# **Implementation Document**

for

# **Elysium**

Version 1.0

# **Prepared by**

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APPENDIX A - GROUP LOG

# Revisions

Version	Primary Author(s)	Description of Version	Date Completed
1.0	Group 13	First draft of Implementation Document	18/03/24

# 1 Implementation Details

## **Programming languages and framework**

### 1) Frontend:

Using HTML, CSS, and JavaScript for the frontend has many advantages. They're supported by all browsers, have numerous tools and libraries, and integrate well with any backend framework. Plus, they're lightweight, resulting in faster system performance and they also allow the frontend to change without the user having to manually reload.

We opted for the Vite.js framework using the React.js template due to its numerous advantages like:

- 1. Ease of learning and adaptability.
- 2. Offers features like reusable components and virtual DOM, giving rise to well-structured and efficient code.
- 3. Includes useful tools like react-router for effectively managing multi-page websites like ours
- 4. The vite.js framework is focused on speed and performance offering features like hot reload during development.
- 5. Helps to maintain uniformity across work done on different devices.

### 2) Backend:

For the backend of our web-app, we are using Node.js. This is due to its numerous advantages like:

- 1. The execution time and runtime is very fast because it has been built on Google Chrome's V8, a C++ based open source JavaScript engine.
- 2. A wide range of functionalities available in the form of bundles in the Node Package Manager (npm), these can be imported with ease at any time, during the development process.
- 3. Node.js is totally asynchronous in nature allowing us to build real time and data intensive web applications.
- 4. Node.js is open-source and it is easy to develop projects using Node.js if one is familiar with Javascript.
- 5. Many prominent software companies like Netflix and Paypal use Node.js for their websites.

Additionally to route our API's we have used Express.js library. The advantages of using Express.js are:

1. Express js provides a straightforward and minimalist framework for building web applications and API's with powerful routing mechanisms.

- 2. It makes application development fast, easy and simple due to its highly supportive open source community.
- 3. Express.js is known for its lightweight and fast performance. It is built on top of Node.js, leveraging its asynchronous and event-driven architecture. This results in efficient handling of concurrent requests with the support of I/Q request handling.
- 4. It is highly flexible allowing us to define routes based on HTTP methods and URLs.

### 3) Databases:

For the database we have used MongoDB, due to its marked advantages such as:

- MongoDB is a NoSQL database, which means it does not require a
  predefined schema. This flexibility allows developers to store data of different
  structures within the same collection, making it ideal for applications with
  evolving data requirements.
- 2. MongoDB is designed to scale horizontally by distributing data across multiple servers. This allows for seamless scaling as application data grows, without significant changes to the database architecture.
- 3. MongoDB employs various optimization techniques such as indexing, sharding, and replication to deliver higher performance in database operations such as efficient querying and retrieval of data.
- MongoDB stores data in flexible JSON-like documents called BSON (Binary JSON). This allows us to represent complex hierarchical relationships and nested data structures easily.

### Codebase

Github Repository: <a href="https://github.com/aleph-7/elysium">https://github.com/aleph-7/elysium</a>

### **Code Structure**

The project is divided into two parts, the codebase and the databases, based on the model view architecture format.

#### Codebase

The server directory contains the following major files/folders:

- model folder contains the schema for all the databases to create the models required for making calls to the database
- databases folder contains the code to connect the databases to the application via a https connection
- server.js file that acts as a server and handles all the requests that are made from the frontend sends

The entire organisational structure is as follows:

```
|----node_modules
|----public
|----server
|----src
```

The structure of the backend is as follows:

```
|---- databases
|---- bookingsDB.js
|---- contentDB.js
|---- courtDB.js
|---- leaderboardDB.js
|---- userDB.js
|---- middleware
|---- check_auth.js
|---- models
|---- contentDB.js
```

```
|---- courtDB.js
|---- leaderboardDB.js
|---- userDB.js
|---- node_modules
|---- routes
|---- algorithms
|---- booking.js
|---- apply_workshop,js
|---- auth.js
|---- admin.js
|---- tutorials.js
|---- tutorials.js
|---- workshop.js
|---- server.js
```

The src directory contains all the frontend files and is divided in the following form:

```
---- assets
|---- admin
     |---- assets
     |---- attendance.jsx
|---- counsellor
     |---- screens
           ---- button.jsx
           ---- page1.jsx
           ---- page2.jsx
           |---- page3.jsx
           |---- table.jsx
     |---- CardStack.jsx
     |---- Counsellor.jsx
|---- Dashboard
     |---- Coach
           |---- pages
                 |---- checkEnrollment
                 ---- postWorkshop
                 ---- reserveCourt
                 ---- statistics
```

```
|---- Components
                  |---- buttons
                  |---- datetime
                  ---- home
                  ---- sidebar
                       |---- SidebarData.js
                       |---- Sidebar.js
                  |---- subscribe
                  ---- table
                  |---- taskbar
                  ---- tutorials
                       |---- Tutorials.js
                       ---- items
                 |---- viewshow
           ---- CardStack.jsx
           |---- Coach Dashboard.jsx
      ----Header
     |----Yoga_Instructor
           |----Yoga_Instructor.jsx
            |----CardStack.jsx
            ----screens
                 |----PostBlog
|----PostSession
|----check_enrollment
                       |----check_enrollment.jsx
                       |----table.jsx
      |---- Gym_Instructor
           |---- assets
            ---- Button
            ---- table
            ---- pages
                 |---- check_enrollment
                  |---- reserve
                  |---- statistics
|---- Gym
     |---- components
           |---- Home
            |---- Subscribe
            ---- Tutorials
```

```
|---- Viewshow
           ---- assets
           |---- card stack
     |---- Gym.jsx
|----login
    |----login.jsx
    |----signup.jsx
|---- user
     |---- assets
     |---- badminton
           |---screens
                |---- booking
                      |----active-booking.jsx
                      |----booking.jsx
                      |----pre-booking.jsx
                 |----equipment
                 |----home
                 ---leaderboard
                 ----tutorials
                |----workshop
           |---- CardStack.jsx
           |---- Badminton.jsx
     |---- basketball
           |---- screens
                 |---home
                 ----tutorials
                |----workshop
           ---- CardStack.jsx
           |---- Basketball.jsx
     |----components
           |----tutorials
                |----table.jsx
           |----workshops
                |----table.jsx
                |----table workshop.jsx
     |---- cricket
           |---- screens
                |---- home
                 |---- tutorial
```

```
|---- workshop
           |---- CardStack.jsx
           |---- CardStack.jsx
     |----football
            |---- screens
                 |---- home
                 |---- tutorial
                |---- workshop
           |---- CardStack.jsx
           |---- Football.jsx
     |---- history
           |---- components
                |---- greeting.jsx
                 ---- heading.jsx
                 ---- info.jsx
                |---- table.jsx\
          ----History.jsx
     |---- hockey
           |---- screens
                |---- Home
                 |---- Tutorial
                ---- Workshop
           ---- CardStack.jsx
           |---- Hockey.jsx
---- Landing_Page1
     |---- Button.jsx
     |---- CourtsAvailable.jsx
     |---- LP1.jsx
     |---- LandingPageNewsArticle.jsx
     |---- UpcomingBookings.jsx
     |---- table.jsx
|---- Landing_Page2
     |----App.jsx
     |----LDP.jsx
     |----NewsArticle.jsx
     |----self-help
           |----self-help.jsx
           |----self-help post.jsx
```

```
|----squash
     |---screens
           |---- booking
                |----active-booking.jsx
                |----booking.jsx
                |----pre-booking.jsx
           |----equipment
           |----home
           ----leaderboard
           |----tutorial
           ----workshop
     |---- CardStack.jsx
     |---- Squash.jsx
|---- swimming
     |---screens
           |---- booking
                |----active-booking.jsx
                |----booking.jsx
                |----pre-booking.jsx
           |----equipment
           |----home
           |----leaderboard
            ----tutorial
           ----workshop
     |---- CardStack.jsx
     |---- Swimming.jsx
|---- tabletennis
     |---screens
           |---- booking
                |----active-booking.jsx
                |----booking.jsx
                |----pre-booking.jsx
           |----equipment
           ----home
           ----leaderboard
           ----tutorials
           ----workshop
     |---- CardStack.jsx
     |---- TableTennis.jsx
```

```
|---- tennis
          |---screens
                |---- booking
                     |----active-booking.jsx
                     |----booking.jsx
                     |----pre-booking.jsx
                |----equipment
                |----home
                ----leaderboard
                ----tutorials
                |----workshop
          ---- CardStack.jsx
          |---- Tennis.jsx
     |---- volleyball
          |---- screens
                |---- Tutorial
                |---- Workshop
                |---- Home
          |---- CardStack.jsx
          |---- Volleyball.jsx
     |---- yoga
          ---- screens
                ---- Tutorial
                |---- Workshop
                |---- Home
          |---- CardStack.jsx
          |---- Yoga.jsx
     ---- Header.jsx
    |---- SidebarData_MentalWellness.jsx
    |---- SidebarData_PhysicalWellness.jsx
  -- App.jsx
---- main.jsx
---- protected_routes_admin.jsx
---- protected_routes_user.jsx
---- useAuth.jsx
```

#### Database:

The databases section contains various databases and collections of the form:

```
---- bookings
     |---- counsellor_appointments
     |---- equipments
     ---- sport_bookings
      ---- swim_gym_memberships
     ---- tutorials
     ---- tutorials
     |---- yoga_sessions_sport_workshops
---- content
     |---- blogs_posted_by_counsellors
     |---- homepage_announcements
     ---- sport workshops
     ---- time_slot_posted_by_counsellors
     |---- time_slots_by_counsellors
     ---- tutorials
     |---- yoga_sessions
---- courts
     l---- badmintons
      ---- basketball
      ---- cricket
      ---- football
      ---- hockey
      ---- squashes
     ---- table_tennis
     ---- tennis
     |---- volleyball
---- equipments
     ---- badminton
      ---- basketball
      ---- cricket
      ---- football
      ---- hockey
      ---- squash
      ---- swimming
     ---- table_tennis
```

```
|---- tennis
|---- volleyball
|---- leaderboard
|---- badmintons
|---- squashes
|---- table_tennis
|---- tennis
|---- user
|---- users
|---- records
```

# **API Endpoints**

The following is a summary of all the possible API calls that are present in the application

### 1. Authentication

### a. Login

```
URL: /login

Method: POST

Data : {
    username,
    password
}

Status : {
    If successful: {
        200_OK
    }
    else: {
        401_Unauthorized (Wrong Password / Unregistered)
        500_Internal Server Error (Authentication Failed)
    }
}
```

### b. Sign-Up

```
URL: /signup

Method: POST

Data: {
    username,
    password,
    confirm_password,
    email_id
}
```

### c. Check\_user

#### d. Check routerlied Timeslot

```
URL: /checkrouterliedTimeslots

Method: POST

Data:{
    user_id,
    selectedTime
```

### 2. User

### a. Profile Page

### b. Booking History

```
URL: /get_booking_history

Method: GET

Response: Acquires the booking history of the user from the database
```

```
Status : {
          If successful: {
                200_OK (Data Fetched)
        }
        else: {
                //No edit
        }
}
```

## 3. Sports

#### a. View leaderboard

Places used: Badminton, basketball,cricket, football,gym, hockey, squash, swimming, tennis, volleyball, table\_tennis.

Example:

```
URL: /badminton/leaderboard

Method: GET

Response: Display the leaderboard of badminton

Status:{
        If successful:{
            200_ OK
        }
        Else :{
            401_Unauthorised (Not logged in)
        }
}
```

#### b. View tutorials

Places used: badminton, basketball,cricket, football,gym, hockey, squash, swimming, tennis, volleyball, table\_tennis

#### Example:

### c. View Workshops

Places used: badminton, basketball, cricket, football, hockey, squash, tennis, volleyball, table tennis, yoga

#### Example:

```
Else :{
      401_Unauthorised (Not logged in)
}
```

### d. Active Booking

Places used: badminton, basketball, cricket, football, hockey, squash, tennis, volleyball, table tennis.

Example:

```
URL: /badminton/active booking
Method: POST
Data: {
     user_id,
     time_slot,
     type_of_sport,
     time_of_booking,
     court id,
     show_up_status,
     partners_id,
     no_partners,
     booking_status
}
Status : {
     If successful: {
           200 OK (Booking Done)
     }
     else: {
           500_Internal Server Error (Booking failed)
     }
}
```

### e. Pre Booking

Places used: badminton, basketball, cricket, football, hockey, squash, tennis, volleyball, table tennis.

#### Example:

```
URL: /badminton/pre booking
Method: POST
Data: {
     user_id,
     time_slot,
     type_of_sport,
     time_of_booking,
     court_id,
     date_slot,
     show up status,
     partners_id,
     no partners,
     booking_status
}
Status : {
     If successful: {
           200_OK (Booking added to queue)
     }
     else: {
           500_Internal Server Error (Booking failed)
     }
}
```

### f. Self-Help Blogs

```
URL: /self_help
Method: GET
```

```
Response: Display the self-help blogs uploaded by the
counsellor

Status:{
        If successful:{
            200_ OK
        }
        Else :{
            401_Unauthorised (Not logged in)
        }
}
```

### g. Apply Workshop

Places used: badminton, basketball, cricket, football, hockey, squash, tennis, volleyball, table tennis

#### Example:

```
URL: /badminton/apply workshop
Method: POST
Data: {
     workshop_id,
     user_id
}
Status : {
     If successful: {
           200 OK (Workshop updated successfully)
     }
     else: {
           500_Internal Server Error (Error updating workshop)
           404 Not Found (Workshop not found)
           400_Bad Request (Workshop max strength reached)
     }
}
```

### 4. Admin

#### a. Mark Attendance

Places Used: badminton, squash, table tennis, tennis

#### Example:

```
URL: /badminton/attendance

Method: GET

Response: get the occupancy status of court
```

#### **b.** Enter Court Name

Places used: badminton, squash, tennis, table tennis

#### Example:

```
URL: /court_name_entry

Method: POST

Data: {
        court_name,
        type of sport
}

Status : {
        If successful: {
            200_OK (Court exists for the specific sport)
        }
        else: {
            404_Not Found (Court does not exist for the sport)
            400_Bad Request (Invalid type of sport)
        }
}
```

### c. Mark Attendance

```
URL: /mark_attendance
Method: POST
Data: {
     user_1,
     user_2,
     user_3,
     user_4,
     attendance_1,
     attendance_2,
     attendance_3,
     attendance_4,
     position_1,
     position_2,
     position_3,
     position_4,
}
Status : {
     If successful: {
           200_OK (Attendance marked)
     }
}
```

### d. Fill Entry

```
URL: /fill_entries

Method: POST

Data: {
    court_name,
```

```
type of sport,
     court id,
     time_slot,
     date_slot,
     user id 1,
     user_id_2,
     user_id_3,
     user_id_4
}
Status : {
     If successful: {
           200_OK (Usernames posted)
     }
     else: {
           400_Bad Request (Post empty usernames fields)
     }
}
```

### e. Marking metrics

URL: /match\_metric\_marking

```
Method: POST
Data: {
           username_1,
           username 2,
           username_3,
           username 4,
           attendance_1,
           attendance_2,
           attendance_3,
           attendance_4,
           position_1,
           position_2,
           position_3,
           position_4,
           type_of_sport,
           attributeList
```

```
Status:{
          If successful: {
                OK (Document updated)
          }
          Else:{
                Error(Error updating document)
                Error(Document not found)
        }
}
```

### 5. Coach

### a. Post Workshop

```
URL : /coach/postWorkshop
Method: POST
Response: Post workshop for coach
Data:{
     start_time,
     end_time,
     Description,
     racquet,
     cork,
     shoe
     coach_user_id,
     max_participants,
     date,
     type_of_sports
}
Status:{
     If successful:{
```

```
200_ OK(Post successful)
}
Else :{
     500_Exception(Post failed)
}
```

#### **b.** Reserve Court

```
URL: /coach/reserveCourt
Method: POST
Response: Court booking for coach
Data:{
          time slot,
          date slot,
          court_id,
          show_up_status,
          type_of_sport,
          time_of_booking,
          booking_status,
          user_id
}
Status:{
     If successful:{
           200_ OK(Reserve successful)
     }
     Else :{
           500_Exception(Reserve failed)
     }
}
```

### c. Post Yoga Session

```
URL: /yoga/postSession
Method: POST
Response: Post new yoga session
Data:{
          batch_size,
          content,
          startDate,
          startTime,
          endTime
}
Status:{
     If successful:{
           200_ OK(Post successful)
     Else :{
           500 Exception(Post failed)
     }
}
```

### 6. Counsellor

### a. Post Blog

```
Status:{
        If successful:{
            200_ OK(Post successful)
     }
     Else :{
            500_Exception(Post failed)
     }
}
```

### b. Availability

```
URL: /counsellor/availability
Method: POST
Response: Update Availability status
Data:{
          day_vector,
          hour_vector,
          date_slot,
          date_slot_time_vector,
          counsellor_user_id
}
Status:{
     If successful:{
           200_ OK(Availability updated successful)
     }
     Else :{
           500 Exception(Availability updating failed)
}
```

### c. Get Appointments

```
URL: /counsellor/getAppointments
```

```
Method: POST
Response: Get all pending appointments
Data:{
          booking_id,
          user_id,
          date_slot,
          time_slot,
          booking_status,
          counsellor_user_id
}
Status:{
     If successful:{
           200_ OK (Got pending appointments)
     }
     Else :{
           500 Exception (Unable to fetch appointments)
     }
}
```

### d. Get Availability

```
URL: /counsellor/getAvailability

Method: POST

Response: Get available times

Data:{
         hour_vector,
         day_vector,
         date_slot,
         date_slot_time_vector,
         counsellor_user_id
}
```

```
Status:{
        If successful:{
            200_ OK (Got availability)
     }
     Else :{
            500_Exception (Error Availability Fetching)
     }
}
```

### e. Delete Day Availability

### f. Delete Date Availability

```
URL: /counsellor/deleteDateAvailabilty
Method: POST
Response: Delete the availability of a day.
Data:{
          date_slot,
          counsellor_user_id
}
Status:{
     If successful:{
           200_ OK (Successfully updated)
     }
     Else :{
           500 Exception (Availability detection failed)
           500 Exception (Availability updating failed)
     }
}
```

### g. Accept Appointments

```
Else :{
      404_Exception(Appointment not found)
      500_Exception(Appointment acceptance failed)
}
```

## Completeness

### **Implemented Features**

- 1. **Sign-up/Sign-in:** Created a login/register page which redirects to their respective profile dashboard. It also displays if incorrect credentials are entered.
- 2. **Privacy of users:** We have used **jwt tokens and sha256 hashing** to store the passwords of all the users in the database. By using this technique, the passwords of the users are not visible to those who have access to the database and this ensures the security and privacy of the users.
- 3. Features implemented in User Section:
  - a. **User Dashboard:** The dashboard will be divided into three sections to assist the users, i.e. IIT Kanpur students. The facilities offered to them are:
    - Book a sports facility
    - Book a yoga session
    - Book an appointment with a counsellor.
    - The profile will show the upcoming bookings of the user.

The side navigation bar will be divided into two sections, one for physical wellness and the other for mental wellness.

- The physical wellness section will enlist the various sports whose facilities are available in IITK. It will also contain yoga
- The mental wellness section will contain links to avail the facilities of the ICS counsellors as well as self-help blogs.
- b. **Sports Coach Dashboard**: Every coach of every sport in IIT Kanpur will have a dashboard. This page will allow them to:
  - Posts regarding upcoming workshops
  - Check enrollment of students.
  - Reserve courts for team practice
- c. Validation dashboard:
  - Verifies the occupancy of courts for existing bookings
  - Checks if players have arrived on time as well
- d. Counsellor Dashboard:
  - Accept appointments
  - Post blogs
  - Set their availability

#### e. Yoga Instructors Dashboard:

- Put up announcements
- Post blogs

### f. Swimming/Gym Instructor Dashboard:

- Reserve slots
- Check enrollment of users

#### 4. Features implemented in Sports Section:

- a. Sports Page:
  - View tutorials
  - View leaderboard (if exists for that sport)
  - Enroll for workshops
  - Book courts in advance as well as active
    - Advance booking implements a FCFS system
    - Active booking is to book in case no advance booking is done
  - Add playmates (if exists for that sport)
  - Pair players (if exists for that sport)
- b. **Gym/Swimming Page:** This page will allow users to the following for the gym/swimming:
  - slots can be booked depending on availability
  - user can see the respective tutorials
  - there is an option to show the pass for verification while entry

#### 5. Features implemented in Wellness Section:

- a. Yoga Page:
  - Enroll for upcoming yoga sessions
  - View tutorials

#### b. Counsellor Session Booking Page:

- Display available timings
- Book appointments
- Keep a track of upcoming appointments
- c. Self-help blogs:
  - Display self help blogs

### **Future Development Plans**

- **1. Adding personalised profile pictures:** We shall allow users to upload a profile picture at the time of sign-up which will be displayed at all the user pages.
- 2. Viewing past bookings or appointments: On registering for a workshop or appointment we are yet to implement the feature to allow users to view their respective bookings with the status
- 3. Adding forgot password feature: At present there is no feature for users to reset their password if they forget it. We shall be including an option at login to enable users to reset their password
- **4. Issuing equipment:** We shall be adding the option to issue equipment at various sports facilities. This feature wasn't implemented properly and shall be debugged in the testing phase.
- **5. View empty courts:** We will be adding a feature to show all the courts that are currently empty so that the active booking feature can be used more conveniently.
- **6. Statistics:** We will be adding a feature for the coaches to view the statistics of court bookings so that they can book courts for team practice at the appropriate times, and staff can be adjusted based on the people that are coming at a particular time.
- 7. General fixing of bugs and improvement of software through rigorous testing.

# Reserved User\_ID's for testing

The following is a list of credentials so that the special dashboards for the coaches can be tested

User name	Password	Role	
coach_badminton	coach_badminton	Coach	
coach_tabletennis	coach_tabletennis	Coach	
coach_tennis	ach_tennis coach_tennis Coach		
chinmay	linguist	Counselor	
coach_squash	coach_squash	Coach	
yoga_inst	yoga_inst	Yoga Instructor	
gym_inst	gym_inst	Gym Instructor	
swim_inst	swim_inst	Swim Instructor	
admin	admin	Admin	

# Appendix A - Group Log

Date	Timings	Duration	Minutes
02 Mar	23:00 – 1:30	2hrs 30 min	Discussed the components to be present and distributed the division of the components
07 Mar	22:00 – 00:00	2hrs	Built the individual components and discussed further plans regarding the combination of the components.
09 Mar	21:00 – 22:00	1hr	Revision of the components and distribution of the individual pages of the application.
13 Mar	21:00 – 03:00	6hrs	<ul> <li>Finished the user dashboards.</li> <li>Finalising the coach and counsellor dashboards and started working on the databases.</li> <li>Started working on the backend.</li> </ul>
14 Mar	21:00 – 03:00	6hrs	<ul> <li>Finished the frontend.</li> <li>Working on the backend and the integration.</li> <li>Started working on the implementation document.</li> </ul>
15 Mar	10:00 – 14:00	4hrs	<ul> <li>Finished the implementation doc</li> <li>Finishing up the backend and the integration of the frontend and backend.</li> </ul>