

CS-411 (Section QG) Project Track-1

ARC Management System

Project Summary

This project aims to build a management system which will provide a comprehensive view of the facilities at the Activities and Recreation Center at UIUC. The system will have an interactive web User Interface which will allow the students to book courts for sports and equipment (gym or otherwise) on a slot-wise basis. The users can also perform actions like viewing, updating, and cancelling the bookings in a hassle-free manner. This process will also optimize the booking of the sports equipment as well as the locations (e.g., courts, pools, etc.) so that there isn't a burden on one sport. Furthermore, the system will also be integrated with other third-party sporting events (for example a football match at the Memorial Stadium) and allow people to book tickets for such events.

Detailed Description

The ARC Management System will sort out the entire booking process and help optimize the usage of the facilities. The system has multiple components to it like the users, sports, courts (or locations), booking and equipment. The user's category has two groupings- students and staff (full-time and part-time employees). Only the students studying at UIUC, and the staff will be able to make a booking. Employees' shifts will be recorded for payment and tracking the number of hours they work (relevant in the case of part-time employees like international students who cannot work for more than 20 hours a week). The sports category will list all the available sporting activities (including the gym) available at the ARC. This category will also include various gym facilities like the sauna or the spa room. Based on the number of slots available, students will be able to book that sport (or gym) along with its associated court (or location). The system also allows students to rent out equipment like badminton shuttles, table tennis bats, etc. This will be a separate entity associated with the students' booking.

Another page in the system would list the scheduled third-party sporting events happening in and around the university and it would allow the users to book tickets for the same (perhaps at a discounted rate). The system will have an admin user interface to allow the administrators to perform CRUD operations on the back-end tables (users, sports, equipment, locations, sporting events, slots, etc.). In the future, we also plan to integrate the existing system with Illini Cash which can allow for a seamless booking experience for the UIUC members.

Detailed Functionality Description

The ARC Management System will sort out the entire booking process and help optimize the usage of the facilities. The application has two sets of users- administrator and the facility users.

1. Administrator –

This type of user will have the access control rights to perform the following actions:

- a. Adding and updating sports equipments and their count in the system.
- b. Adding and updating information about gyms, courts, pools.
- c. Adding and updating fitness equipments and their count in the system.
- d. Adding, updating, and deleting users in/from the system (with the current scope of project, as we are not integrating the system with university's database).
- e. Adding, updating, and deleting the slots for the court's booking.
- f. Renting out the sports equipments to the users and adding their details to the system. Updating the record once user returns the equipment.
- g. Adding, updating, and deleting the details of Supervisor, Doctors, Lifeguards, and other staff who will be working in ARC for user's help and safety.
- h. Creating events (like a football game).

2. Users –

This type of user will have access to perform the following actions:

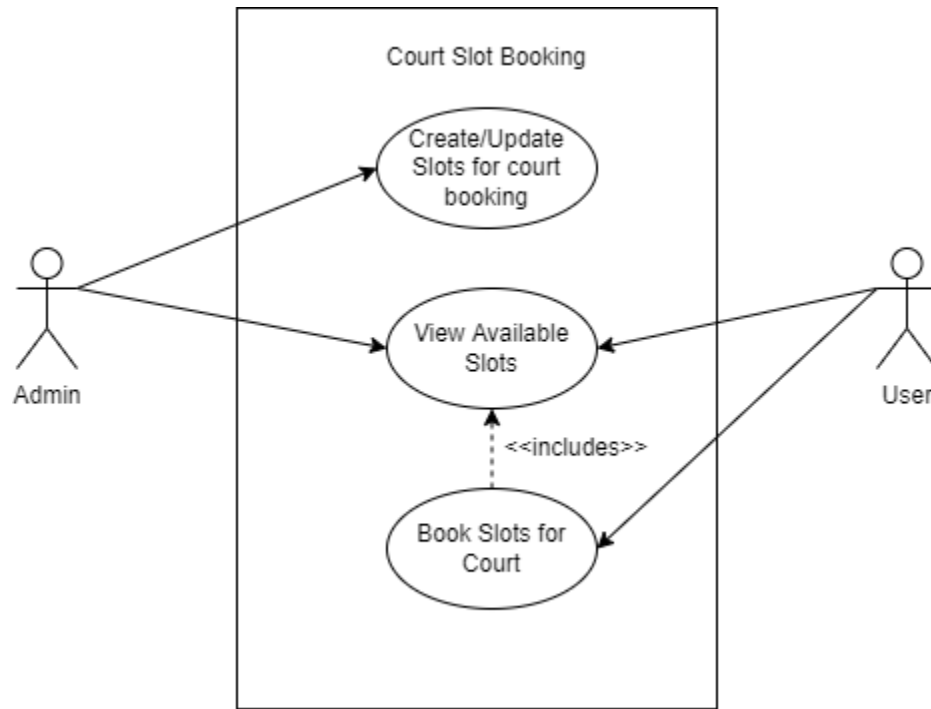
- a. Booking slots for courts.
- b. Book/rent equipment for sports.
- c. Book tickets for the events.

3. Along with the features mentioned, we are planning to add some more functionalities as the future scope –

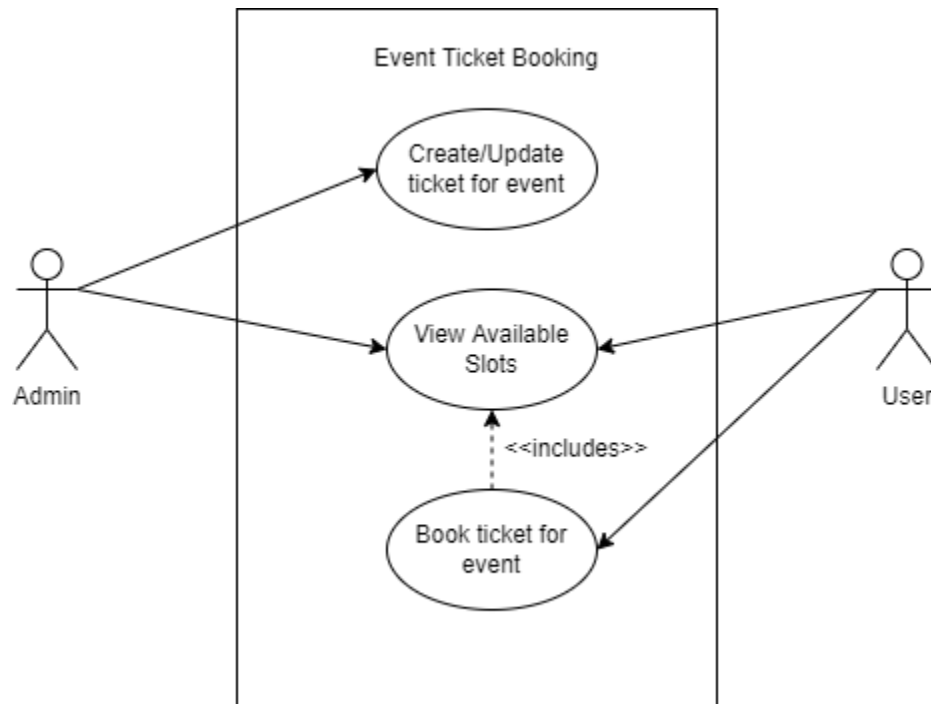
- a. For part-time employees: Requesting open shifts.
- b. Integrating Illinicalash for renting out equipment.

Use Case Diagrams

1. Court Slot Booking



2. Event Ticket Booking



Usefulness

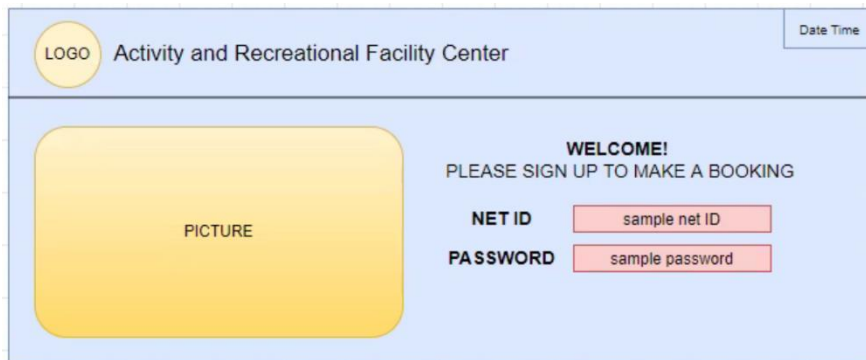
1. User based views
 - a. The ARC Management System will provide user-specific views. The administrator will be able to see and perform functionalities like managing users, sports, equipment and slots for badminton, volleyball, sauna, etc. Secondly, the employees/staff will be able to view how many hours they have worked in each week (and maybe also request open shifts). Third, the users of this application will be able to book slots for various sports and equipment.
2. Slot booking
 - a. It will allow the users to view the available slots for different sports like badminton and basketball and book them. The web app will provide this information which will help many users schedule their activities better and also save time.
3. Shift tracking
 - a. The proposed application will help the administrator keep track of the number of hours an employee has worked in a particular time frame (can be a week, or a month). This will be particularly useful when the employee is a student and there is a cap on how long the student can work in a week.
 - b. (It can also allow the admin to post open shifts and the employee to request for such shifts)

Realness

Our ARC Management Database will have data related to Sports, Equipments, Slots, and Users. We distribute the data as follows-

1. Slot booking- 70% synthetic and 30% system generated. We will use a python script to generate data and we will ensure its validity by creating slots that are an hour each. Furthermore, we also guarantee the slots will lie within the ARC operational hours.
2. For Sports, Equipment and Room tables will visit the ARC to get the information on the data that will go in them.
3. Finally for Users table, we will use the Twitter Username Alias Dataset (<https://www.usna.edu/Users/cs/nchamber/data/twitternames/>). We will randomly assign these users roles- students, staff, administrators, and medical staff to each user in the dataset.

Low Fidelity UI



Activity and Recreational Facility Center

Date Time

WELCOME!
PLEASE SIGN UP TO MAKE A BOOKING

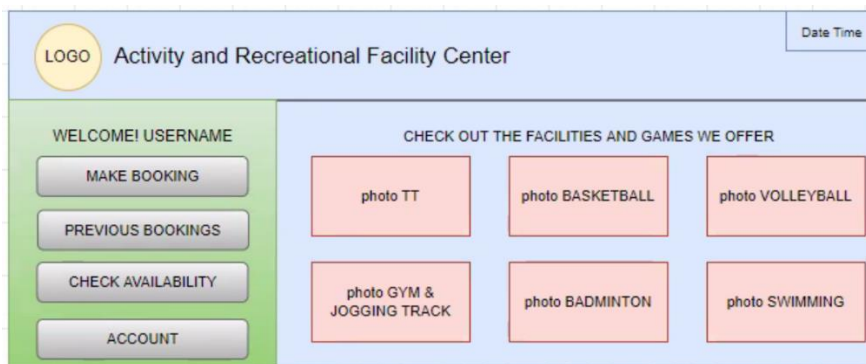
NET ID

PASSWORD

PICTURE

This is a low-fidelity UI mockup for a login page. It features a light blue header with a yellow circular logo containing the word 'LOGO' on the left, the text 'Activity and Recreational Facility Center' in the center, and a 'Date Time' label on the right. Below the header, there is a large yellow rounded rectangle labeled 'PICTURE'. To the right of this rectangle, the text 'WELCOME! PLEASE SIGN UP TO MAKE A BOOKING' is displayed. Below this text are two red input fields: 'NET ID' with the placeholder text 'sample net ID' and 'PASSWORD' with the placeholder text 'sample password'.

Login Page



Activity and Recreational Facility Center

Date Time

WELCOME! USERNAME

MAKE BOOKING

PREVIOUS BOOKINGS

CHECK AVAILABILITY

ACCOUNT

CHECK OUT THE FACILITIES AND GAMES WE OFFER

photo TT

photo BASKETBALL

photo VOLLEYBALL

photo GYM & JOGGING TRACK

photo BADMINTON

photo SWIMMING

This is a low-fidelity UI mockup for a user's home page. It has the same header as the login page. On the left side, there is a green vertical sidebar containing the text 'WELCOME! USERNAME' and four grey buttons: 'MAKE BOOKING', 'PREVIOUS BOOKINGS', 'CHECK AVAILABILITY', and 'ACCOUNT'. The main content area has the text 'CHECK OUT THE FACILITIES AND GAMES WE OFFER' and displays six red rectangular boxes arranged in a 2x3 grid. Each box contains the text 'photo' followed by a sport name: 'TT', 'BASKETBALL', 'VOLLEYBALL', 'GYM & JOGGING TRACK', 'BADMINTON', and 'SWIMMING'.

Home Page for User



Activity and Recreational Facility Center

Date Time

WELCOME! USERNAME

MAKE BOOKING

PREVIOUS BOOKINGS

CHECK AVAILABILITY

ACCOUNT

MAKE BOOKING

SPORT:

EQUIPMENT

TIMING:

This is a low-fidelity UI mockup for a slot booking page. It features the same header and green sidebar as the home page. The main content area is titled 'MAKE BOOKING' and contains three labels: 'SPORT:', 'EQUIPMENT', and 'TIMING:'. Each label is followed by a grey button with the text 'SELECT'. Below these three buttons is a single red button with the text 'SUBMIT'.

Slot Booking Page

LOGO

Activity and Recreational Facility Center

Date Time

WELCOME! USERNAME

MAKE BOOKING

PREVIOUS BOOKINGS

CHECK AVAILABILITY

ACCOUNT

PREVIOUS BOOKING

SPORT:

START DATE:

END DATE

SELECT

SELECT

SELECT

SUBMIT

Sport	Date	Equipment	Slot Timings

Previous Booking Details

Project Work Distribution

1. Front-end- Chinmay, Kedar
2. Back-end- Rishabh, Saket
3. Database conceptual, logical design with normalization, queries, triggers, stored procedures – Chinmay, Kedar, Rishabh, Saket.