2.2 If the organizer chooses the **event management options,**
2.2.1 They are able to edit the event details, manage events enrollments by approving or rejecting requests, track the attendance and communicate with the participants by sending out notice or notification.
2.2.2 They are also able to view the event statistics and manage the ticket sales for the paid event.

2.3 If the organizer enter the **club management page**,
2.3.1 They are able to edit profile and club details.
2.3.2 They are also able to track the club member, assign the club administration and manage the member's club status.

2.4 If the organizer enter to the **advertisement management page,**
2.4.1 They are able to manage the advertisement and promotion about the club and club events that show on the user's main menu.
2.4.1.1 Create, edit, and delete banners for promoting activities.
2.4.2 Access data analytics and reports on user engagement, club popularity, etc.

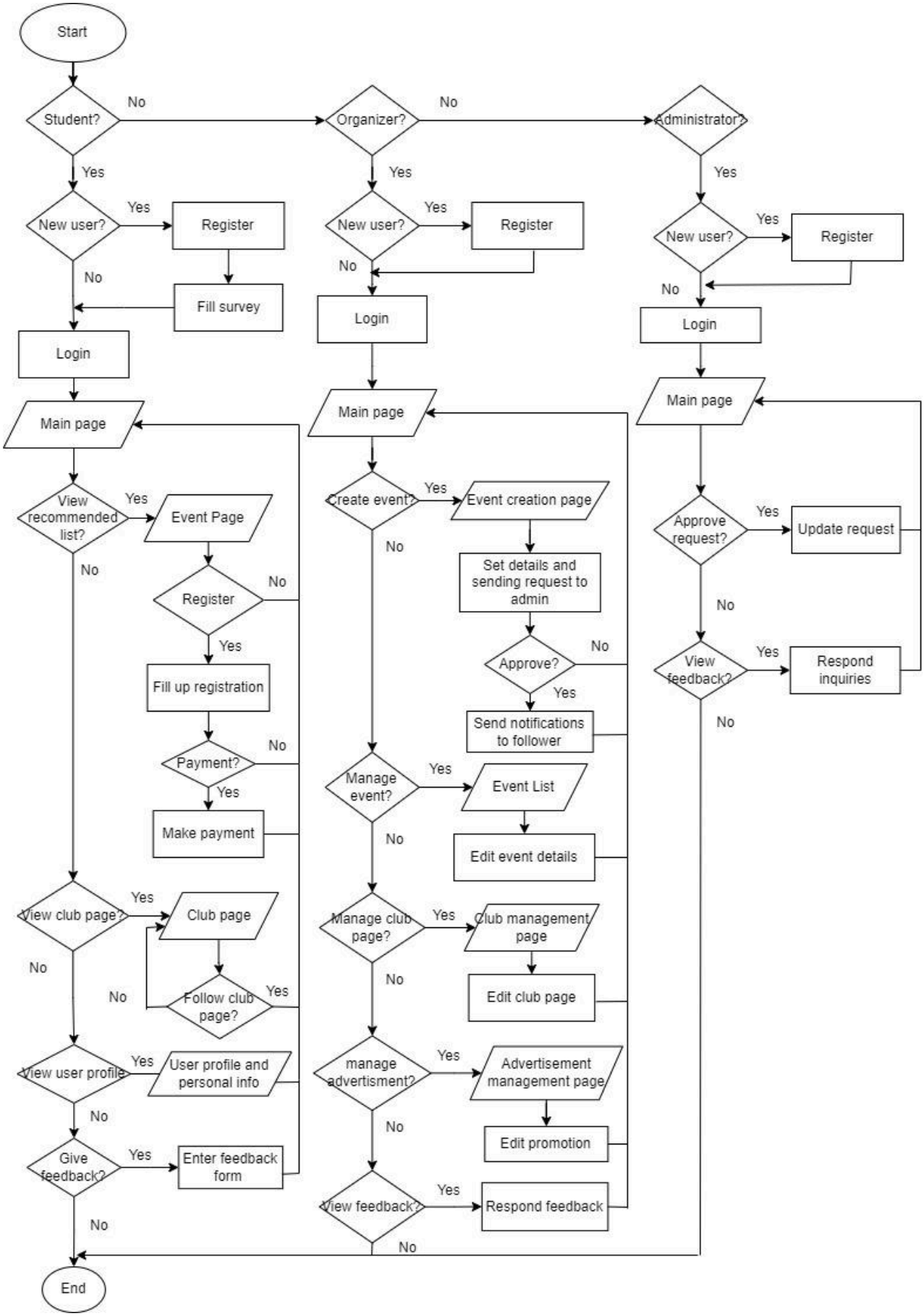
2.5 If the organizer enter to the **feedback and support page,**
2.5.1 They are able to review the user's feedback regarding the events or activities.
2.5.2 They able to respond to the inquiries and address issues related to the events and club

Administrator

1. Existing admin login with their username and password.
   1.1 If they are a new admin, they need to set up profile details, username, password.

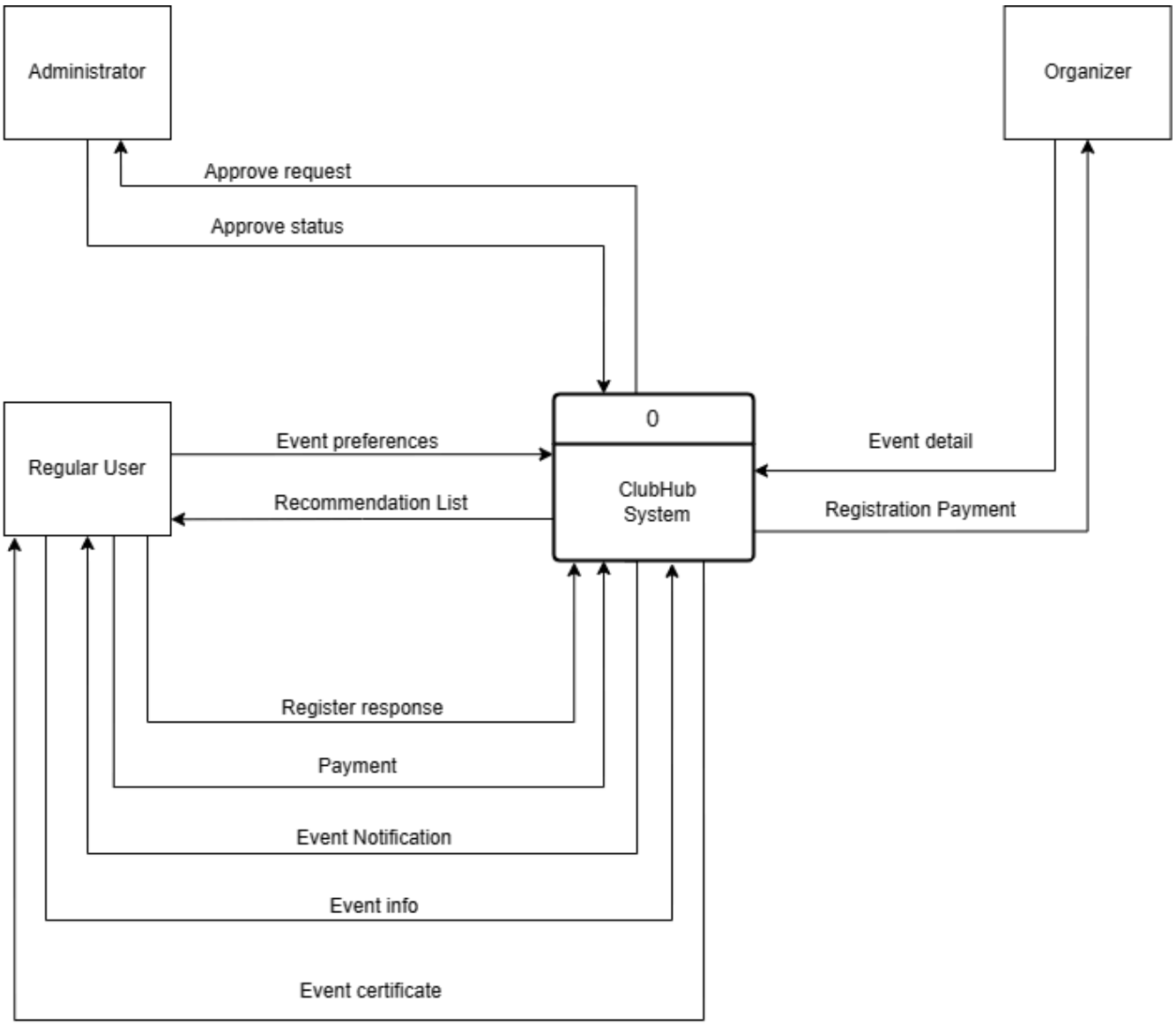
2. When they enter to the **administrator page,**
   2.1 They are able to view and manage user profiles, events, and club profiles.
   2.2 They can approve promotion requests by the organizer.
   2.3 They can also view site statistics and manage payments system

3. When they choose the **feedback and support page,**
   3.1 They can receive user feedback and support requests regarding the system.
   3.2 They can respond to inquiries and address issues to improve the user experience.

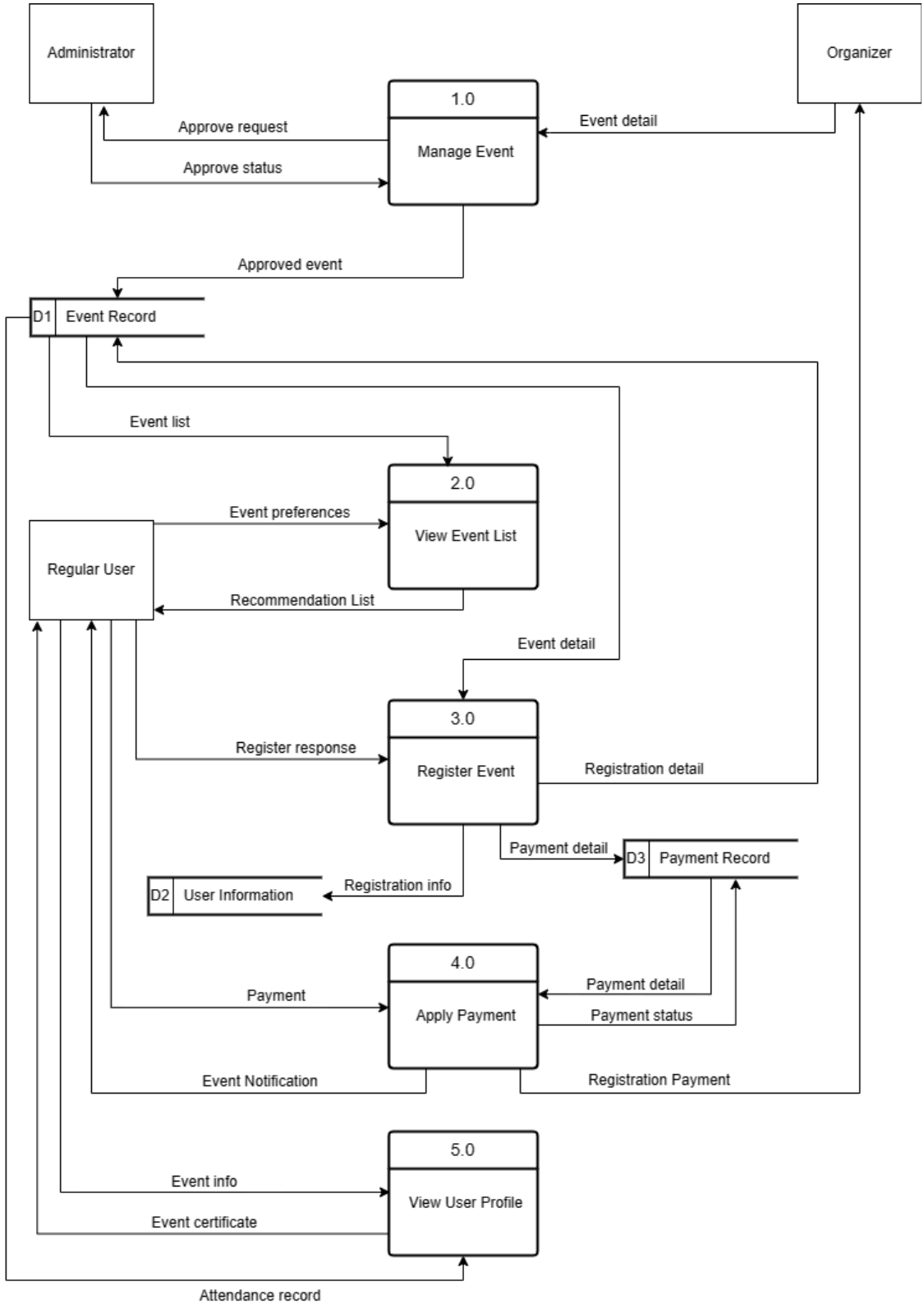

Start
Student?
No
Organizer?
No
Administrator?
Yes
New user?
Yes
Register
Fill survey
No
Login
Main page
View recommended list?
Yes
Event Page
Register
No
Yes
Fill up registration
Payment?
No
Yes
Make payment
View club page?
Yes
Club page
Follow club page?
Yes
No
View user profile
Yes
User profile and personal info
No
Give feedback?
Yes
Enter feedback form
No
End
Create event?
Yes
Event creation page
Set details and sending request to admin
Approve?
No
Yes
Send notifications to follower
Manage event?
Yes
Event List
Edit event details
No
Manage club page?
Yes
Club management page
Edit club page
No
manage advertisment?
Yes
Advertisement management page
Edit promotion
No
View feedback?
Yes
Respond feedback
No
Approve request?
Yes
Update request
No
View feedback?
Yes
Respond inquiries
No

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

5.0.1 Context Diagram

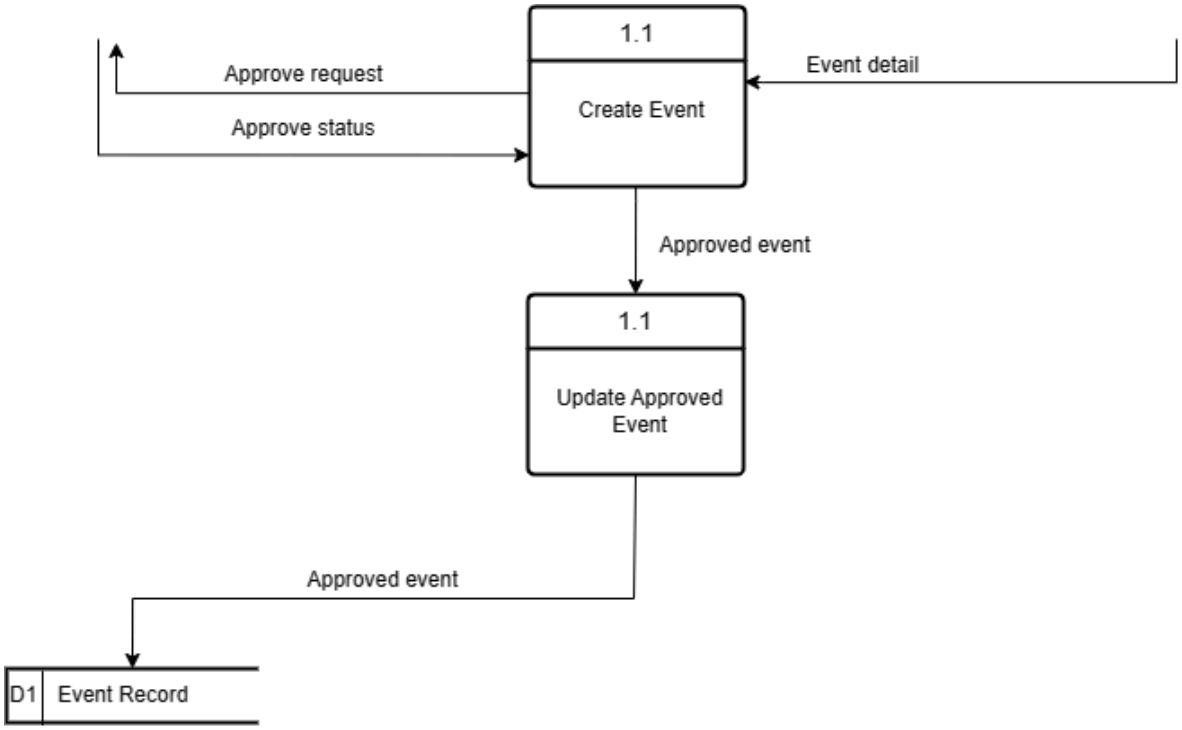


5.0.2 Level 0 Diagram

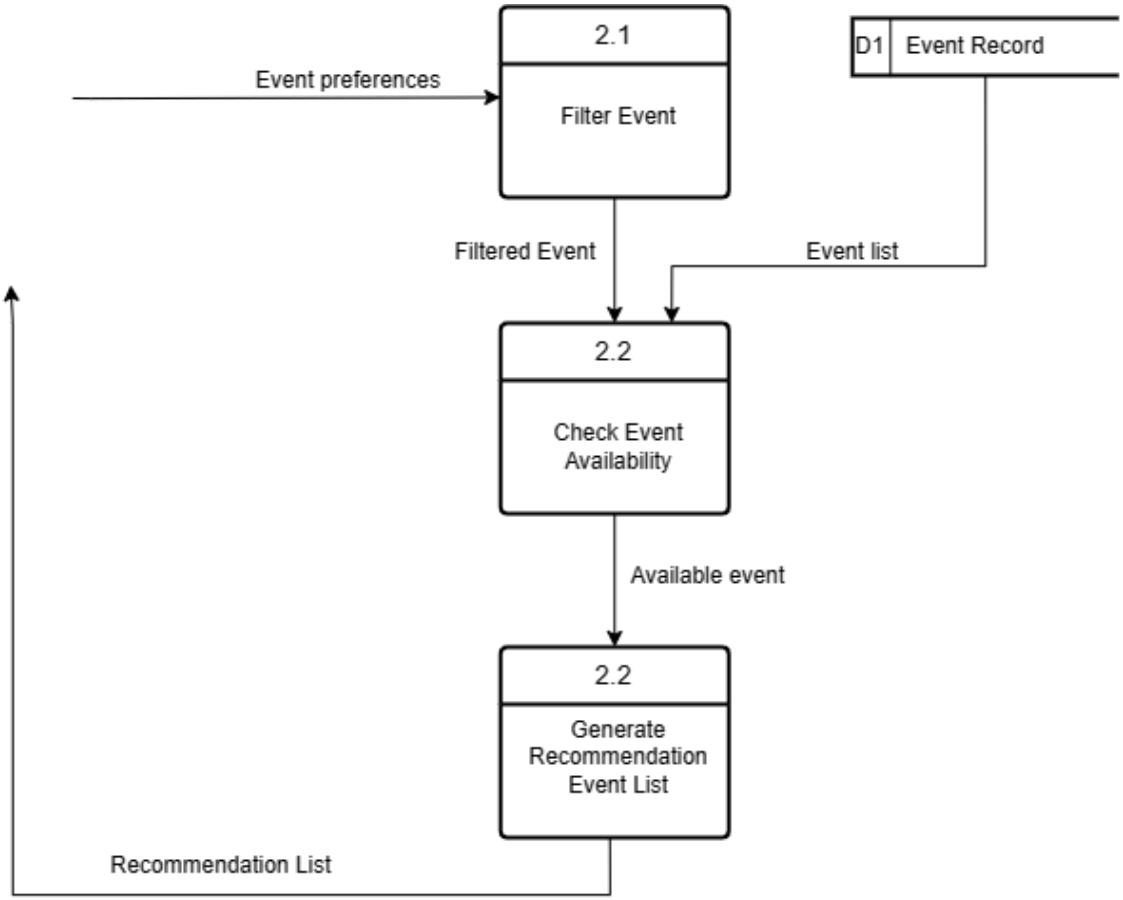


5.0.3 Child Diagram

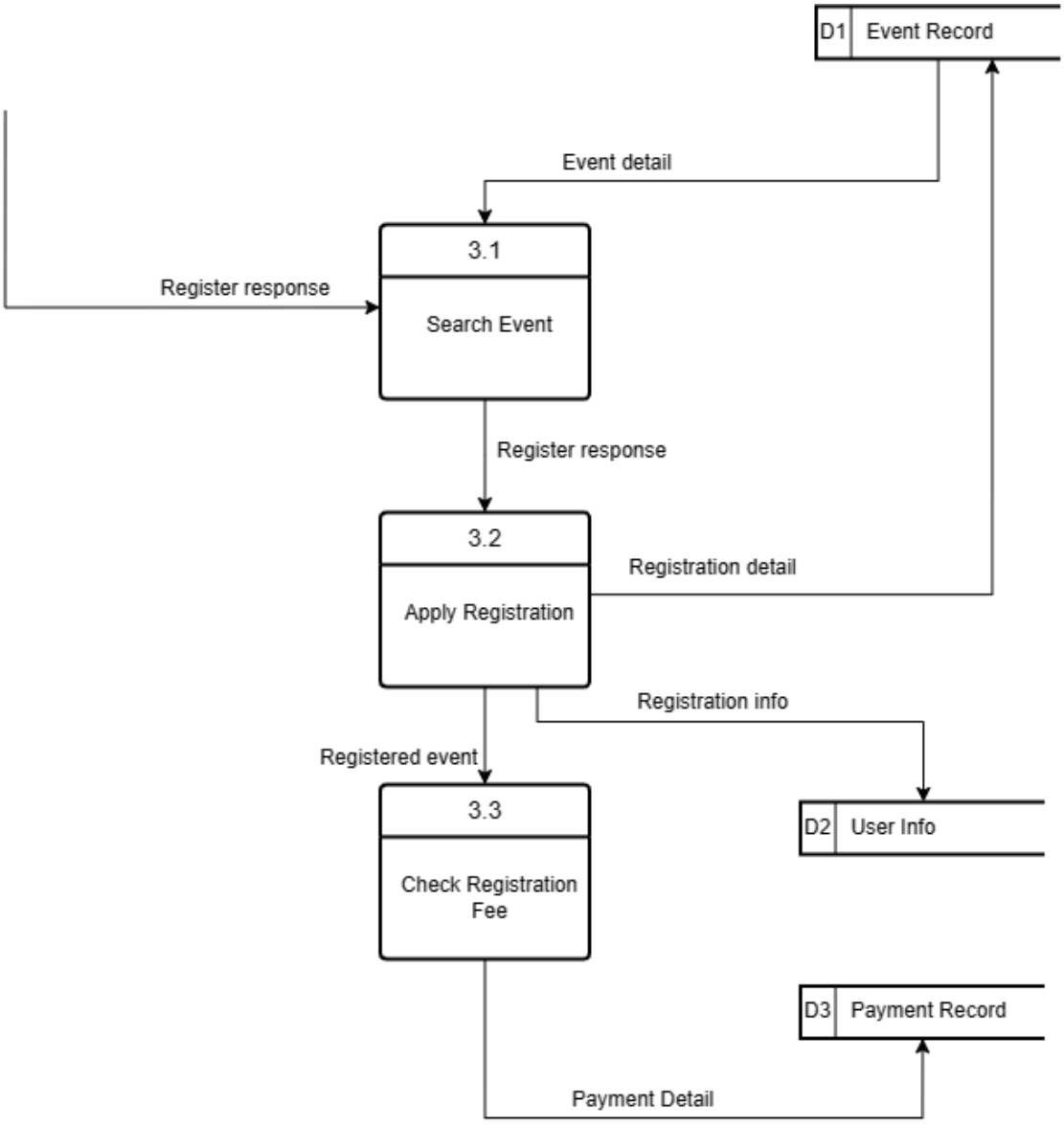
5.0.3.1 Process 1: Manage Event



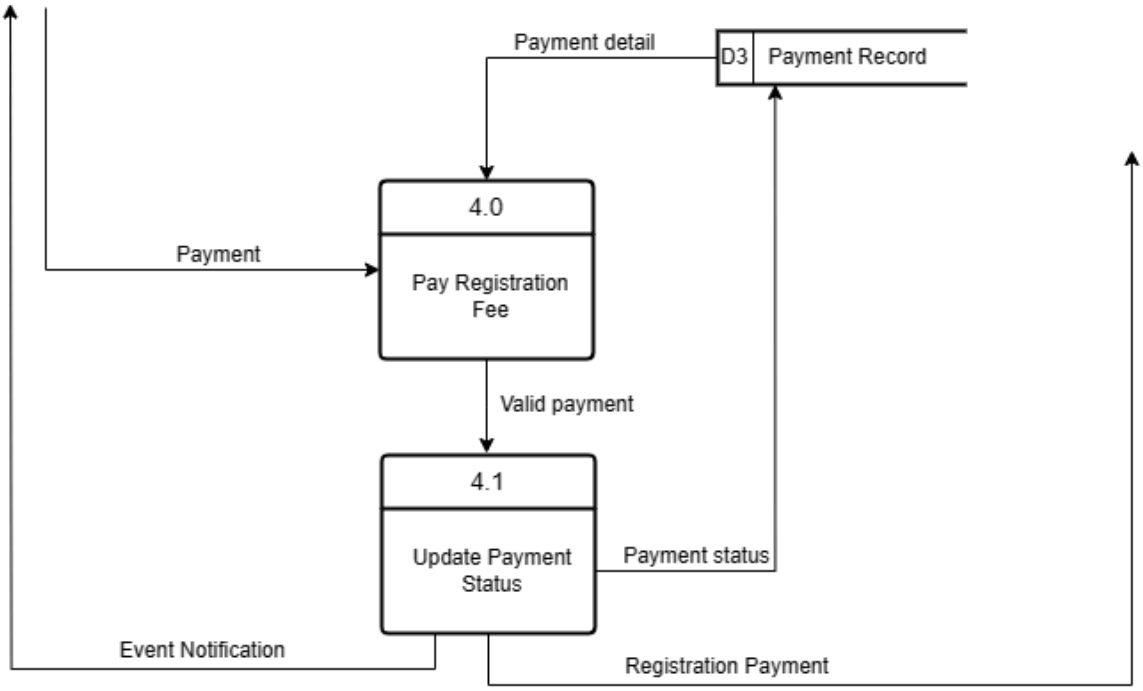
5.0.3.2 Process 2: View Event List



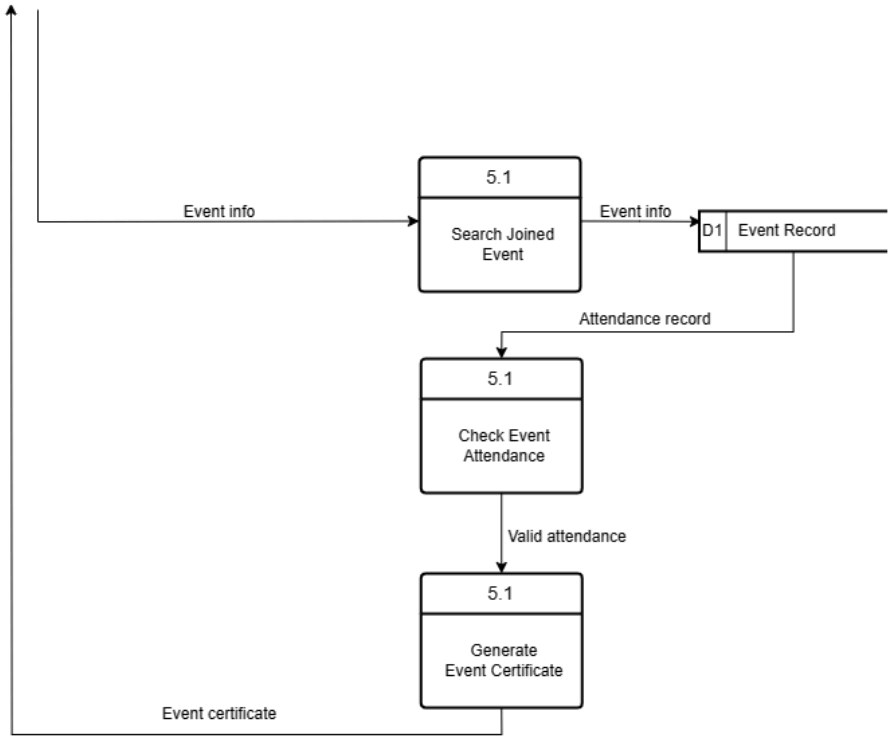
5.0.3.3 Process 3: Register Event



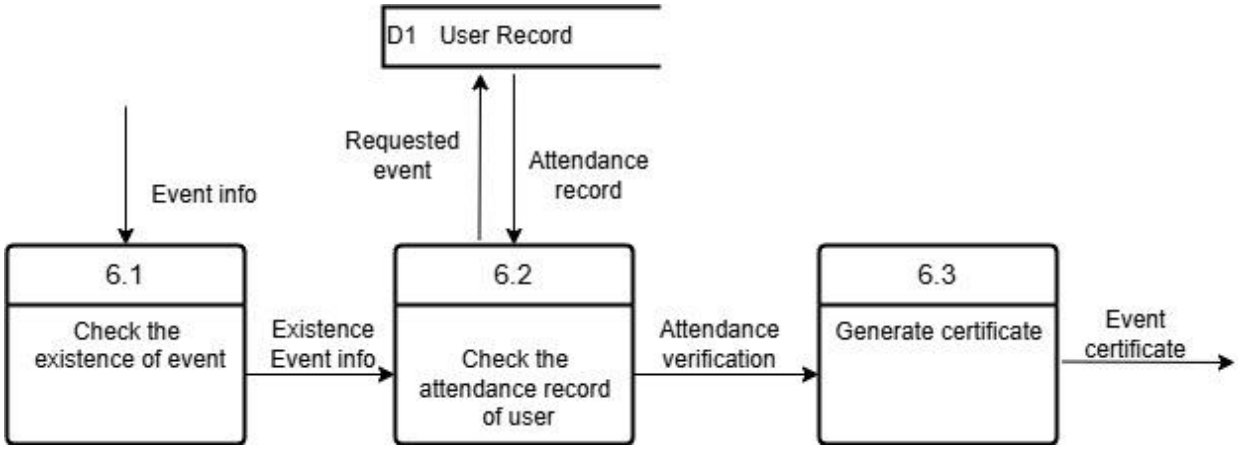
5.0.3.4 Process 4: Apply Payment



5.0.3.5 Process 5: View User Profile



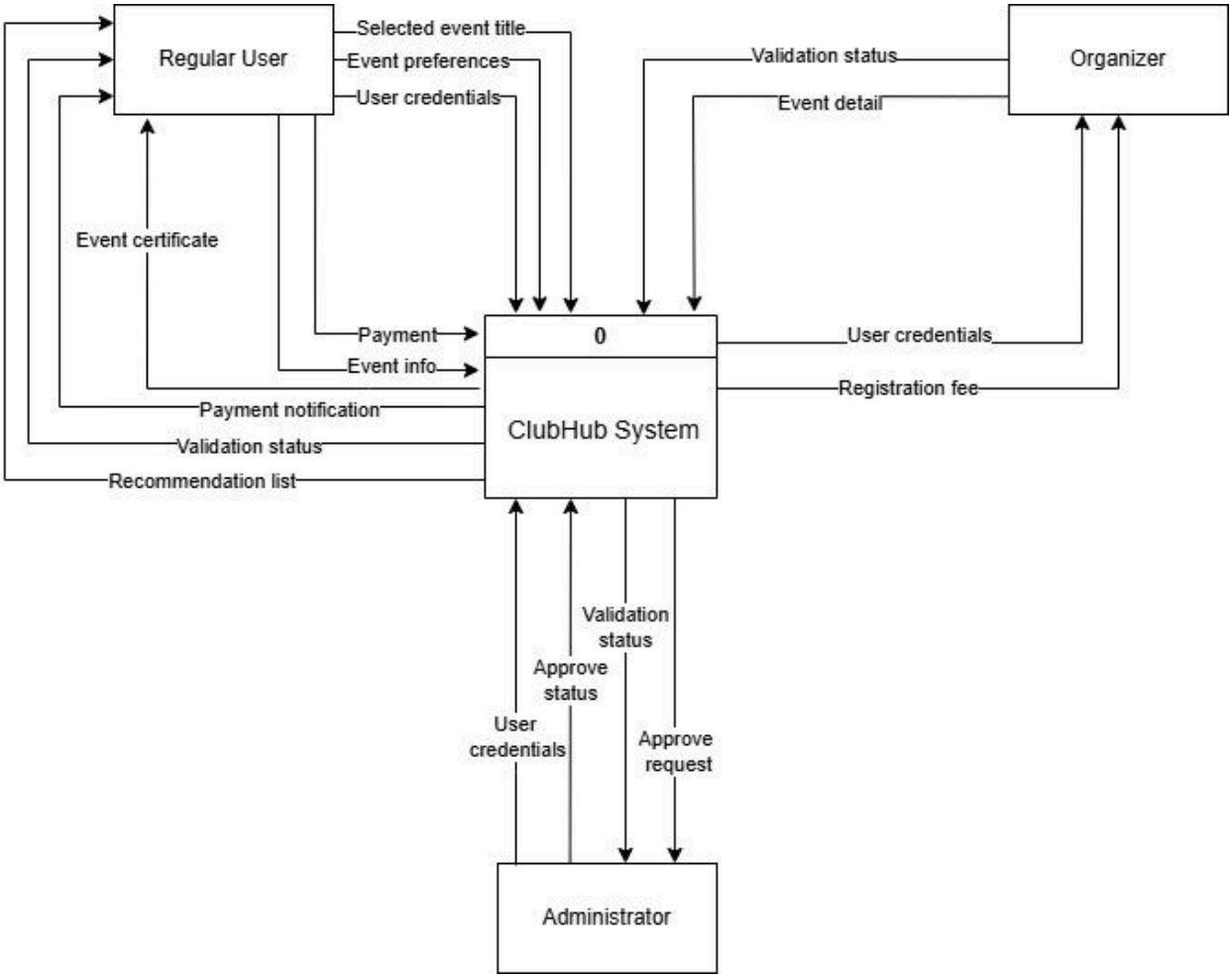
5.0.3.6 Process 6: View User Profile



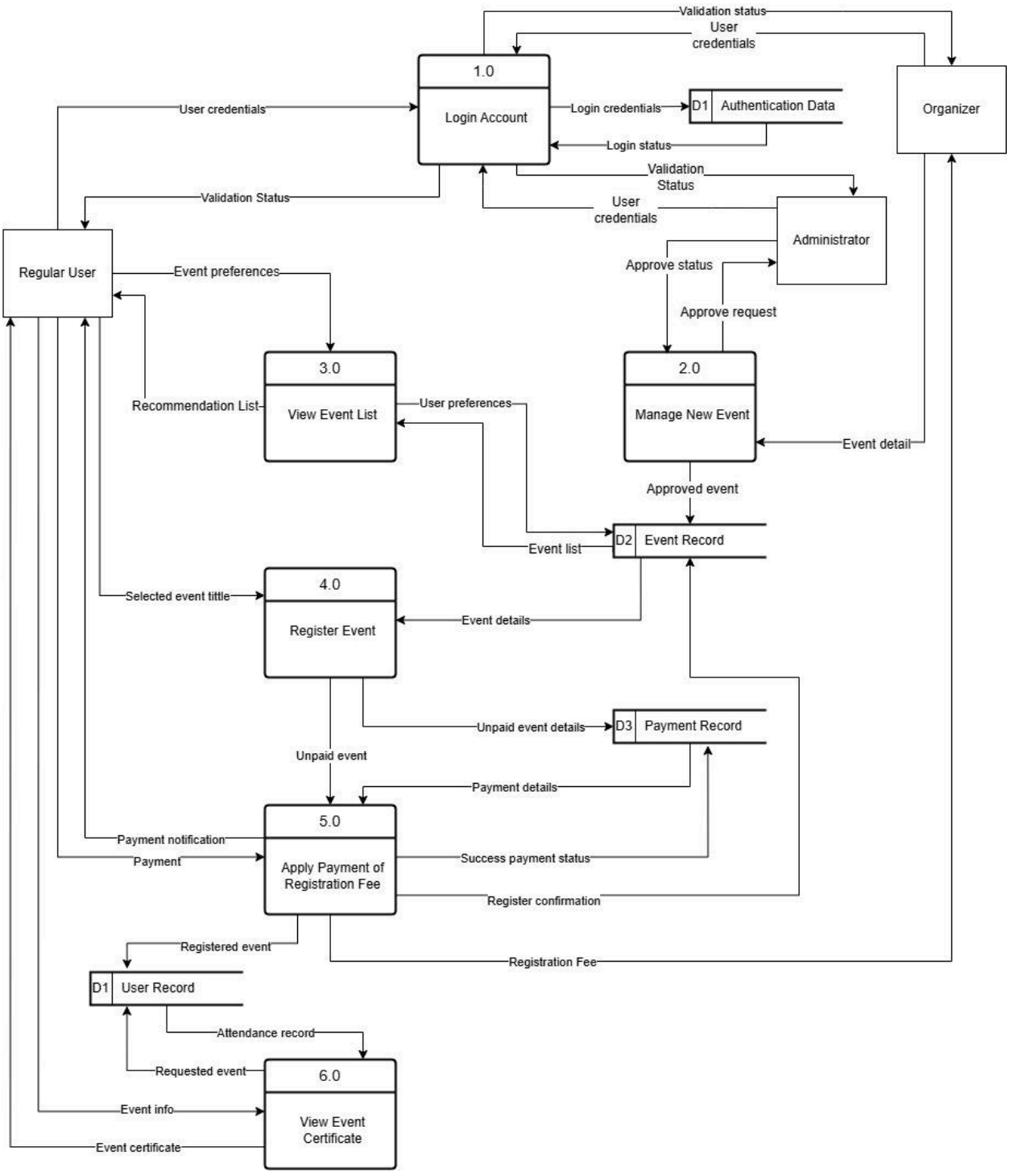
6.0 System Analysis and Specification

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

Context Diagram

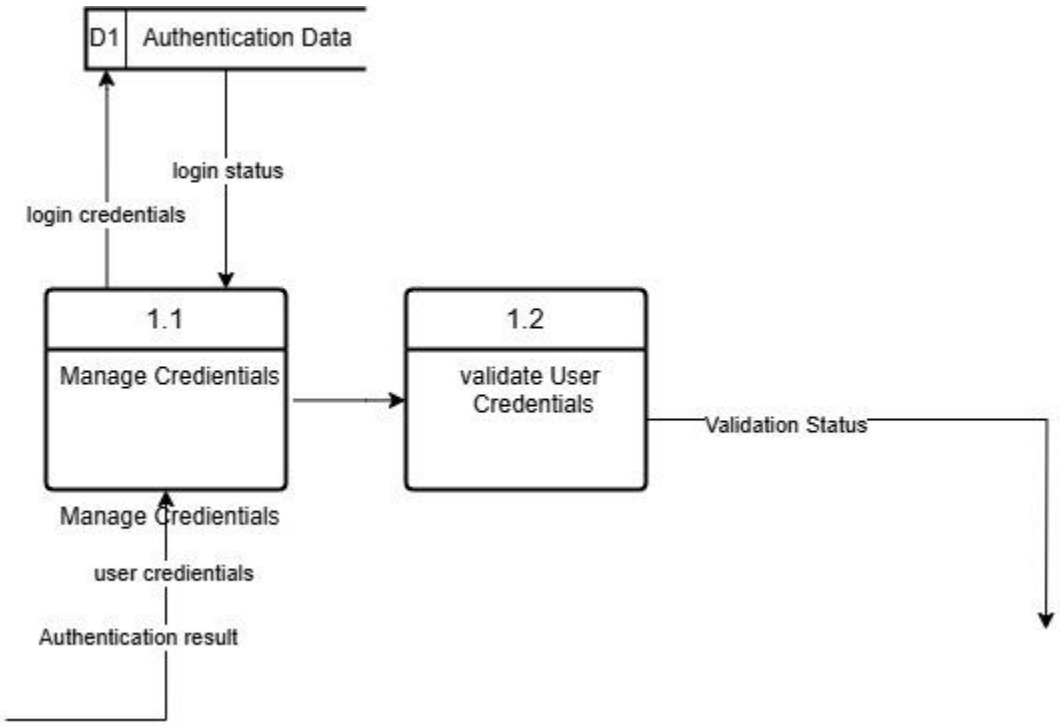


Level 0 Diagram

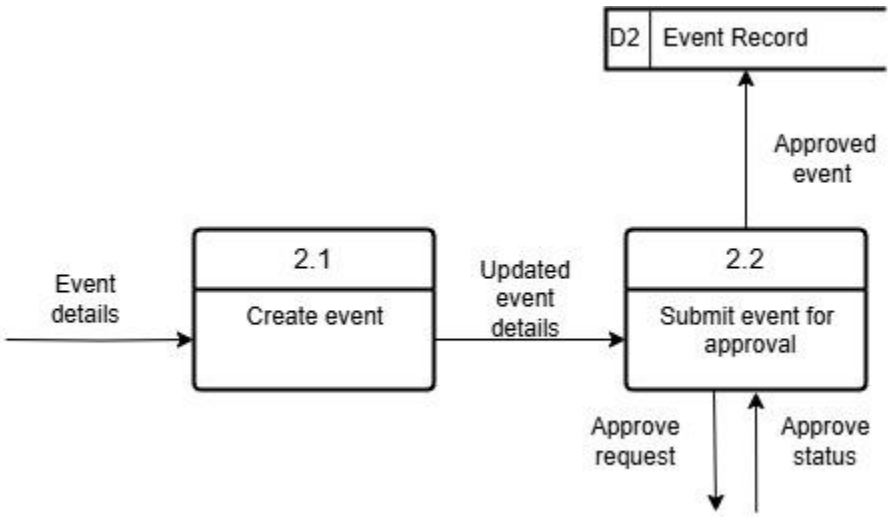


Level 1 Diagram (Child diagram)

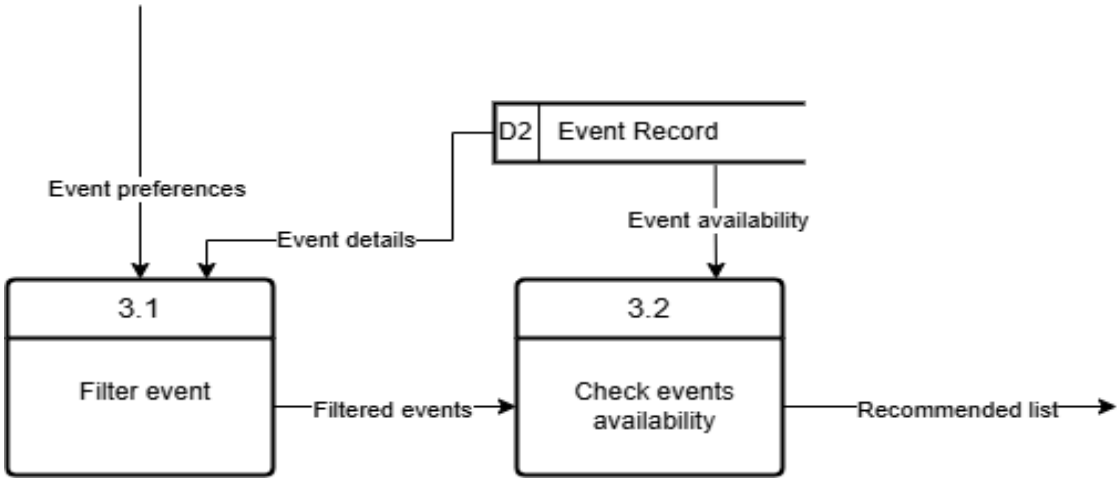
Process 1.0 Login account



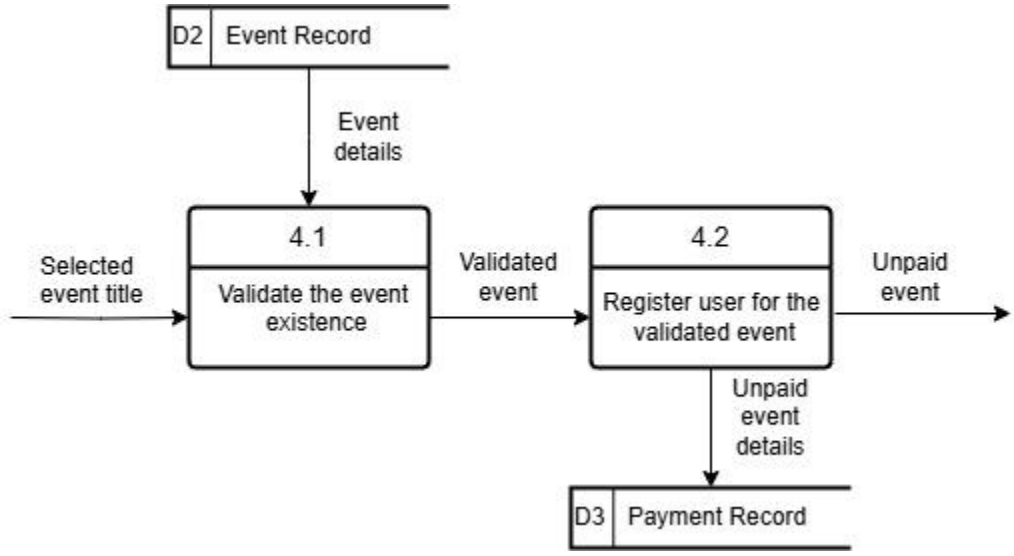
Process 2.0 Manage event



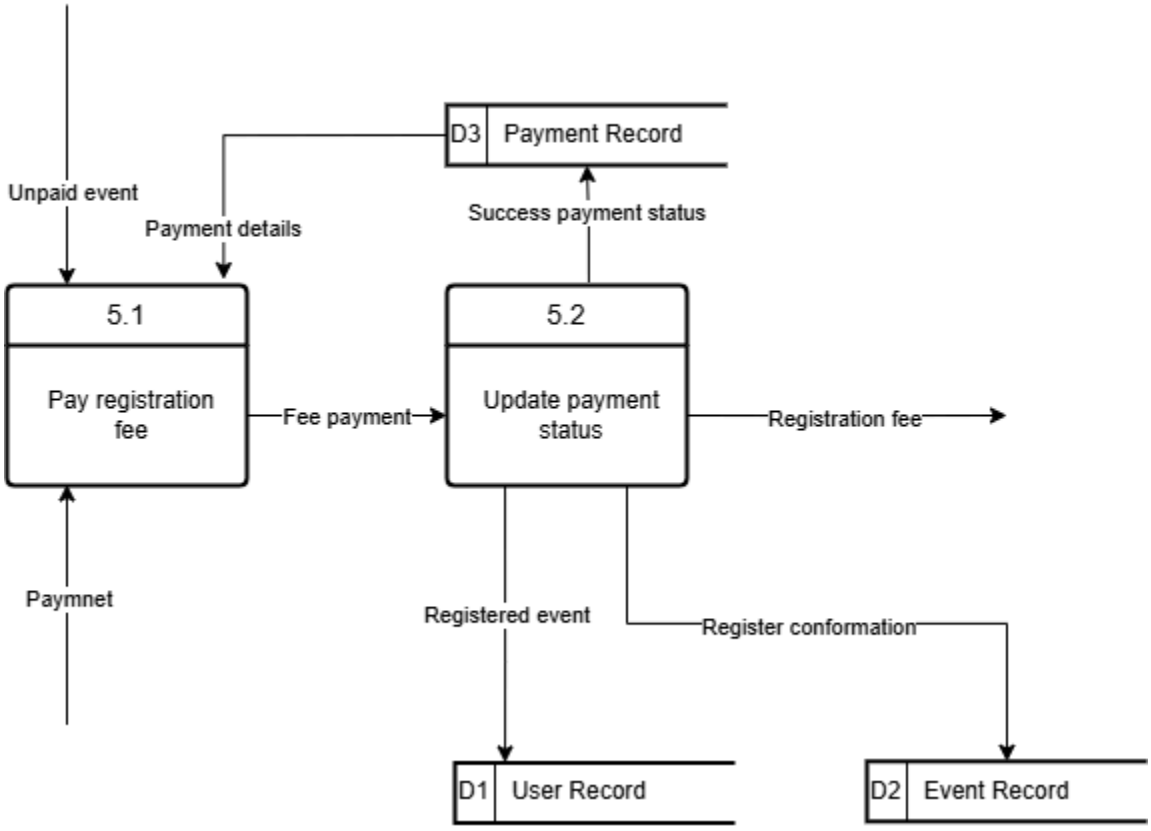
Process 3.0 View event list



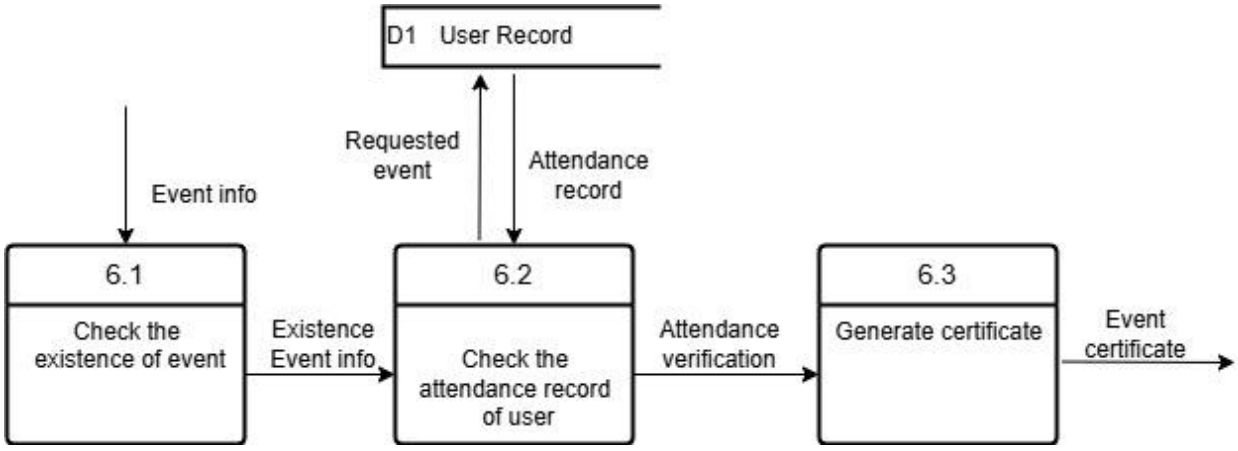
Process 4.0 Register event



Process 5.0 Apply payment for registration fee



Process 6.0 View event certificate



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

6.2.1 Process Specification for child diagram

Child diagram 1 : Login Account

DO
READ User Credientials
SEND Login Credie
VALIDATE Credentials
BEGIN IF
IF Credential status = TRUE
  THEN Send validation
ELSE
  PRINT Incorrect Credentials
ENDIF

Child diagram 2 : Manage new event

DO
READ Event details
UPDATE approval
BEGIN IF
IF Event approval = TRUE
  THEN UPDATE event details
  STORE event details
ELSE
  PRINT event rejected
ENDIF

Child diagram 3 : View Event list

```
DO
READ Event Preferences
READ Event Records
BEGIN IF
IF Event Preferences = event Record details
   BEGIN IF
   IF Event Availability = TRUE
      THEN DISPLAY event
ELSE
   DISPLAY NULL
ENDIF
```

Child diagram 4: Register event

```
DO
READ selected event title
DO While EOF Event records == FALSE
   READ Event Records
   BEGIN IF
      IF selected event title == event Record title
      INCREMENT Event attendees
      UPDATE Unpaid event details
      STORE unpaid event detail
   ELSE
      DISPLAY NULL
   ENDIF
ENDWHILE
```

Child diagram 5 : Apply Payment for Registration fee

```
DO
READ Unpaid event details
Read payment details
READ payment
BEGIN IF
IF payment status == Successful
   THEN STORE payment status
   Update event record
   SEND payment to organizer
ELSE
   PRINT payment unsuccessful
ENDIF
```

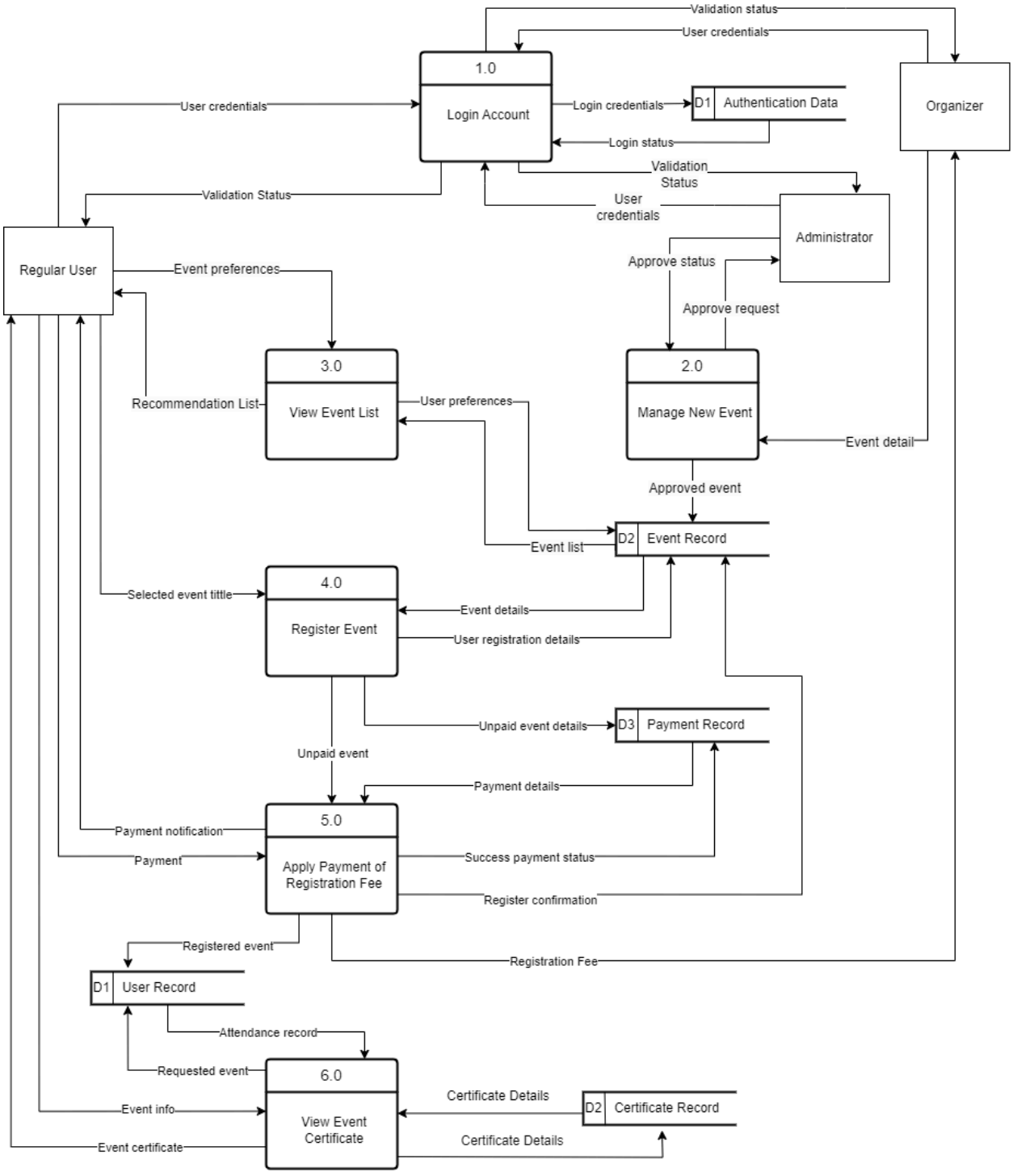
Child diagram 6: View Certificate

```
DO
READ Event info
Read Event Records
READ payment
DO While EOF Event Records
   BEGIN IF
   IF Event title == event record title
      BEGIN IF
      IF User Name = Attendees Name
         GENERATE E-Certificate
      ELSE
         PRINT Event attendees not found
   ELSE IF
      PRINT Event information not found
   ENDIF
ENDWHILE
```

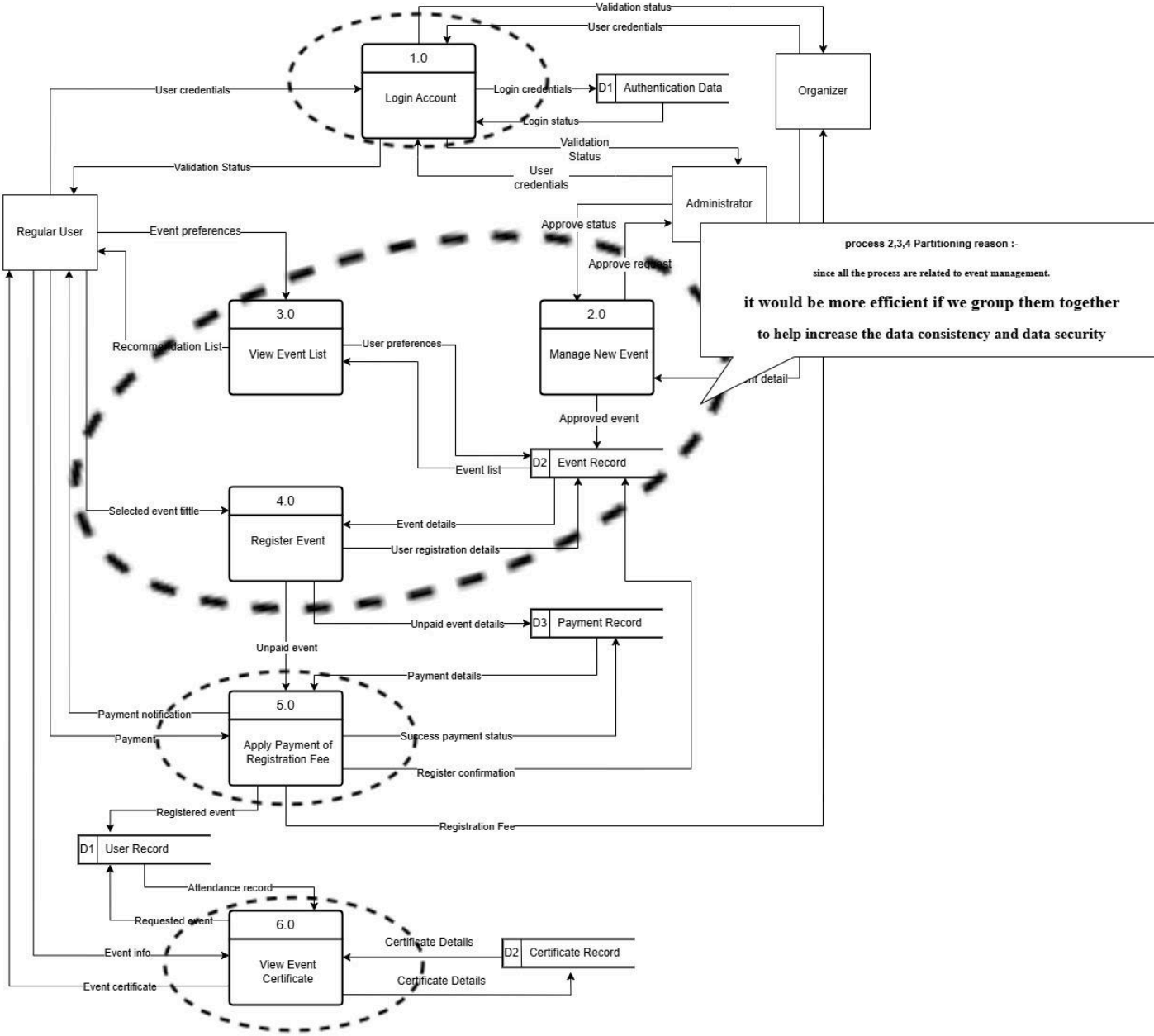
7.0 Physical System Design

7.1 Physical DFD TO-BE system

Level 0 Diagram

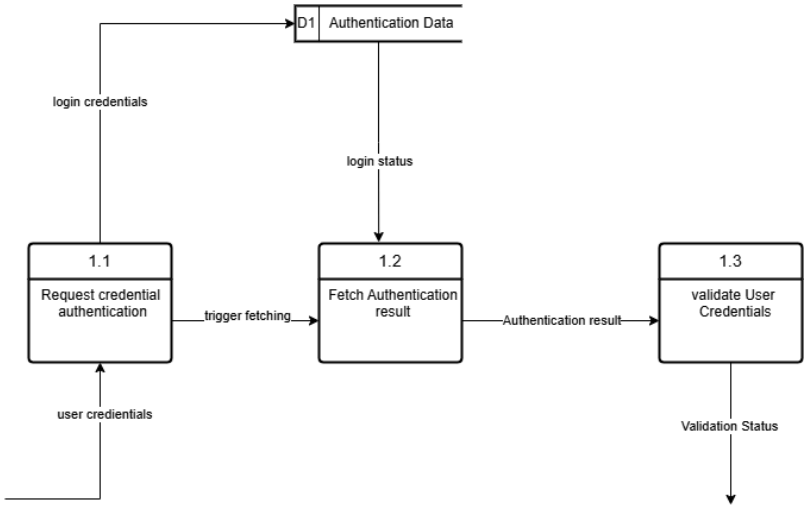


Partition

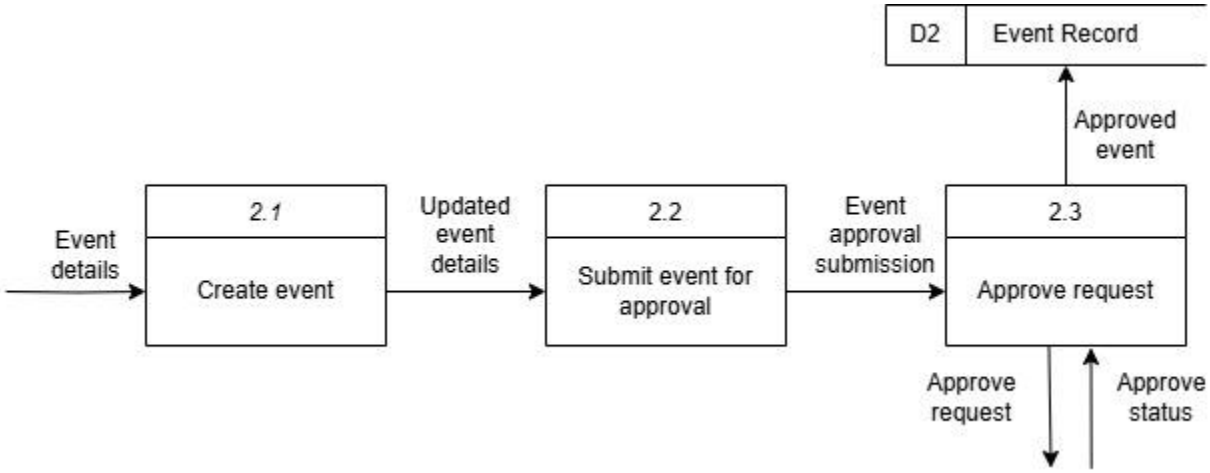

Validation status
User credentials
1.0
Login Account
Login credentials
D1 Authentication Data
Organizer
User credentials
Login status
Validation Status
Validation Status
User credentials
Administrator
Regular User
Event preferences
Approve status
Approve request
process 2,3,4 Partitioning reason :-
since all the process are related to event management.
it would be more efficient if we group them together
to help increase the data consistency and data security
3.0
View Event List
Recommendation List
User preferences
2.0
Manage New Event
Approved event
D2 Event Record
Event list
4.0
Register Event
Selected event tittle
Event details
User registration details
D3 Payment Record
Unpaid event details
Unpaid event
Payment details
5.0
Apply Payment of Registration Fee
Payment notification
Payment
Success payment status
Register confirmation
Registered event
Registration Fee
D1 User Record
Attendance record
Requested event
6.0
View Event Certificate
Certificate Details
D2 Certificate Record
Certificate Details
Event info
Event certificate

Child Diagram

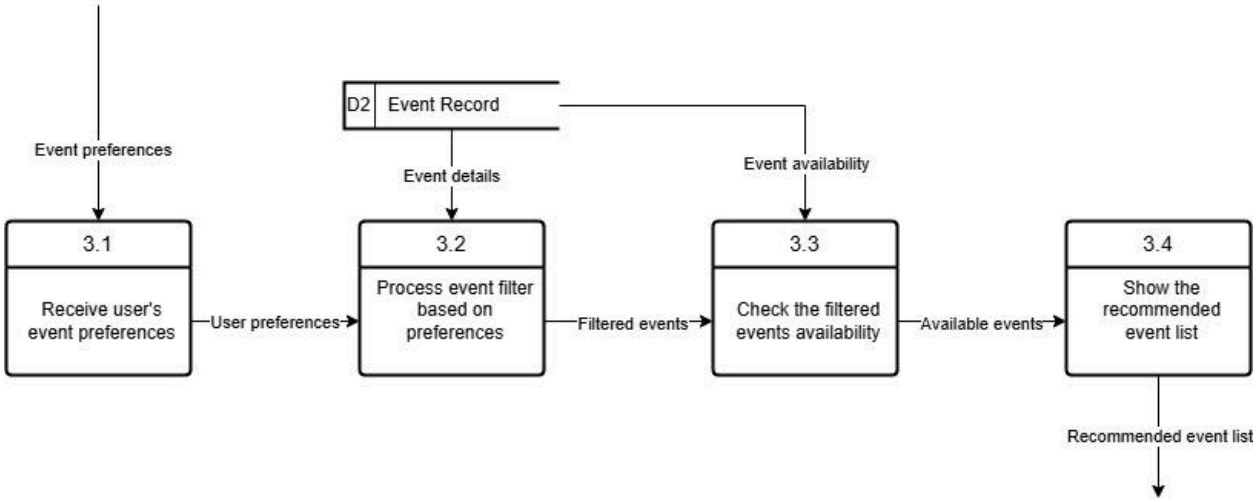
Process 1.0 Login account



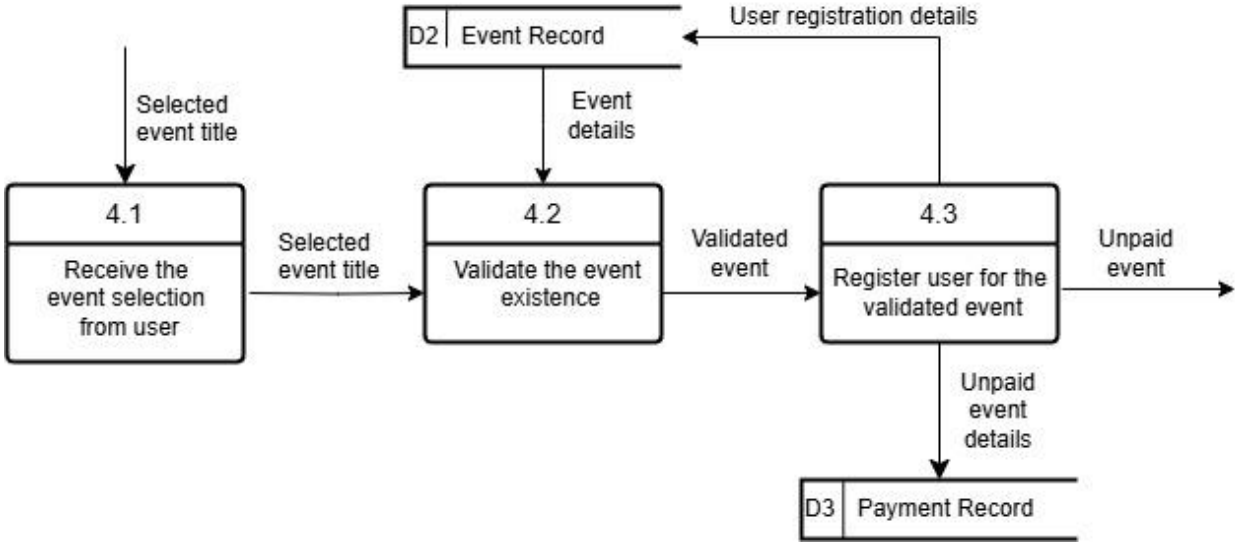
Process 2.0 Manage event



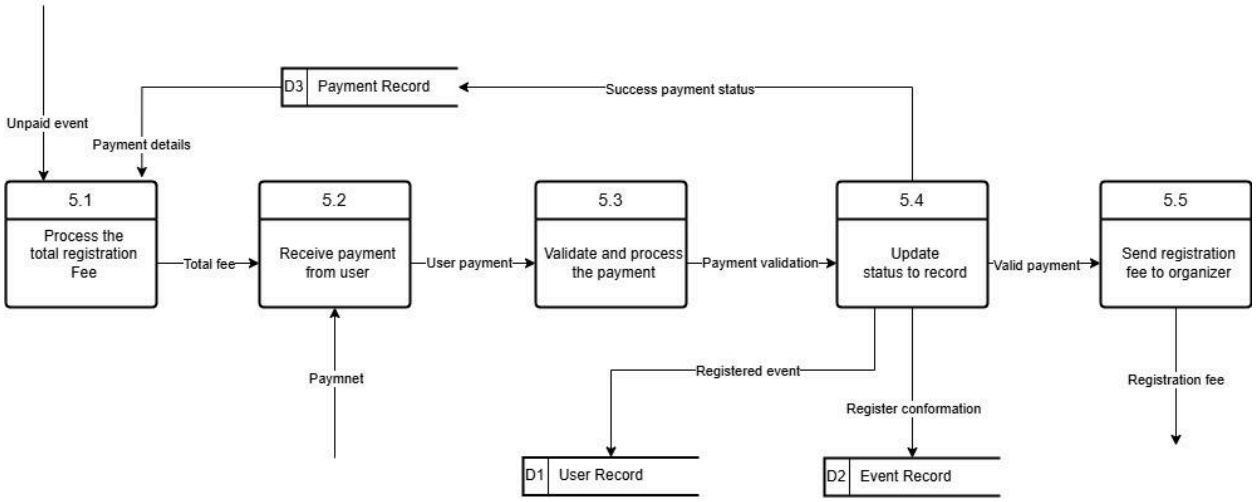
Process 3.0 View event list



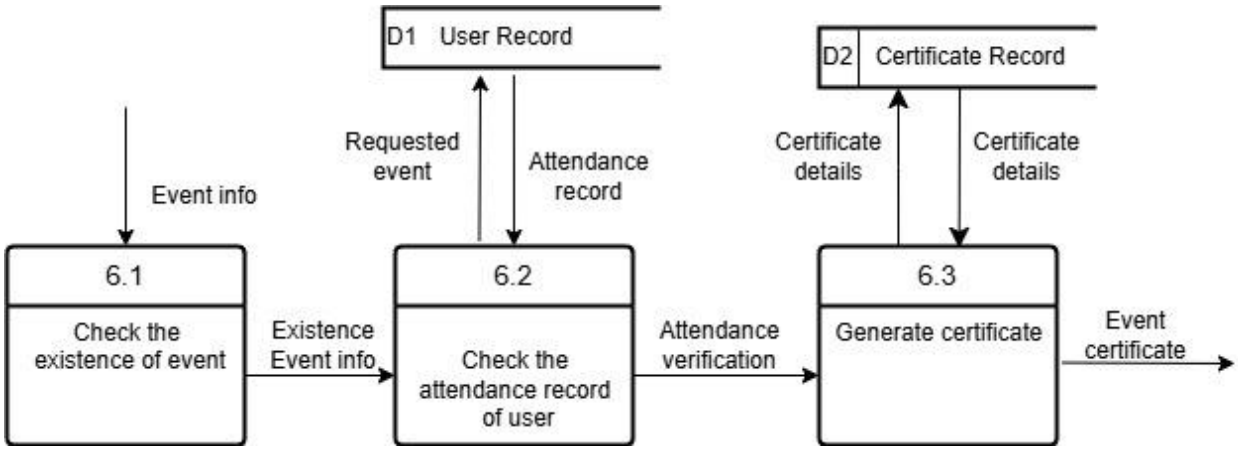
Process 4.0 Register event



Process 5.0 Apply payment for registration fee



Process 6.0 View event certificate



CRUD Matrix

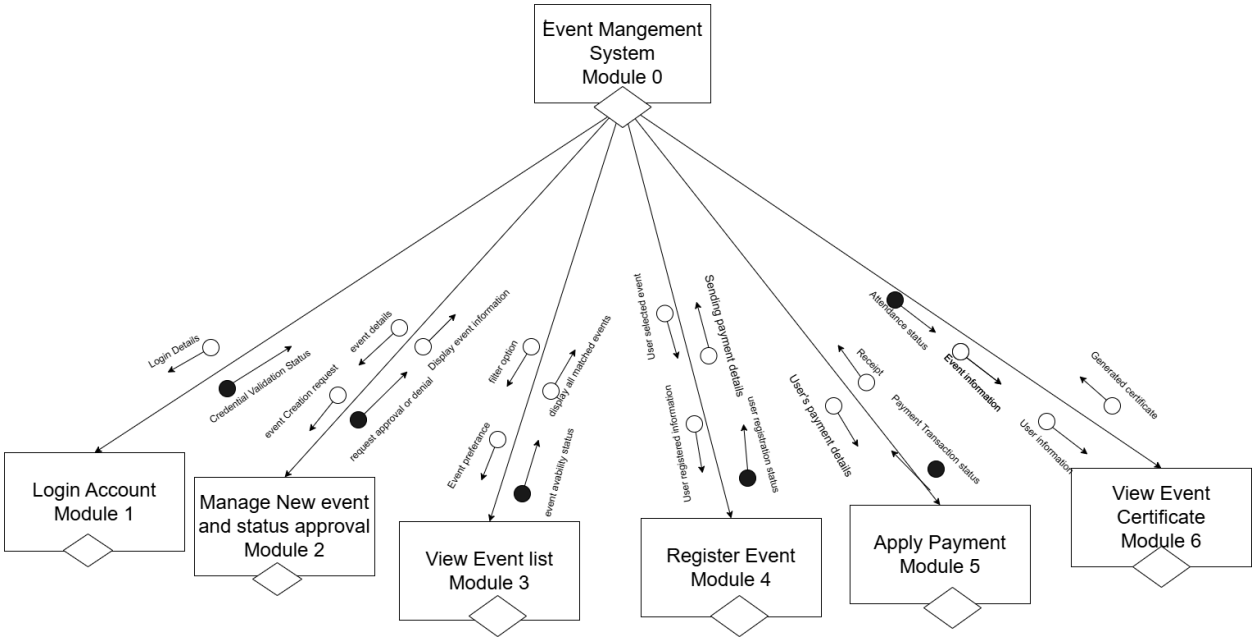
Activity	Regular User	Organizer	Administrator
Login Account	CRU	CRU	CRUD
Manage New Event		CRU	CRUD
View Event List	R	RU	RUD
Register Event	CRU	RU	RUD
Apply Payment for Registration Fee	CRU	CRU	CRUD
View Event Certificate	R	R	RUD

Event Response Table

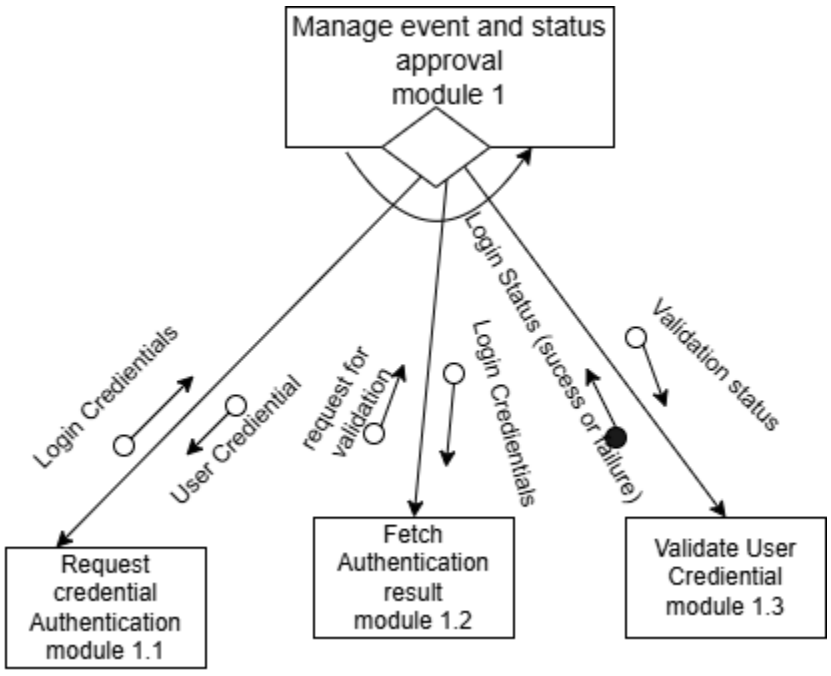
Event	Source	Trigger	Activity	Response	Destination
Login Account	Regular user, Organizer, Administrator	User credentials	Login account	Successful or unsuccessful login status	Regular user, Organizer, Administrator, Authentication Data
Event Created	Organizer, Administrator	Event details, event category, event images	Manage event and status approval	Notify users, update event list	Regular user, Event Record
Event Registration	Regular user	User details, event details	Register event	Update registration information	Regular user, Administrator Organizer
Event Payment Applied	Regular user	Payment information	Apply payment for the event	Verify payment, update payment status	Organizer, Admin, Payment record

Event	Source	Trigger	Activity	Response	Destination
Event Status Approved	Admin	Event details	Approve or reject event status	Update event status, notify users	Regular user, Organizer, Event Record
View Event List	Regular user, Admin, Organizer	Event details	View event list	Display event list	User interface
View/Update User Profile	Regular user, Admin, Organizer	User details	View user profile	Display user profile	User profile, User Information
Event Notification Sent	Organizer, Admin	Notification requirement	Send notification via notification service	Notification pop up message	Regular user
View Event Certificate	Regular User	Event info, Attendance record	Event Certificate Generated	View the event certificate	Regular User, User Record, Certificate Record
Attendance Recorded	Organizer, Admin	Event details, user details	Manage attendance records	Update attendance records	Event record
Payment Detail Accessed	Regular User, Organizer, Admin	Payment details, user details	View payment details	Display payment details	Payment record

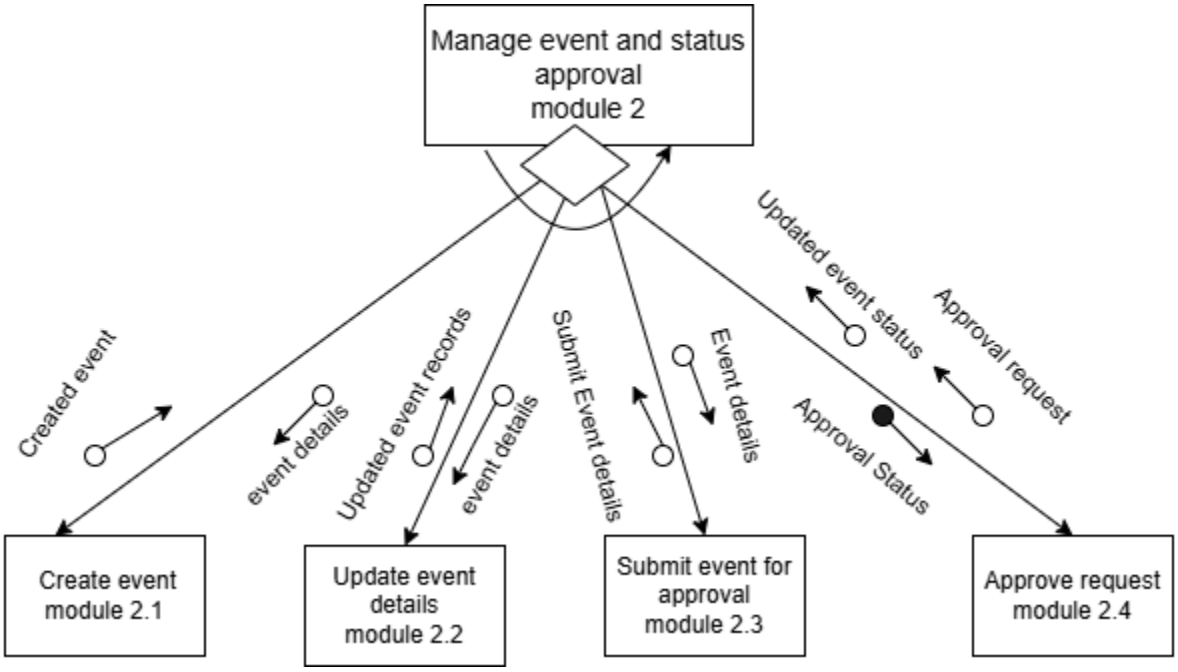
Structure chart for module 0



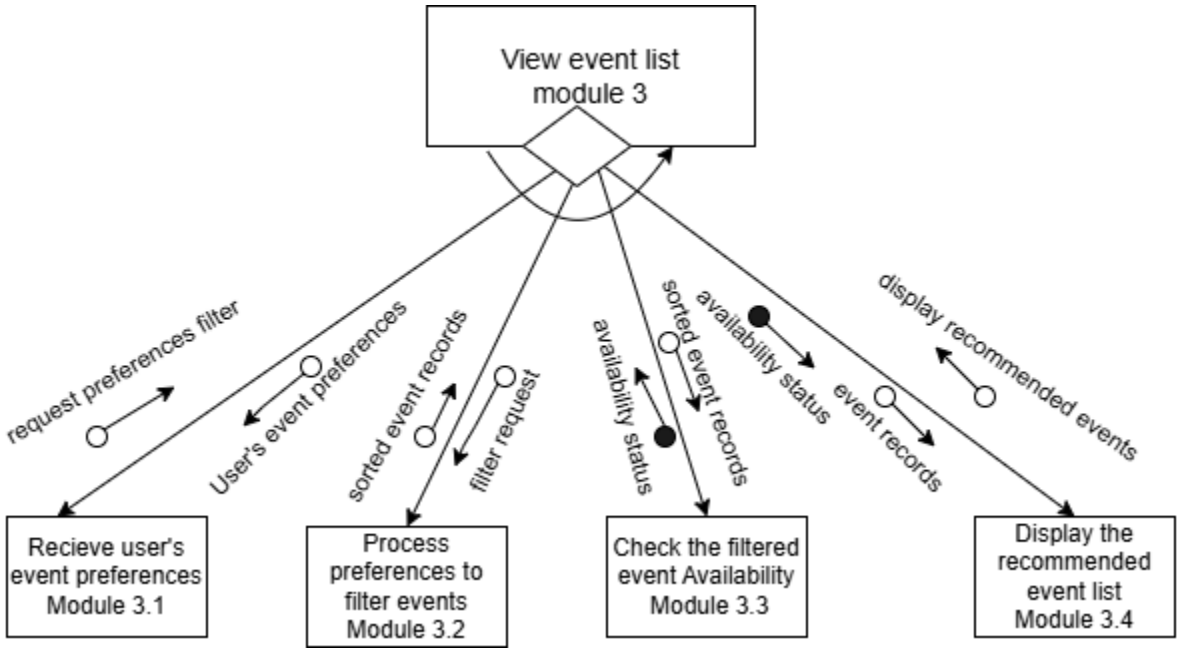
Structure Chart for module 1



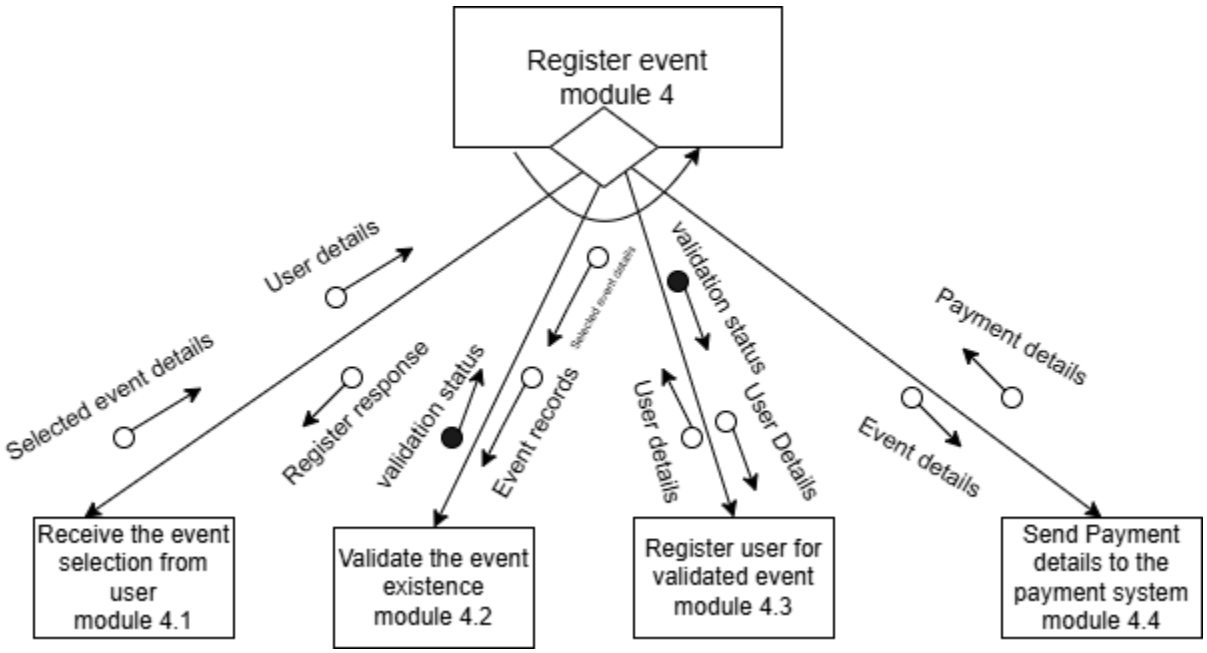
Structure Chart for module 2



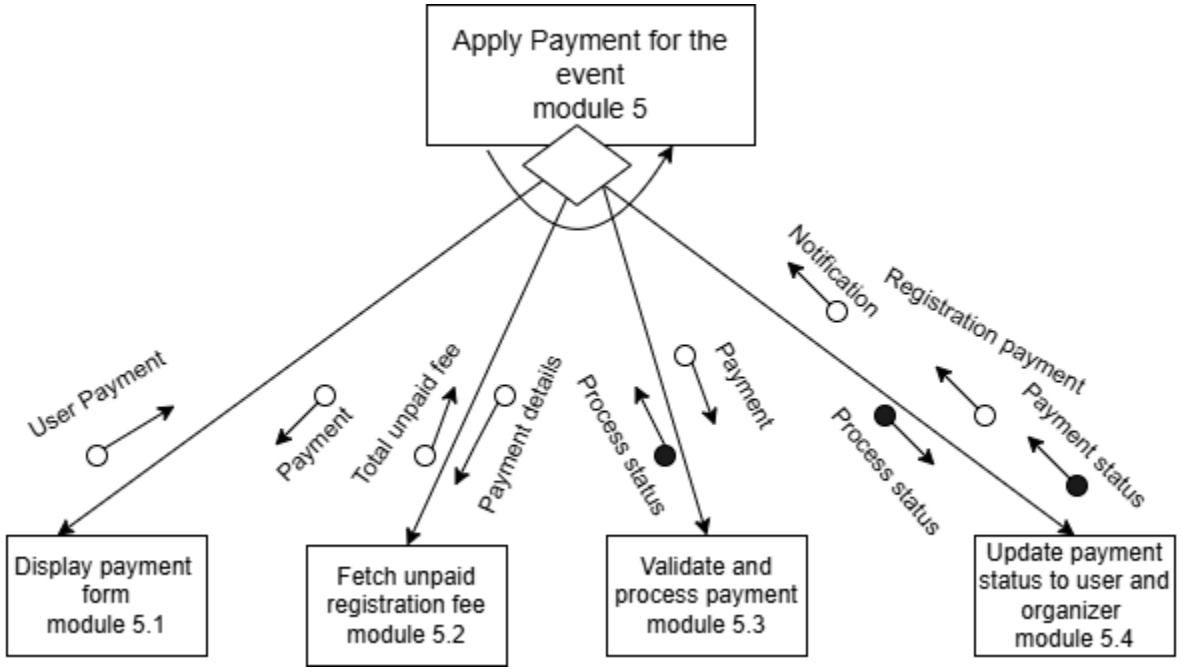
Structure Chart for module 3



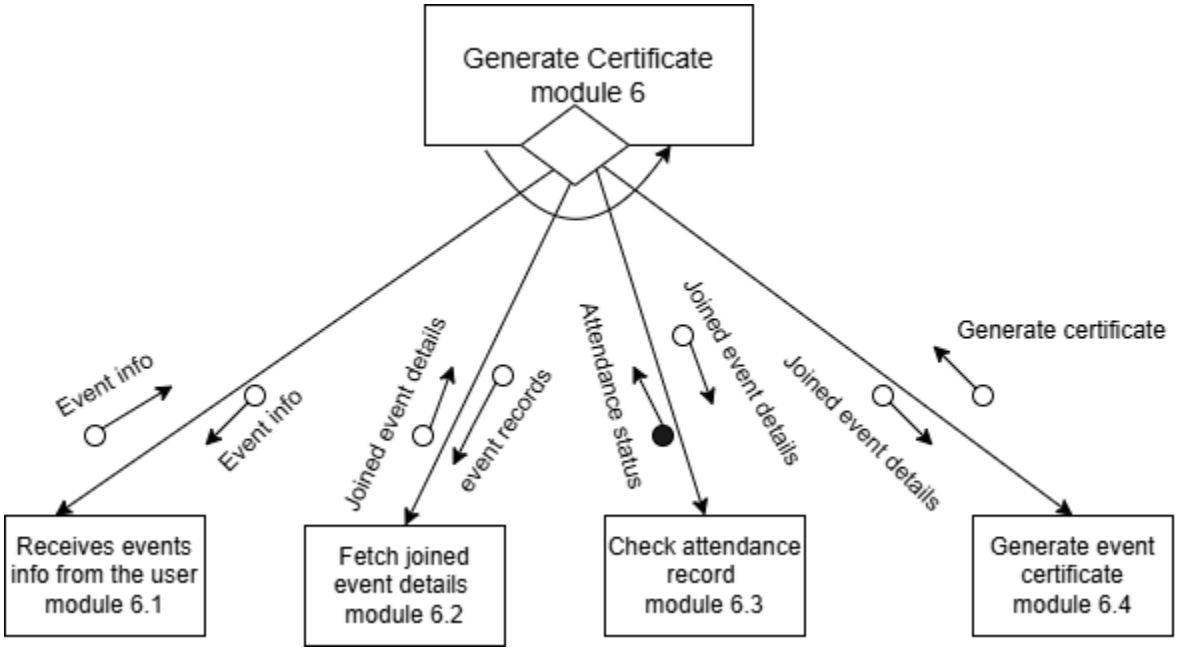
Structure Chart for module 4



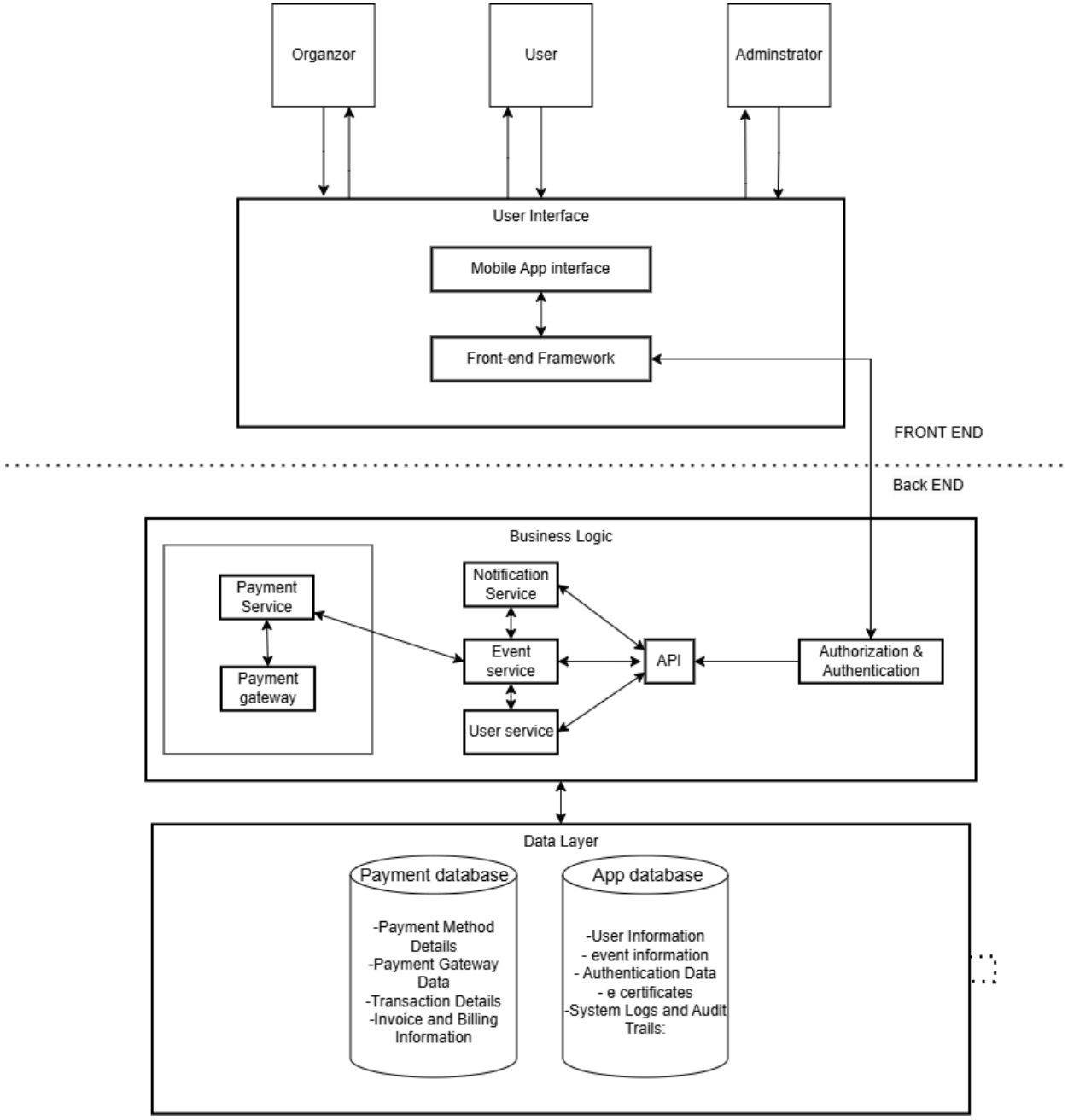
Structure Chart for module 5



Structure Chart for module 6



Architecture



Architecture Breakdown:-

Front End:

- **User Interface (UI):** Mobile App interface for various user roles (Organizer, User, Administrator).
    Features:-
    - Login page
    - Home page
    - Interactive interface
    - Event registration page
    - Event creation page
    - Certificate generation page
    - Easy navigation
- **Frontend Framework:** Serves as the bridge between UI and backend services
    - Making use Flutter as a frame work for front end

Backend:

- **Application Layer: responsible for processing and managing the business logic of the application. It serves as the intermediary between the user interface and the data layer, handling all the operations required to fulfill user requests**
    - Authorization and Authentication : This component ensures that only authenticated and authorized users can access the system.
    - web server: Acts as the interface between the client (e.g., mobile app or web browser) and the backend services.
    - API :provides a set of endpoints that allow the front-end to communicate with the back-end services.
- **Data Layer: Store structured data in a persistent and queryable form**
    - Includes databases for Payment records and Event & User records, as well as a Cache for performance optimization

Type/Size of Computer:

- **Cloud-Based Servers:** Use scalable instances for flexibility.
- **Server Specifications:**
    - **RAM:** 16GB to 32GB
    - **Storage:** 1 tb SSD storage

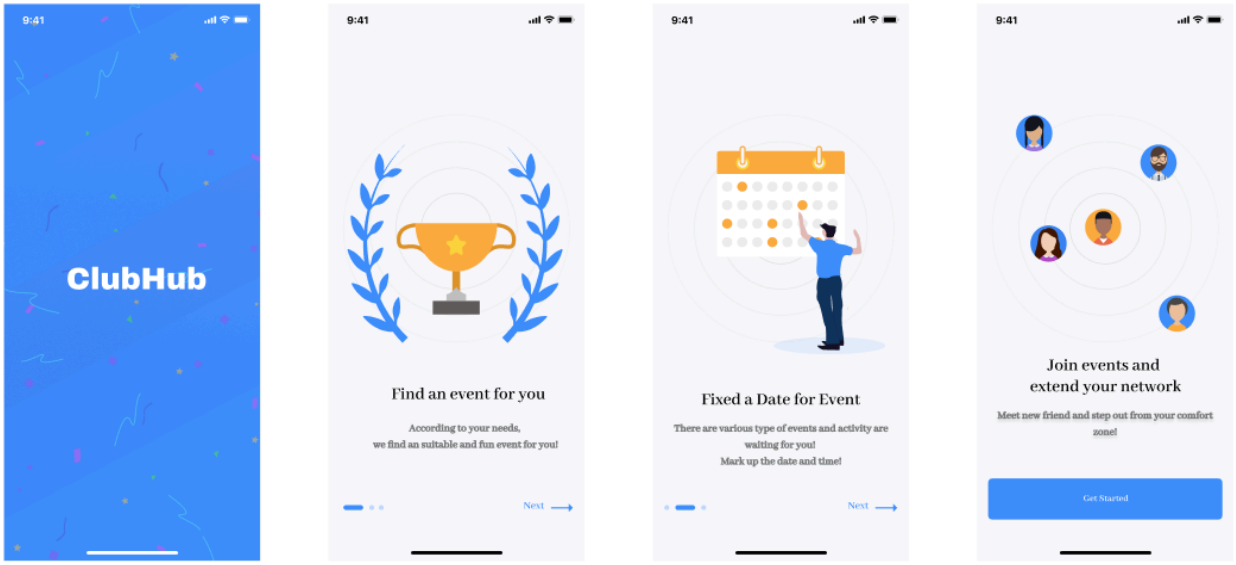
Networking and Communication:

- **Web-Based System:** Relies on internet communication.
- **Content Delivery Network (CDN):** Use CDNs for fast content delivery.
- **Security Measures:** Implement firewalls for system protection

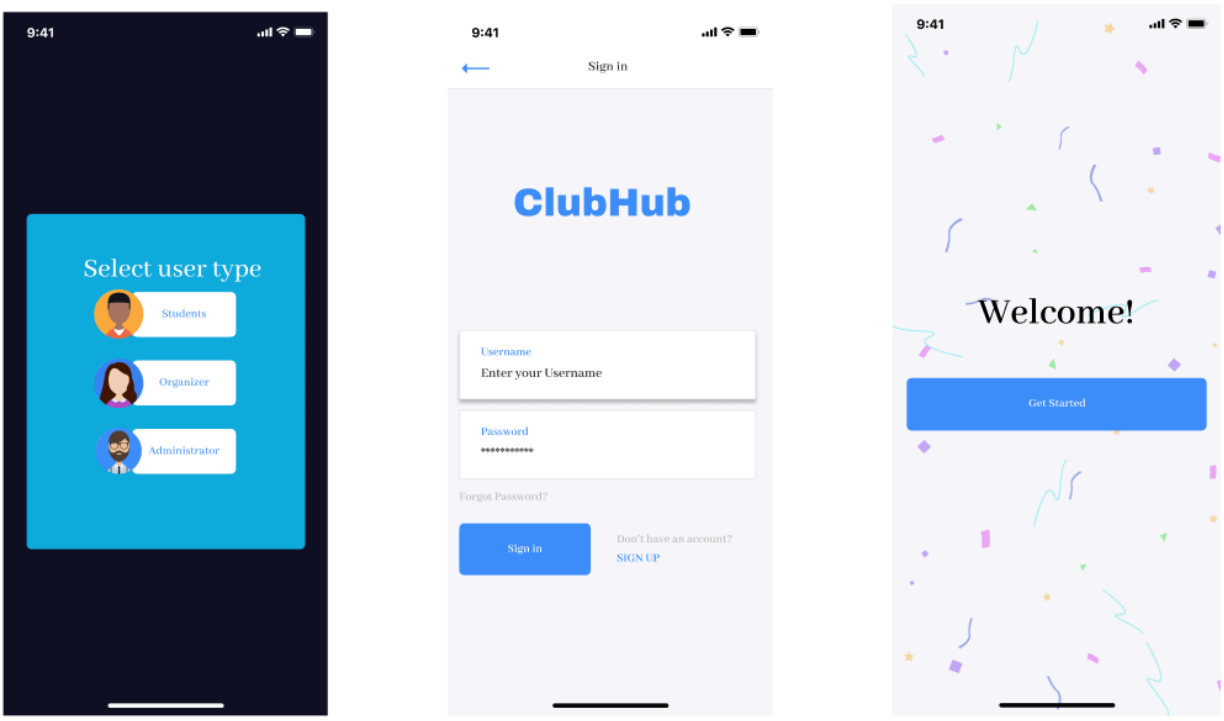
8.0 System Wireframe (Input Design, Output Design

Prototype Link :
https://www.figma.com/proto/fF5wvyjxNstFyy7SK9FDaE/ClubHub?node-id=0-1&t=E1K8Yy6bDwOUTbZD-1

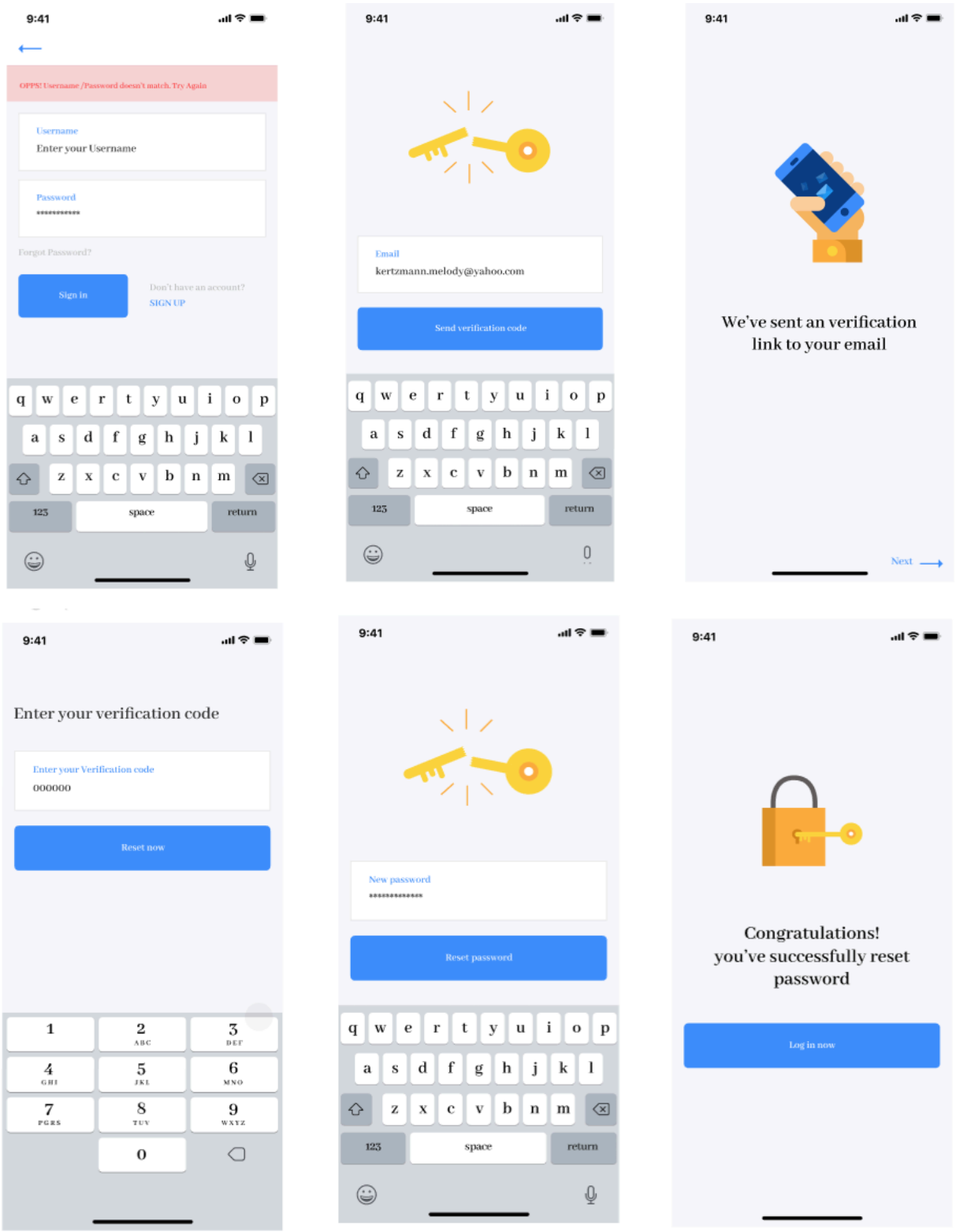
Login System



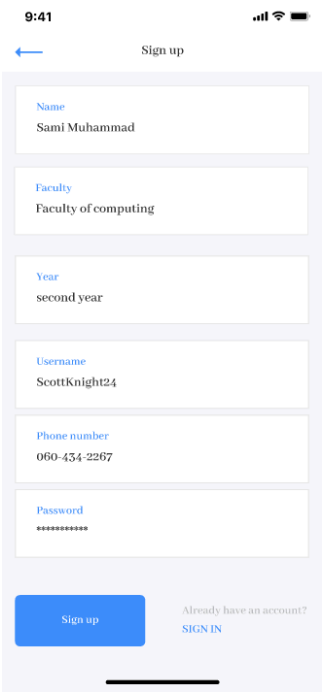
8.0.1 Application interface



8.0.2 Selecting the type of user and sign in

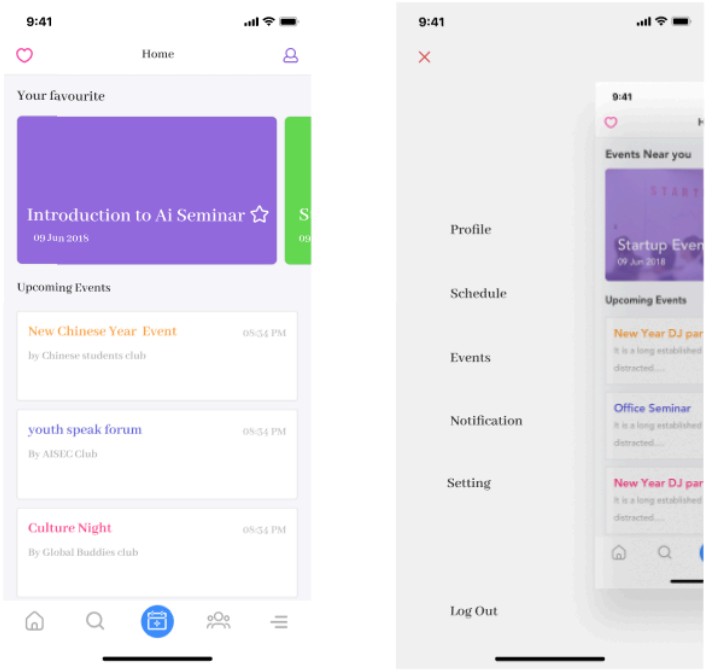


8.0.3 Reset password if login failure

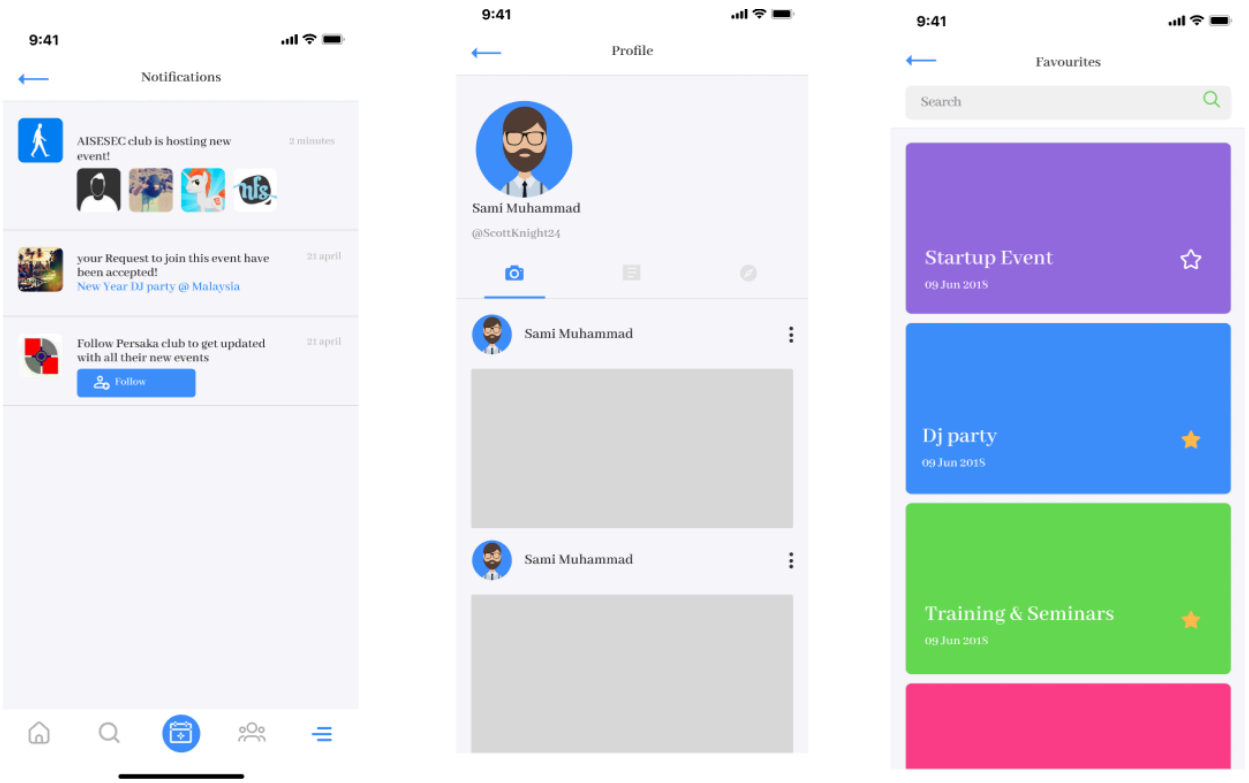


8.0.4 Sign up interface

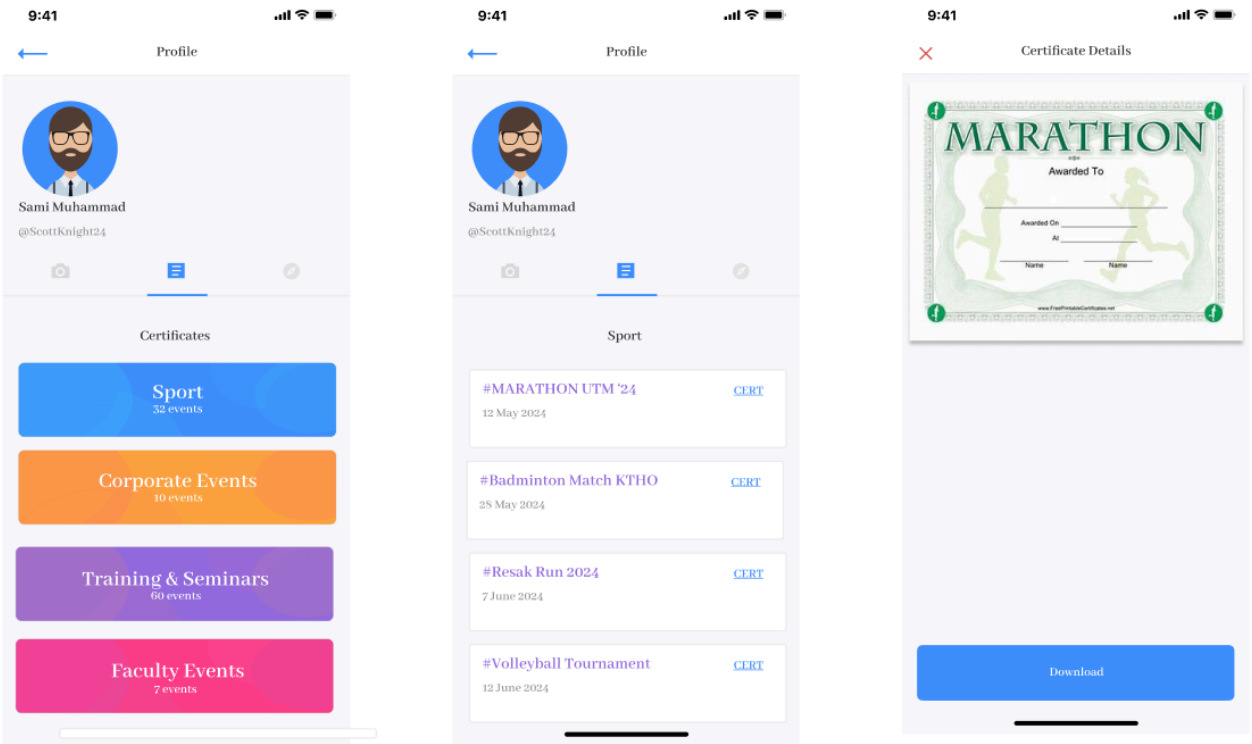
Home page for regular user



8.0.5 Home page and navigation bar for regular user (student)

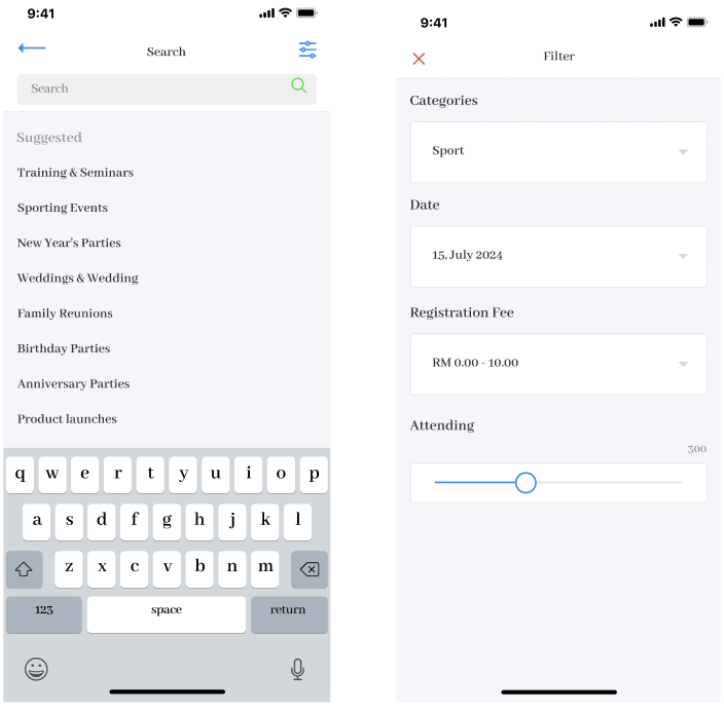


8.0.6 Notification, user profile and user favorites interface

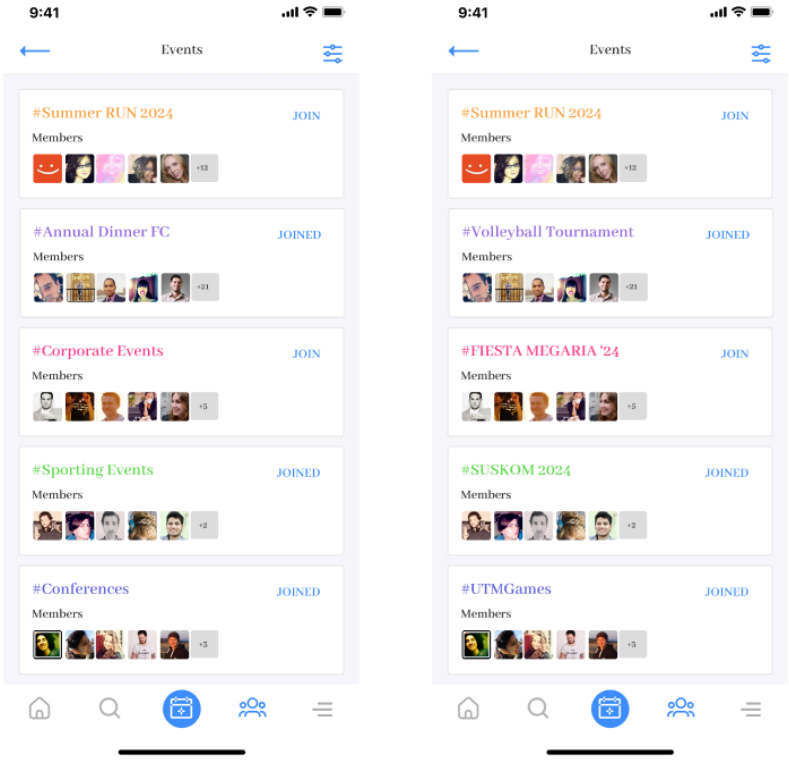


8.0.7 Event certificates in user profile

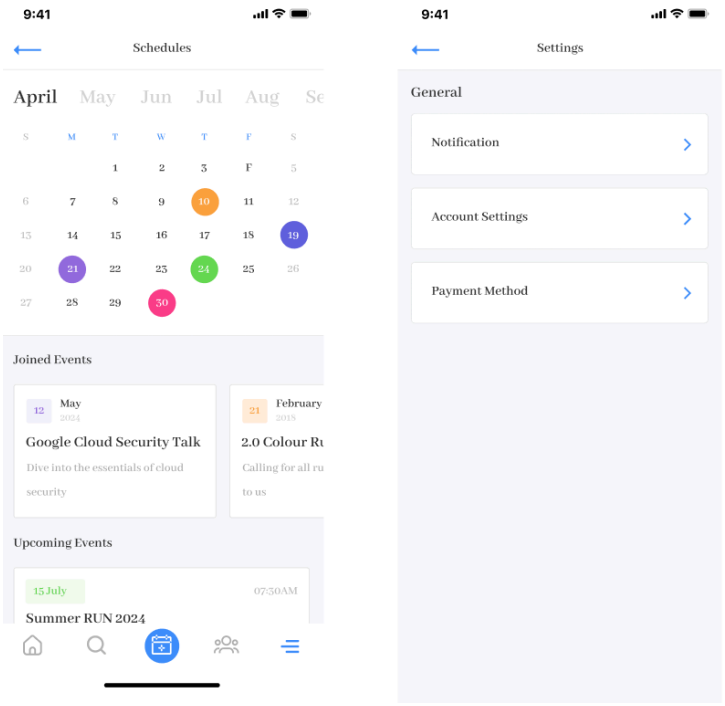
Event navigation



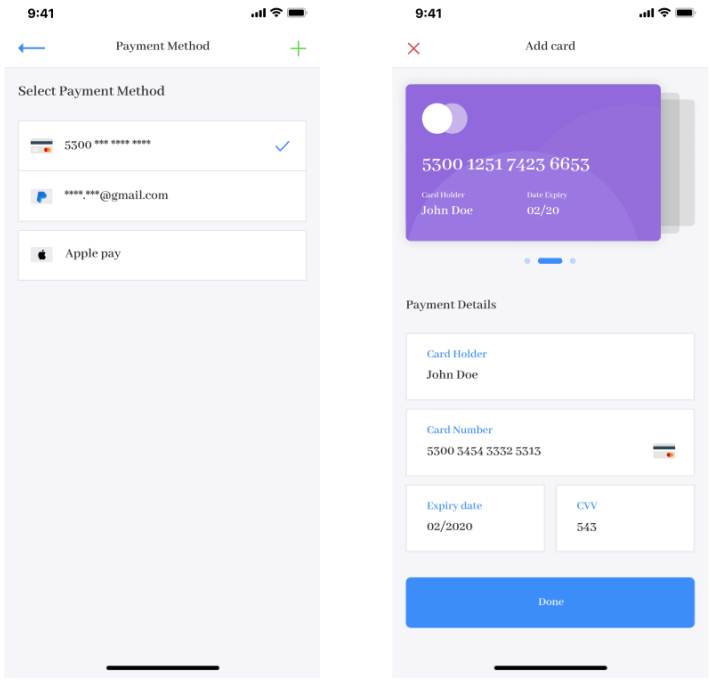
8.0.8 Event navigation and filter searching



8.0.9 Event before filter and event results filtered

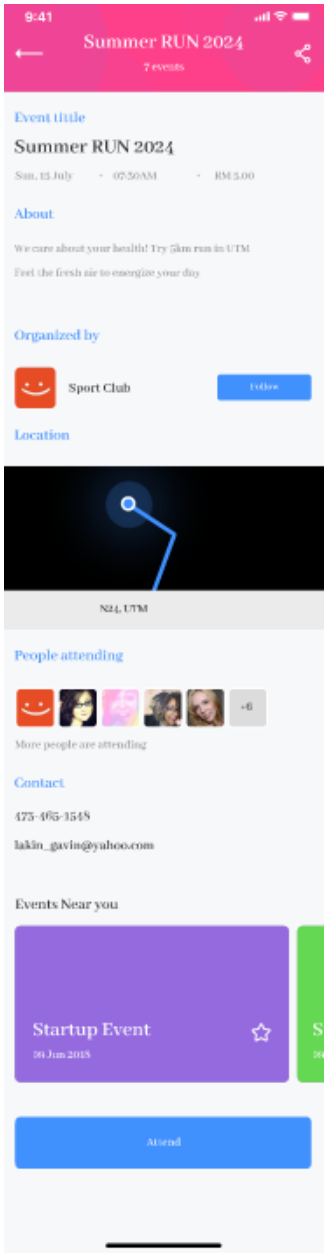


8.0.10 Schedules and Setting interface

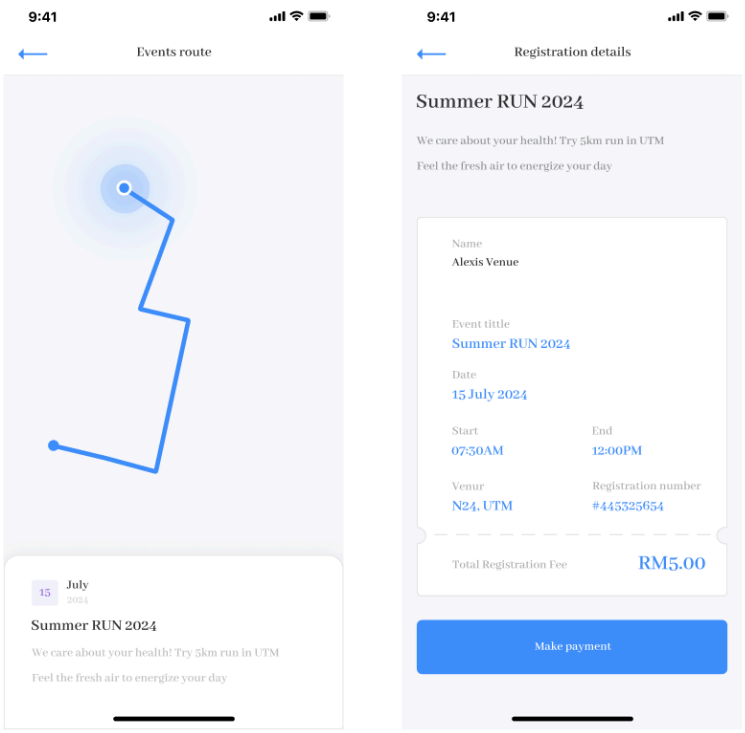


8.0.11 Payment setting interface

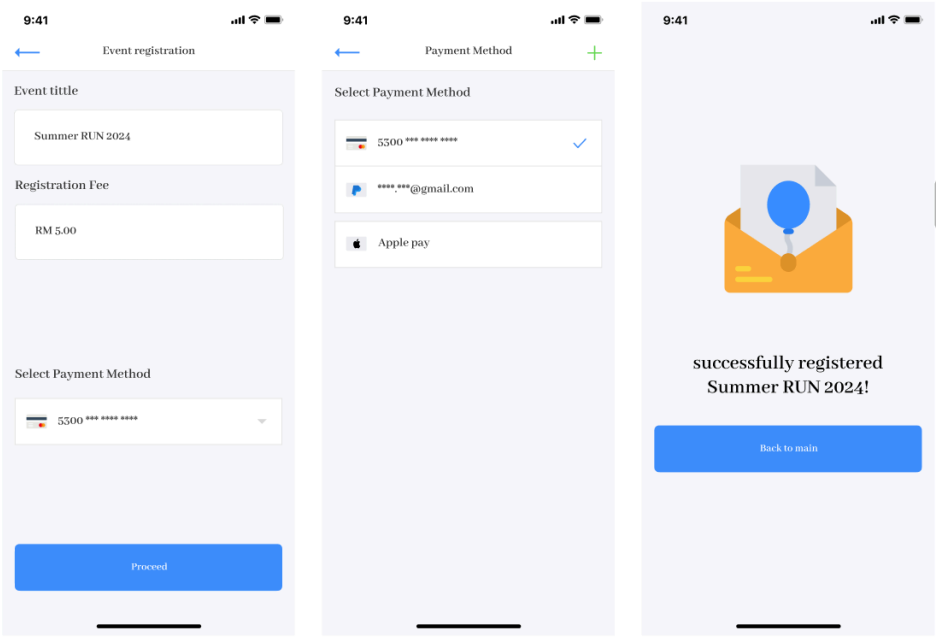
Event registration



8.0.12 Event details interface

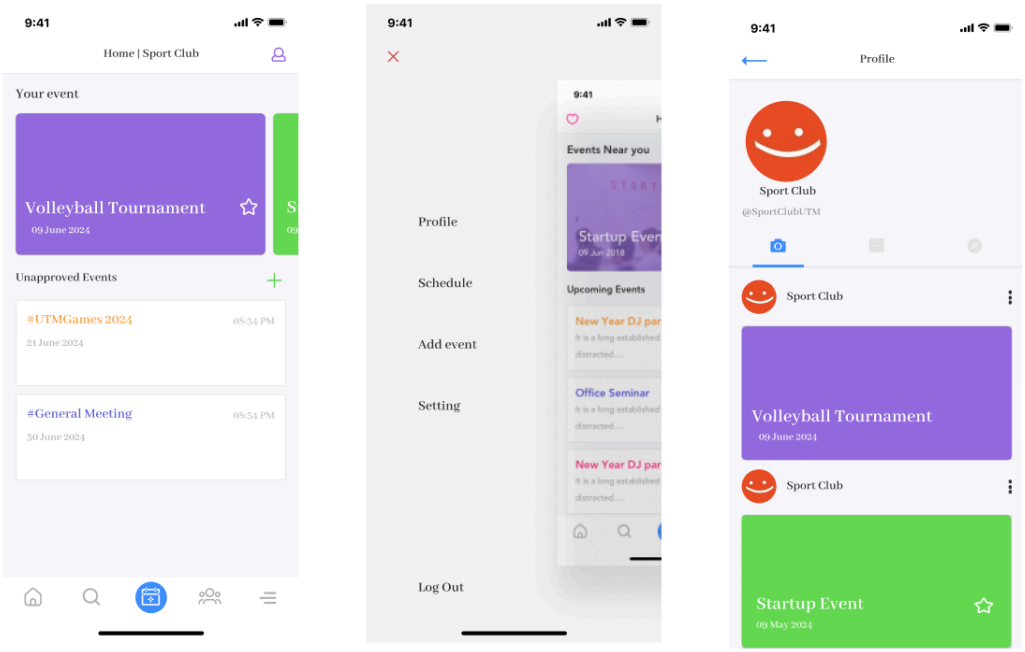


8.0.13 Event route and registration details



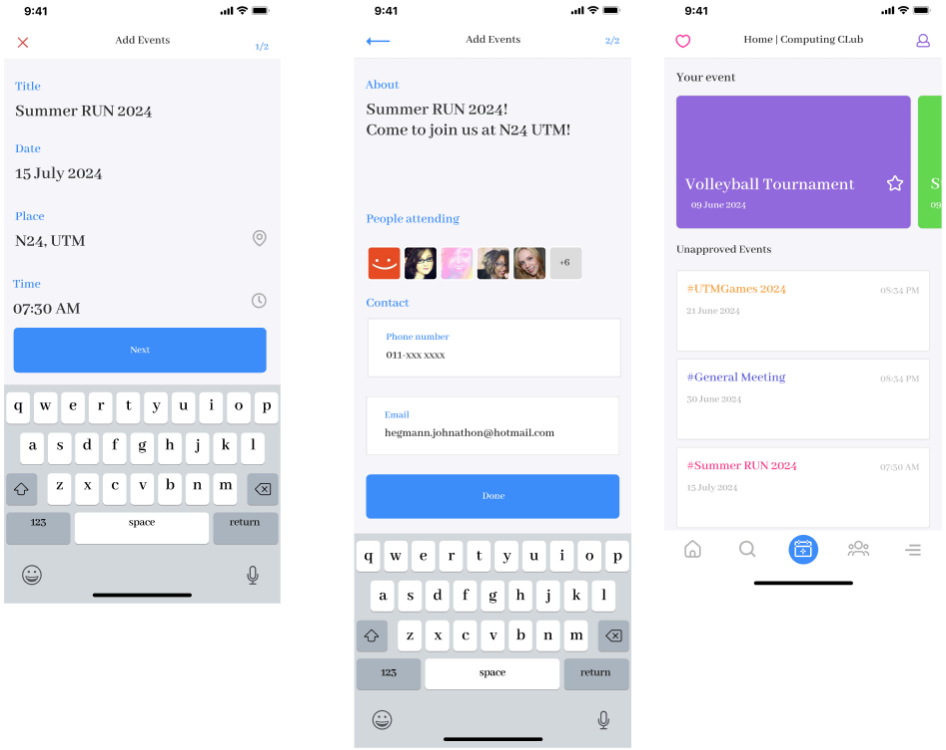
8.0.14 Payment for event registration and interface successful registration

Home page for organizer

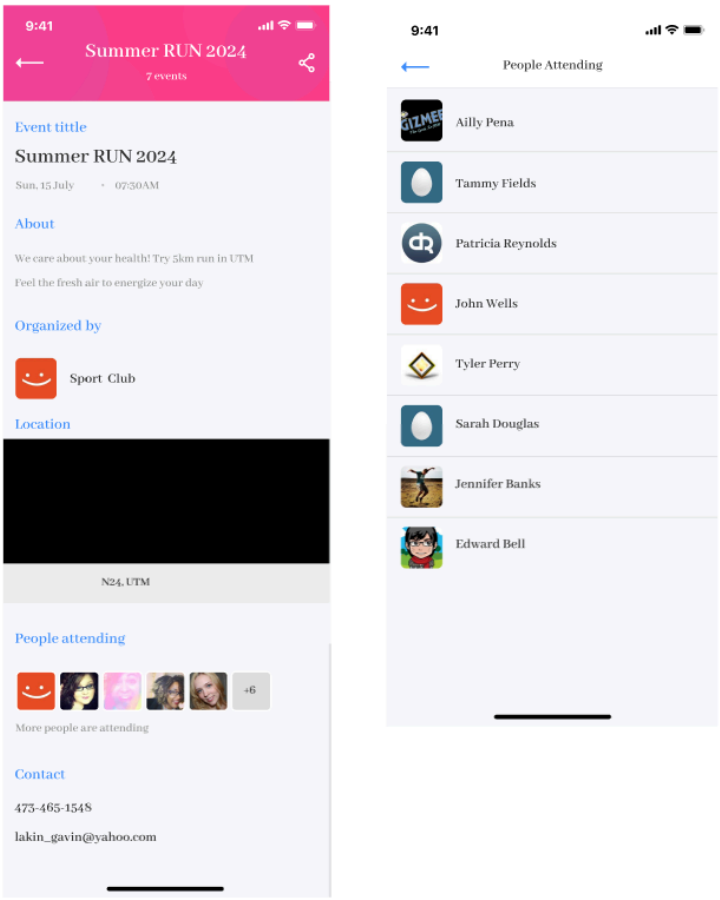


8.0.15 Home page, navigation bar and profile for organizer

Event registration for organizer

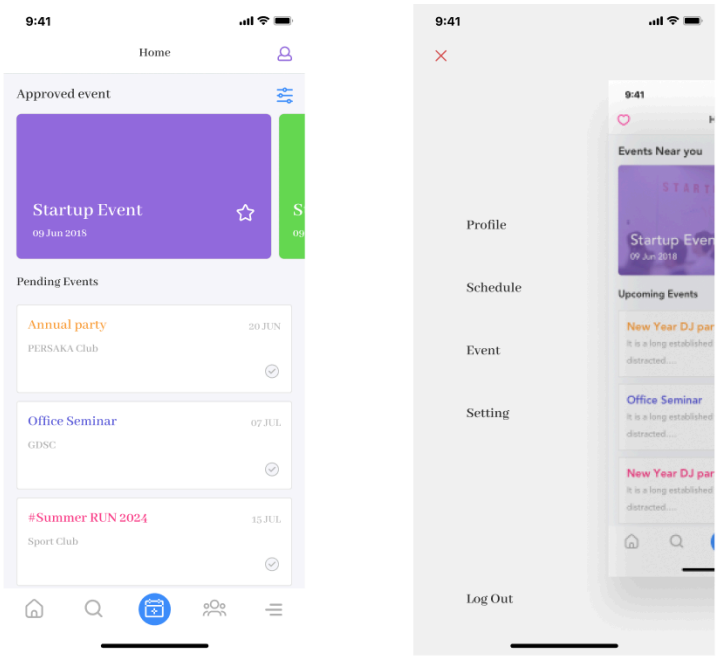


8.0.16 Event registration and home page after registration

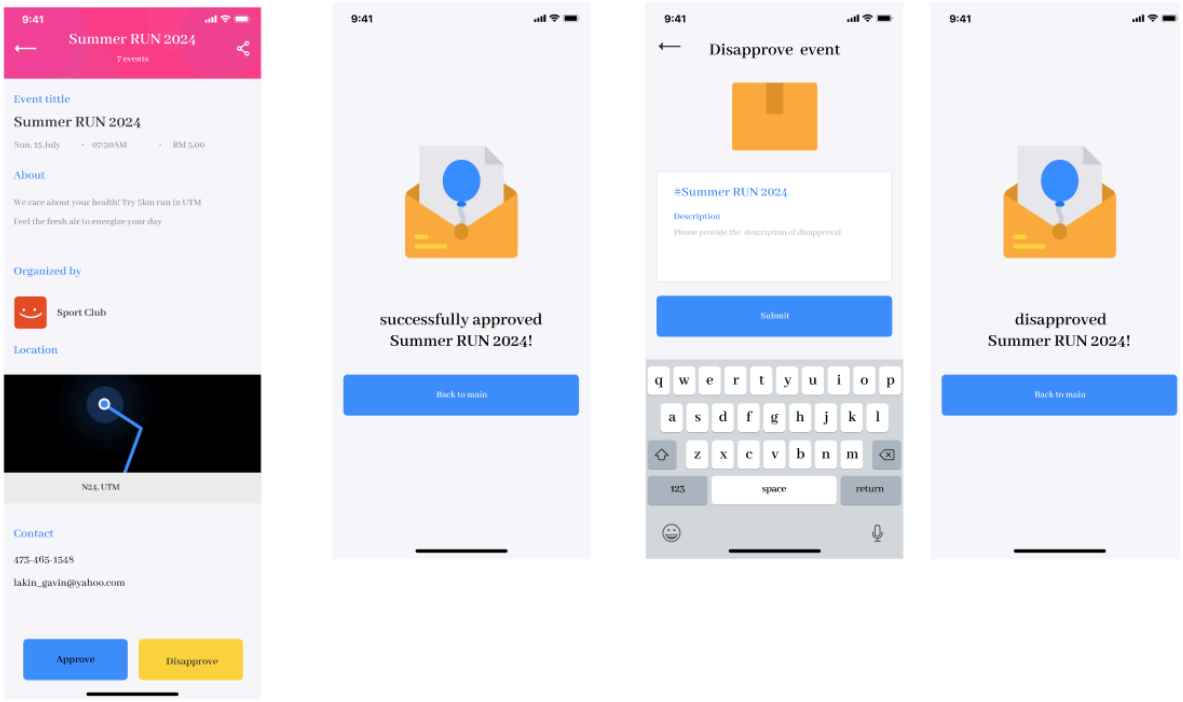


8.0.17 Event details and list of participants

Interface for Administrator



8.0.18 Homepage and navigation bar for administrator



8.0.19 Approve and disapprove event

9.0 Summary of proposed system

Clubhub is a proposed system designed to significantly enhance the campus experience for students at UTM by providing a centralized platform for managing and communicating information about campus clubs and societies. It addresses three major issues: the prevalence of spam in campus group messages, the lack of a centralized communication platform, and the limited exposure for niche clubs. By introducing a user-friendly mobile application, Clubhub aims to streamline communication and engagement. The app will feature personalized club profiles, event registration, attendance tracking, and an integrated ticketing system, ensuring students receive relevant notifications about club activities without spam. Additionally, it will offer a repository of past event records, including photos, reviews, and participant feedback, aiding students in making informed decisions about future participation.

Clubhub's development is grounded in a comprehensive analysis of the current challenges and needs of the student body, ensuring the proposed solution is both effective and relevant. Each club will have its own dedicated section within the app, showcasing its history, purpose, membership details, and past activities. This personalized approach empowers students to make informed decisions about which clubs to join and fosters a deeper appreciation of the diverse array of opportunities available on campus. The app's sustainability is supported by a detailed feasibility study, including technical, operational, and economic assessments.

Moreover, Clubhub will support different user roles, including regular users (students), organizers, and administrators, each with tailored interfaces and functionalities to manage their specific tasks efficiently. Regular users can register, browse events, and manage their profiles; organizers can create and manage events, track attendance, and handle promotions; and administrators can oversee the entire system, ensuring smooth operation and addressing user feedback. By centralizing event management and communication, Clubhub aims to reduce the burden of navigating through multiple social media groups and channels, ultimately fostering a vibrant and engaged campus community. In summary, Clubhub is a transformative initiative that aligns with UTM's vision of a future-ready campus by fostering a vibrant, engaged student community and enhancing the overall campus experience.