**AUTOMATING UTD ACTIVITY CENTER ACTIVITIES**

****

by

**Anuj Yadav**

**Table of Content**

[EXECUTIVE SUMMARY 3](#_Toc489912543)

[PROBLEM STATEMENT 4](#_Toc489912544)

[The problems: 4](#_Toc489912545)

[The objectives: 4](#_Toc489912546)

[The scope: 4](#_Toc489912547)

[BUSINESS PROCESS DIAGRAM FOR COURT RESERVATION AT UTD ACTIVITY CENTER 5](#_Toc489912548)

[CONTEXT DIAGRAM 5](#_Toc489912549)

[CLASS DIAGRAM 7](#_Toc489912550)

[SEQUENCE DIAGRAM 13](#_Toc489912551)

[DATA DICTIONARY 14](#_Toc489912552)

[Activity Centre Staff 14](#_Toc489912553)

[End User 14](#_Toc489912554)

[FUNCTIONAL SPECIFICATION DOCUMENT 15](#_Toc489912555)

[Functional Requirement 15](#_Toc489912556)

[1. Select Game Type 15](#_Toc489912557)

[2. Look up for court 15](#_Toc489912558)

[3. Make reservation 15](#_Toc489912559)

[4. Confirmation Page 15](#_Toc489912560)

[5. Reservation List 16](#_Toc489912561)

[INTERFACE DESIGN 17](#_Toc489912562)

[End User 17](#_Toc489912563)

[Welcome Screen 17](#_Toc489912564)

[Sport Selection Screen. 17](#_Toc489912565)

[Make Reservation Page 18](#_Toc489912566)

[Confirmation Page. 18](#_Toc489912567)

[Confirmation Notification 19](#_Toc489912568)

[Reservation List 19](#_Toc489912569)

[Activity center staff 19](#_Toc489912570)

[Check Availability and Make a reservation 20](#_Toc489912571)

[DATABASE DESIGN 21](#_Toc489912572)

[DATABASE MODEL 22](#_Toc489912573)

[SOFTWARE DESIGN 22](#_Toc489912574)

[Sample Java Code 22](#_Toc489912575)

[SYSTEM CONTROL DESIGN 24](#_Toc489912576)

[PROJECT ACTIVITIES 24](#_Toc489912577)

[MINUTES OF THE PROJECT MEETINGS 24](#_Toc489912578)

[REFERENCES 26](#_Toc489912586)

# EXECUTIVE SUMMARY

UTD Activity Center is an all-purpose building that includes a big gymnasium, 4000-foot fitness center, an auxiliary gym, indoor pool, racquetball and squash courts, locker rooms and training facilities available for all the UTD students, Alumni, Faculty and Staff. Each year, huge number of students coming to UTD take advantage of the Campus Recreation facilities and programs frequently and experience the benefits which positively influences student’s attitudes toward maintaining a healthy lifestyle. Students who participate in recreational sports have known to have increased concentration and improved health and wellness. Most of the students consider the campus recreational facilities and services while selecting the colleges to pursue their degree. Thus, it is important to have a proper management and efficient use of campus resources that provides operational efficiencies.

We are a part of the culture where health and fitness have high priorities. Currently, UTD has four racquetball courts, two squash courts, four basketball courts and two multipurpose rooms. Considering the limited resources and the number of students and staff that use these services every day, it has become difficult to efficiently allocate the courts and other resources to the users. Students also need to wait for long hours to acquire a court to play their favorite sport. Sometimes, they also need to leave in the middle of an interesting game because someone else has booked the same court. Moreover, in the current system, the user can only reserve the court by calling or walking to the Control Desk. The people at the control desk should authenticate the user, check availability of the courts manually and then allocate the available courts to the user. They also have to monitor and assign sport’s equipment to the users and keep a record of all the checked out and returned equipment for each individual.

The process followed is completely manual and is prone to human errors and can introduce inconsistency in data entry and increased dependency on people. Apart from that, it requires providing training to the staff which is time consuming and costly. Developing a fully integrated system to automate this process will help solve most of these problems and reduce the need for human intervention. It will also help in efficient allocation of Activity center facilities and resources and every student at UTD will get to enjoy his favorite sport anytime he/she wants by easily reserving the desired courts.

# PROBLEM STATEMENT

## **The problems:**

1. The user needs to call on Activity center phone number to reserve a court/room. If the call doesn’t connect, he must walk to the control desk to book a court.
2. There is no way by which the user can know what time slots are available for the court he wants to book so that he can plan his daily schedule accordingly
3. There is no guarantee that the user will always find the court he desires to book. The user might also need to wait for a long time until the court becomes available.
4. The person at the control desk manually checks the availability of the courts/room before allocating it to the user. There are chances of miscommunication or receiving incorrect information about the availability of courts/rooms which can refrain user from enjoying his favorite sport
5. The user doesn’t know if the Activity Center is closed on holidays or other special occasions unless he visits the center. This often wastes the user’s trip to the Activity Center and in turn wastes his valuable time.

## **The objectives:**

1. Develop an automated Activity Center Management System which will have following features

* Book or cancel the reservation of the Activity Center playing courts/rooms
* Provide option to the users to share the court with other users which will help in utilizing resources more efficiently when all the courts are booked but there is a space for some players in the booked courts

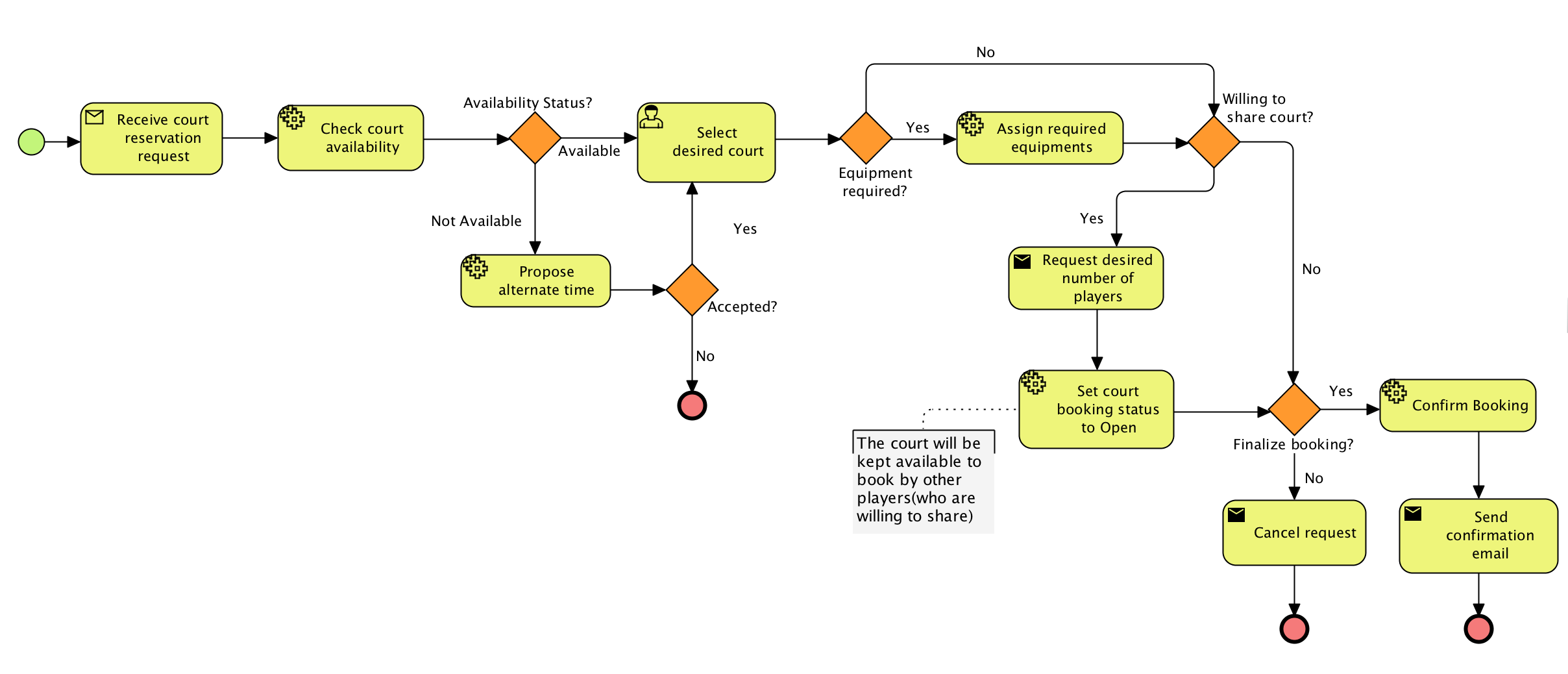
1. Store the timestamp of the user bookings/cancellation for efficient use and allocation of resources
2. Reduce the manual efforts and time which can be used in other important activities that cannot be automated

## **The scope:**

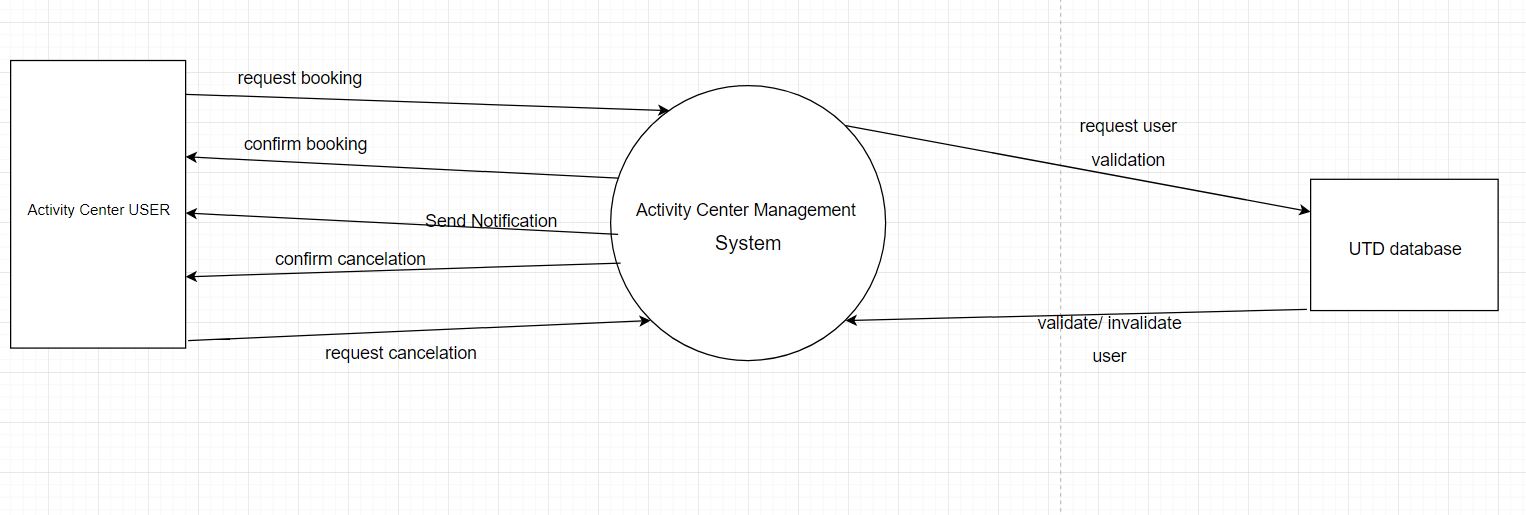
1. The new system should only handle the operations of indoor facilities
2. The new system should include the use of GET Mobile application for user authentication
3. The new system should require access to the UTD student and faculty database to evaluate the eligibility of the user to use the system
4. The development and operations shouldn’t require any significant additional manpower

# **BUSINESS PROCESS DIAGRAM FOR COURT RESERVATION AT UTD ACTIVITY CENTER**

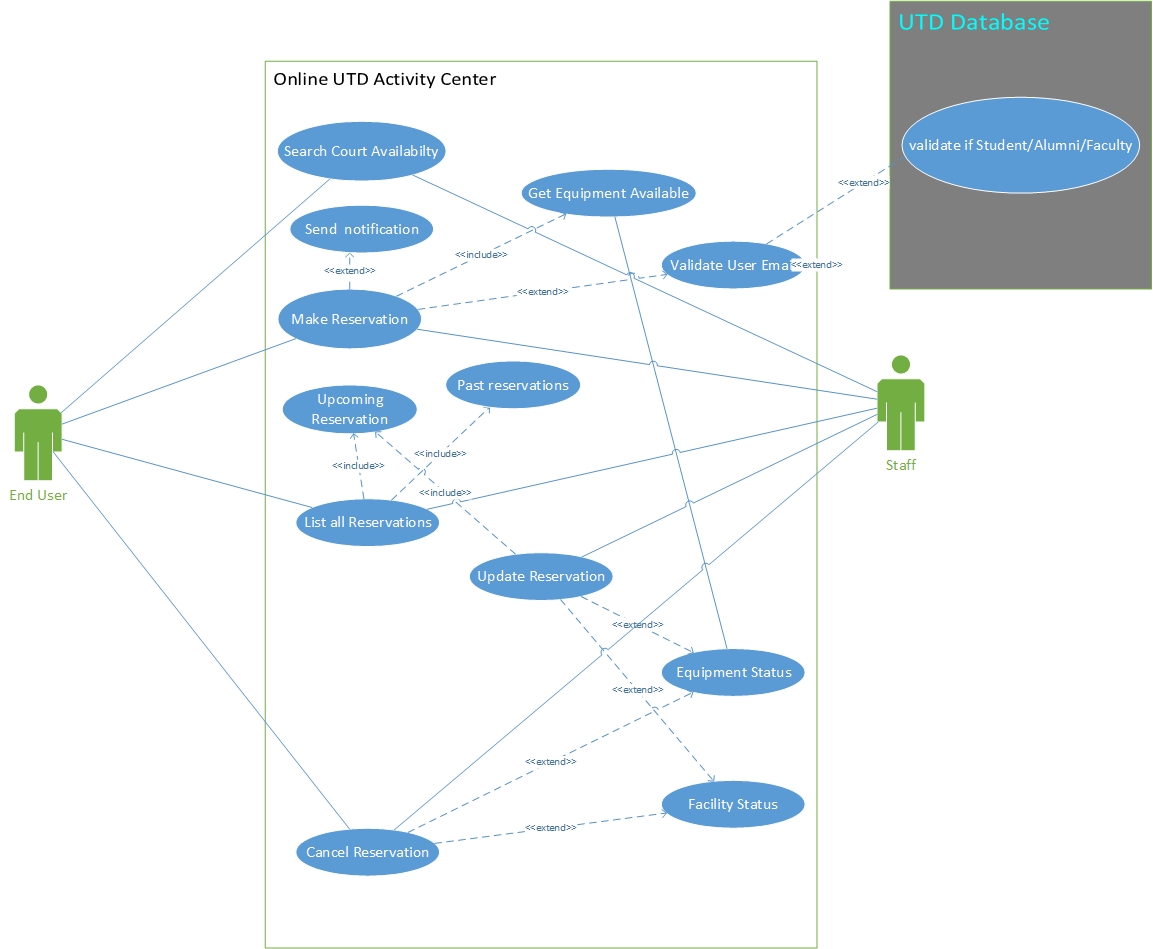
Below is the process flow. The Start node indicates the trigger when end user is indicating to reserve a court for game and End node indicating the reservation complete or cancelled



# CONTEXT DIAGRAM



USECASE DIAGRAMS AND DESCRIPTIONS



**Use case:** Search Court Availability

**Primary Actor:**

**Description:** Student/Alumini/Faculty wants to search if court is available

**Normal flow of events:**

1. User Launches app
2. User selects a sport
3. System shows today’s facility status on the “Make Reservation” page
4. User enters date
5. System retrieves latest availability for the given date from facility database
6. System updates the facility status on the “Make Reservation” page

**Use case:** Make Reservation

**Primary Actor:** Student/Alumini/Faculty

**Description:** Student/Alumini/Faculty wants to reserve a sport facility

**Relationships:**

**Includes:**Get equipment Available

**Extends:** Send Notification, validate user email

**Normal flow of events:**

1. User selects a sport
2. System shows today’s facility status on the “Make Reservation” page
3. User selects an available time slot
4. User clicks on “Equipment’s needed?”
5. System redirects user to equipment’s page
6. User selects equipment type
7. User selects quantity
8. User clicks on “Done”
9. User is redirected back to “Make Reservation” page

**Use case:** List all reservations

**Primary Actor:** Student/Alumini/Faculty

**Description:** Student/Alumini/Faculty wants to see all reservations made by him/her

**Relationships:**

**Includes:**upcoming reservations, past reservations

**Normal flow of events:**

1. User clicks on reservation tab
2. System displays 2 categories of reservation (Past reservation and Upcoming reservation) with their total on reservation main page
3. User clicks on “Upcoming reservation”
4. System redirects to “Upcoming reservations page” and displays all upcoming reservations
5. User clicks back
6. System redirects to reservation main page
7. User clicks on “Past reservation”
8. System redirects to “Past reservations page” and displays all past reservations

**Use case:** List all reservations

**Primary Actor:** Activity Center Staff

**Description:** Staff wants to see all reservations

**Relationships:**

**Includes:**upcoming reservations, past reservations

**Normal flow of events:**

1. User (A C Staff) clicks on reservation tab
2. System displays 2 categories of reservation (Past reservation and Upcoming reservation) with their total on reservation main page
3. User clicks on “Upcoming reservation”
4. System redirects to “Upcoming reservations page” and displays all upcoming reservations
5. User clicks back
6. System redirects to reservation main page
7. User clicks on “Past reservation”
8. System redirects to “Past reservations page” and displays all past reservations

**Use case:** Cancel Reservation

**Primary Actor:** Student/Alumini/Faculty

**Description:** Student/Alumini/Faculty wants to cancel a reservation of sport facility

**Relationships:**

**Extends:** Send Notification, validate user email

**Normal flow of events:**

1. User clicks on reservation tab
2. System displays 2 categories of reservation (Past reservation and Upcoming reservation) with their total on reservation main page
3. User clicks on “Upcoming reservation”
4. System redirects to “Upcoming reservations page” and displays all upcoming reservations
5. User clicks on reservation he /she wants to cancel
6. User clicks on cancel reservation button
7. System displays confirmation alert message.
8. User click on “yes”.
9. System updates Facility Database.
10. System displays Booking cancelation notification message

**Use case:** Upcoming Reservations

**Primary Actor:** Student/Alumini/Faculty

**Description:** User wants to see upcoming reservations

**Relationships:**

**Extends:** Make Reservation

**Normal flow of events:**

1. User clicks on reservation tab
2. System displays 2 categories of reservation (Past reservation and Upcoming reservation) with their total on reservation main page
3. User clicks on “Upcoming reservation”
4. System redirects to “Upcoming reservations page” and displays all upcoming reservations

**Use case:** Past Reservations

**Primary Actor:** Student/Alumini/Faculty

**Description:** User wants to see Past reservations

**Relationships:**

**Extends:** Make Reservation

**Normal flow of events:**

1. User clicks on reservation tab
2. System displays 2 categories of reservation (Past reservation and Past reservation) with their total on reservation main page
3. User clicks on “Past reservation”
4. System redirects to “Past reservations page” and displays all Past reservations

**Use case:** Send Notification

**Primary Actor:** Student/Alumini/Faculty

**Description:** Student/Alumini/Faculty wants to cancel a reservation of sport facility

**Relationships:**

**Extends:** Cancel reservation

**Normal flow of events:**

1. User clicks on reservation tab
2. System displays 2 categories of reservation (Past reservation and Upcoming reservation) with their total on reservation main page
3. User clicks on “Upcoming reservation”
4. System redirects to “Upcoming reservations page” and displays all upcoming reservations
5. User clicks on reservation he /she wants to cancel
6. User clicks on cancel reservation button
7. System displays confirmation alert message.
8. User click on “yes”.
9. System updates Facility Database.
10. System displays Booking cancelation notification message

**Use case:** Get Equipment Available

**Primary Actor:** Student/Alumini/Faculty

**Description:** Student/Alumini/Faculty wants to get equipment’s available

**Relationships:**

**Extends:** Make Reservation

**Normal flow of events:**

1. User selects a sport
2. System shows today’s facility status on the “Make Reservation” page
3. User selects an available time slot
4. User clicks on “Equipment’s needed?”
5. System redirects user to equipment’s page
6. User selects equipment type
7. User selects quantity
8. User clicks on “Done”
9. System checks “equipment’s status”
10. System updates “Equipment’s status”

**Use case:** Validate User Email

**Primary Actor:** Student/Alumini/Faculty

**Description:** To Validate Users Email

**Relationships:**

**Extends:** Make Reservation

**Normal flow of events:**

1. User enters UTD Email id and Phone Number
2. User clicks on “Submit request”
3. System validates email id from user database
4. System updates Facility database
5. System displays Booking confirmation notification message

**Exceptional flow:**

1 user enters invalid email id and a phone number

1 User clicks on “Submit request”

2 System validates email id from user database

3A System displays invalid Email message

**Use case:** Equipment Status

**Primary Actor:** Student/Alumini/Faculty

**Description:** Student/Alumini/Faculty wants to get equipment’s status

**Relationships:**

**Extends:** Make Reservation

1. User clicks on “Equipment’s needed?”
2. System redirects user to equipment’s page
3. User selects equipment type
4. User selects quantity
5. User clicks on “Done”
6. System checks “equipment’s status”
7. System updates “Equipment’s status”

# CLASS DIAGRAM

Below diagram shows different classes involved in the system.

User class holds information of end user.

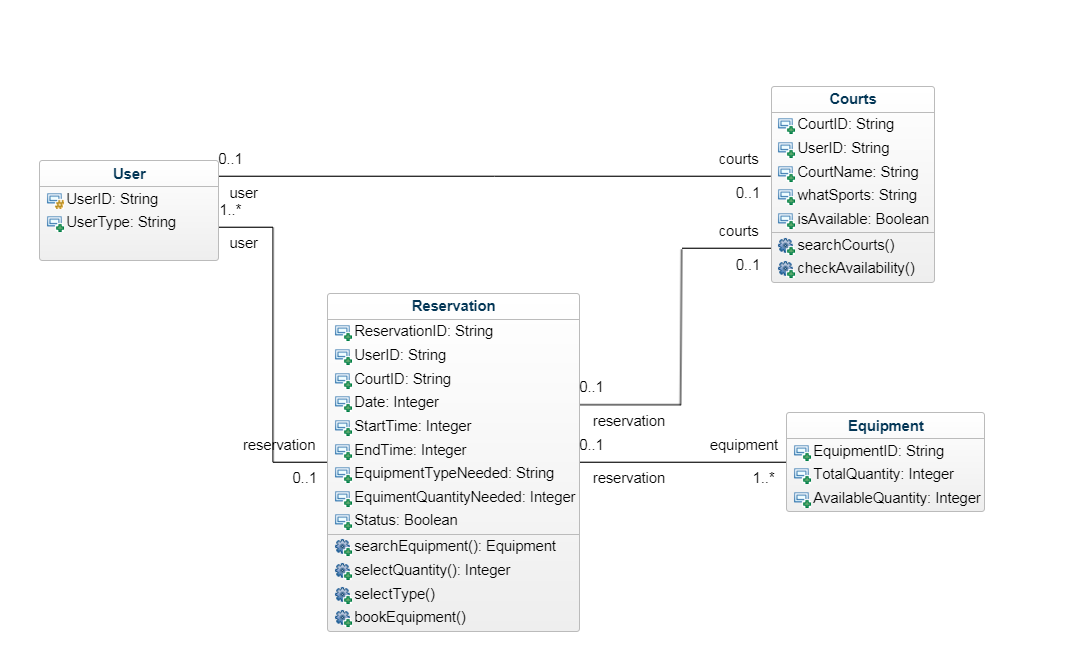
Courts class will have the information related to the courts and whether that is available or not.

Equipment class will have the inventory of the sports equipment

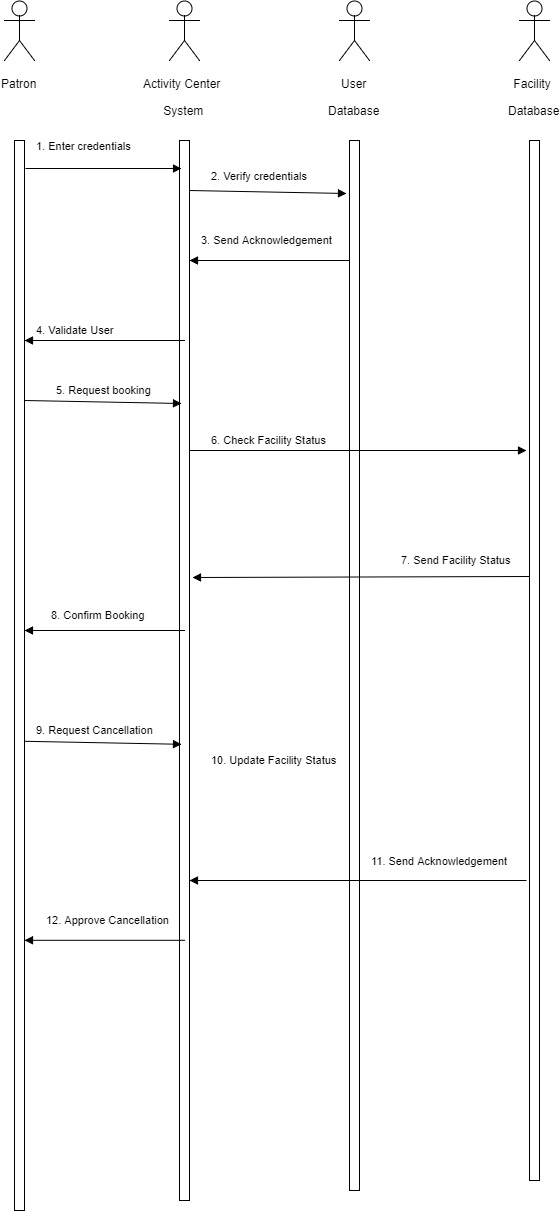
Reservation class is the main class that will have all the reservation with properties like

Date, Slot, User Email Id.

The classes have their own functions providing interfaces to other classes.

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# SEQUENCE DIAGRAM

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# DATA DICTIONARY

## **Activity Centre Staff**

* OnlineActivitySystem = BookANewSlotForm + CheckUpdateAndCancelReservationForm
* BookANewSlotForm = ListofSports + SlotReservationGraph + EnterNewInformationForm + SaveButton
* ListofSports = {Basket Ball|Badminton|Tennis|Racquet}
* SlotReservationGraph = {TimeSlot + {CourtAvailableYes|CourtAvailableNo|CourtAvailableToShare}}
* EnterNewInformationForm = Court + Date + Start Time + End Time + Equipment Type Needed + Equipment Qty Needed + Equipment Available + UserInformation + [ReadyToShareYes|ReadyToShareNo]
* CheckUpdateAndCancelReservationForm = ReservationInformation + AllReservations
* ReservationInformation = Court + Date + Start Time + End Time + Equipment Type Needed + Equipment Qty Needed +UserInformation +[ReadyToShareYes|ReadyToShareNo]
* AllReservations = {SurrogateRecordNumber + UserInformation + Court + Date + Start Time+ End Time + Equipment Type Needed + Equipment Qty Needed + [ReadyToShareYes|ReadyToShareNo]}
* UserInformation = UTD Email ID + Phone Number

## **End User**

* HomePage = ListofSport
* MakeAReservationForm = Date + SlotReservationGraph + EquipmentNeeded + Start Time + End Time + UserInformation +[CourtShareConsent + [Other User Needed]]
* SlotReservationGraph = {TimeSlot +{CourtAvailableYes|CourtAvailableNo|CourtAvailableToShare}}
* EquipmentNeeded = (Equipment Available Message) + EquipmentType + Qty Needed
* EquipmentType = [Badminton Racquet|Tennis Racquet|Shuttlecock|Basket Ball|Tennis Ball]
* ReservationList = UpcomingReservations + PastReservations
* UpcomingReservations = {ReservationCourt + ReservationDetails}
* PastReservations = { ReservationCourt +ReservationDetails}
* ReservationDetails = Reservation Date + ReservationStartTime + ReservationEndTime + ReservationStatus

# FUNCTIONAL SPECIFICATION DOCUMENT

The New UTD Activity center system is intended to support activity center with following functions

1. Speed up reservations of court for games
2. Easy access to the availability of courts
3. Ability to play with other players who are willing to share the court
4. Users of the system are Students, Alumni,
5. The System would have user interface for end users and recreational staff

## **Functional Requirement**

### **Select Game Type**

This feature enables users to select the type of sports that they are looking for and the subsequent steps will have the context of the sports selected

### **Look up for court**

This feature enables users to have a snapshot of courts reservations per slot. The list returned is filtered based on the game selected previously. The list would have different time slots and GREEN color would mean available, BLUE would mean booked and YELLOW mean they are booked by other user but they allow other users to play with them.

This snapshot should have capability to select the GREEN slots and the timings would be populated in the form

### **Make reservation**

This Screen would be a form which captures user inputs and provides capability to make reservation.

It should capture following

* Date. One should only be allowed to make booking as far as 2 days from current date
* Court
* Start Time – User should only be allowed to make a booking latest by 2 hrs before actual timing
* End Time
* If Equipment like Badminton racquet is needed or not.
  + We need to capture Equipment Type and Quantity needed
  + We also need to show the quantity of the equipment is available
* UTD Email ID
* Phone Number

### **Confirmation Page**

This page would just be confirmation page assuring user that reservation is made.

User should be able to navigate to home page from this page

At the same time, a SMS should be sent to the user with the details of reservation

### **Reservation List**

There should be a list of Upcoming reservations and past reservations.

Customer should also have capability to cancel a reservation from here. At the same time, customer should be allowed to cancel only the upcoming reservations. They should not be allowed to change anything for past reservations.

Only Staff should be able to update active reservation. Current system does not allow update of reservation from end user. They are allowed to cancel and make a new reservation.

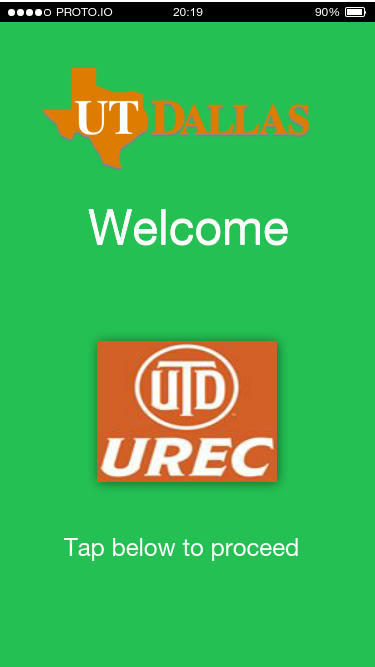
# INTERFACE DESIGN

The System is intended to provide easy access of UTD activity center for users.

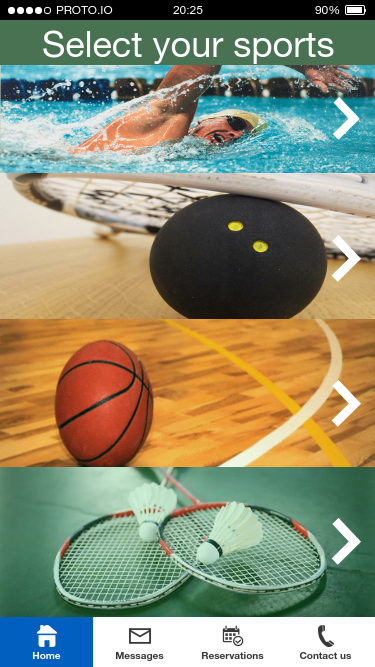
The End users will have a full fledge mobile app with easy and self-explanatory options

## **End User**

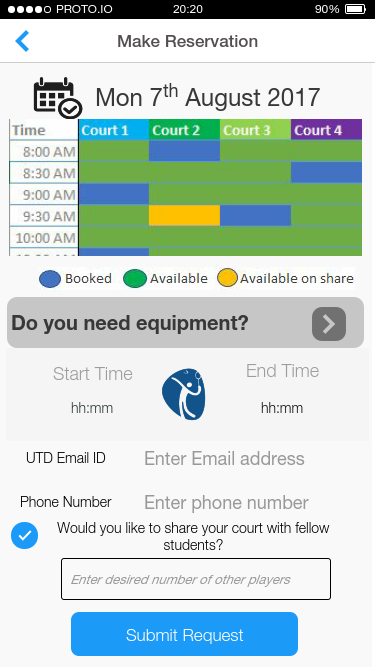
### Welcome Screen: This is displayed at App launch



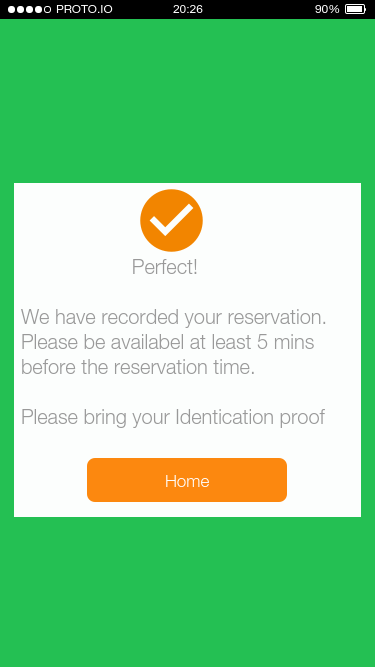
### Sport Selection Screen: This is the screen where user will select the game they want to play and based on this selection the context for further pages will be created.



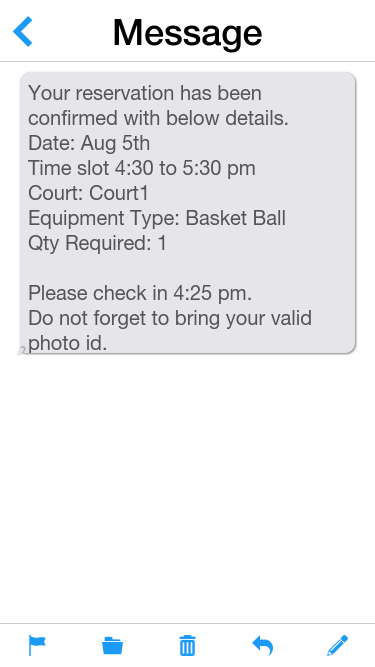
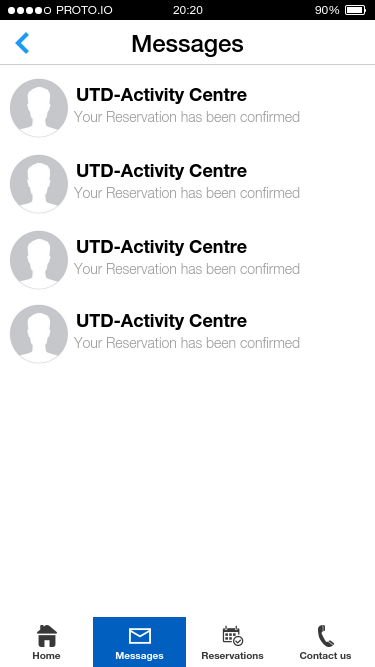
### Make Reservation Page: This page will provide a snapshot of the current availability of the courts. At the same time user, will be able to make a reservation. They would be able to book only available ones. The slots marked as YELLOW would indicate that the court is booked by someone else and they are willing to share. At this point of time, they would be asked if they would like to share the court with others.



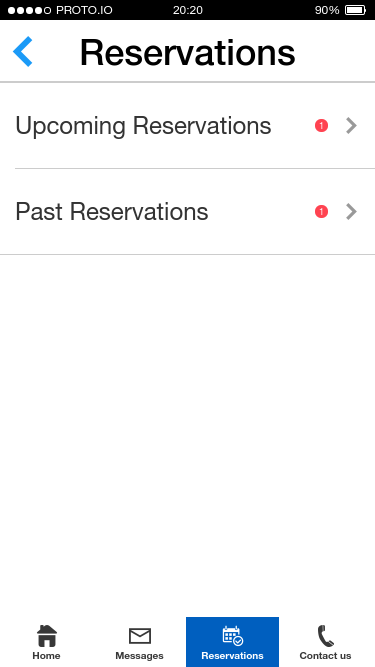
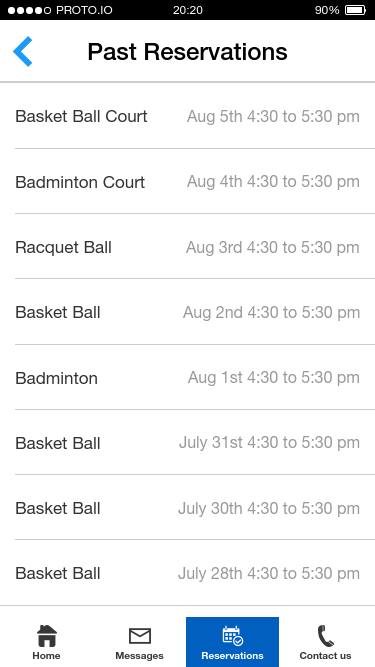
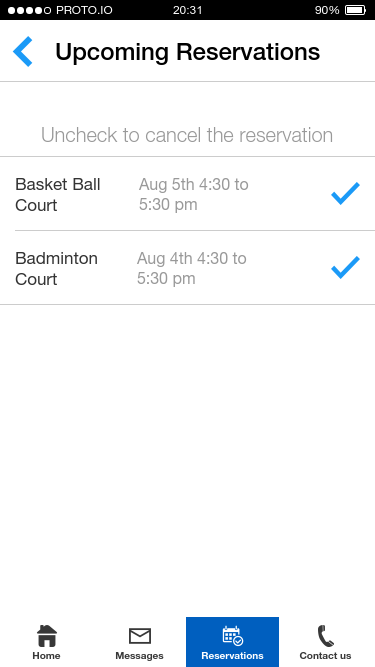
### Confirmation Page: This page will be displayed when user submits the request and the reservation is successfully made.



### Confirmation Notification



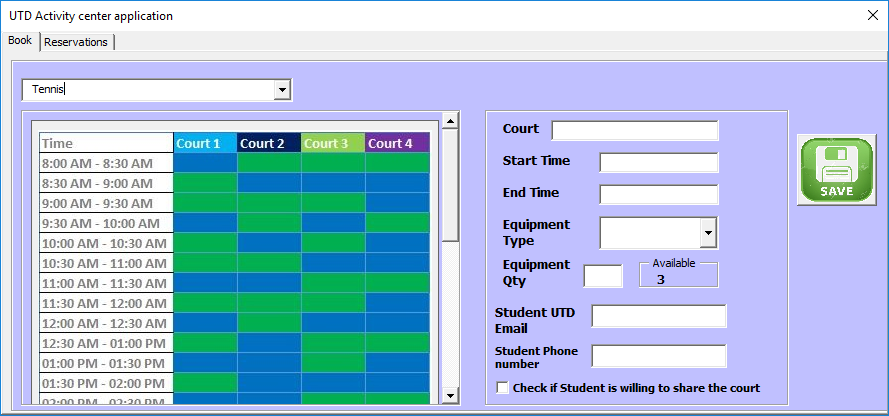
### Reservation List

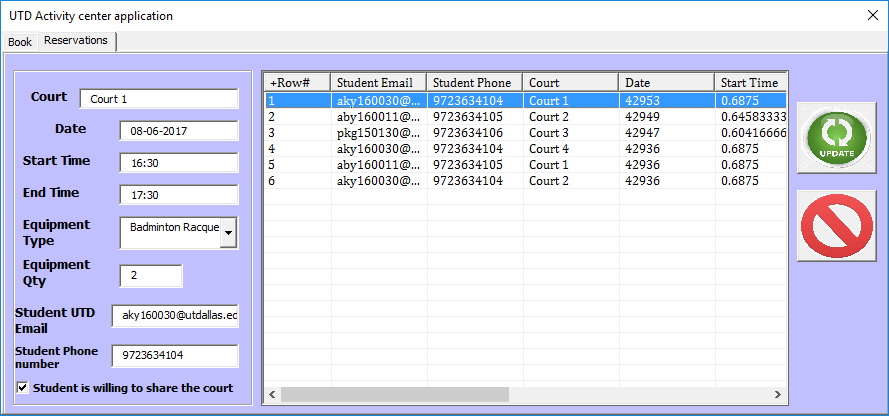
## ****Activity center staff****

Staff would have similar interface but it would be condensed to 2 simple screen.

### Check Availability and Make a reservation



Check all the reservation/Cancellation and updation



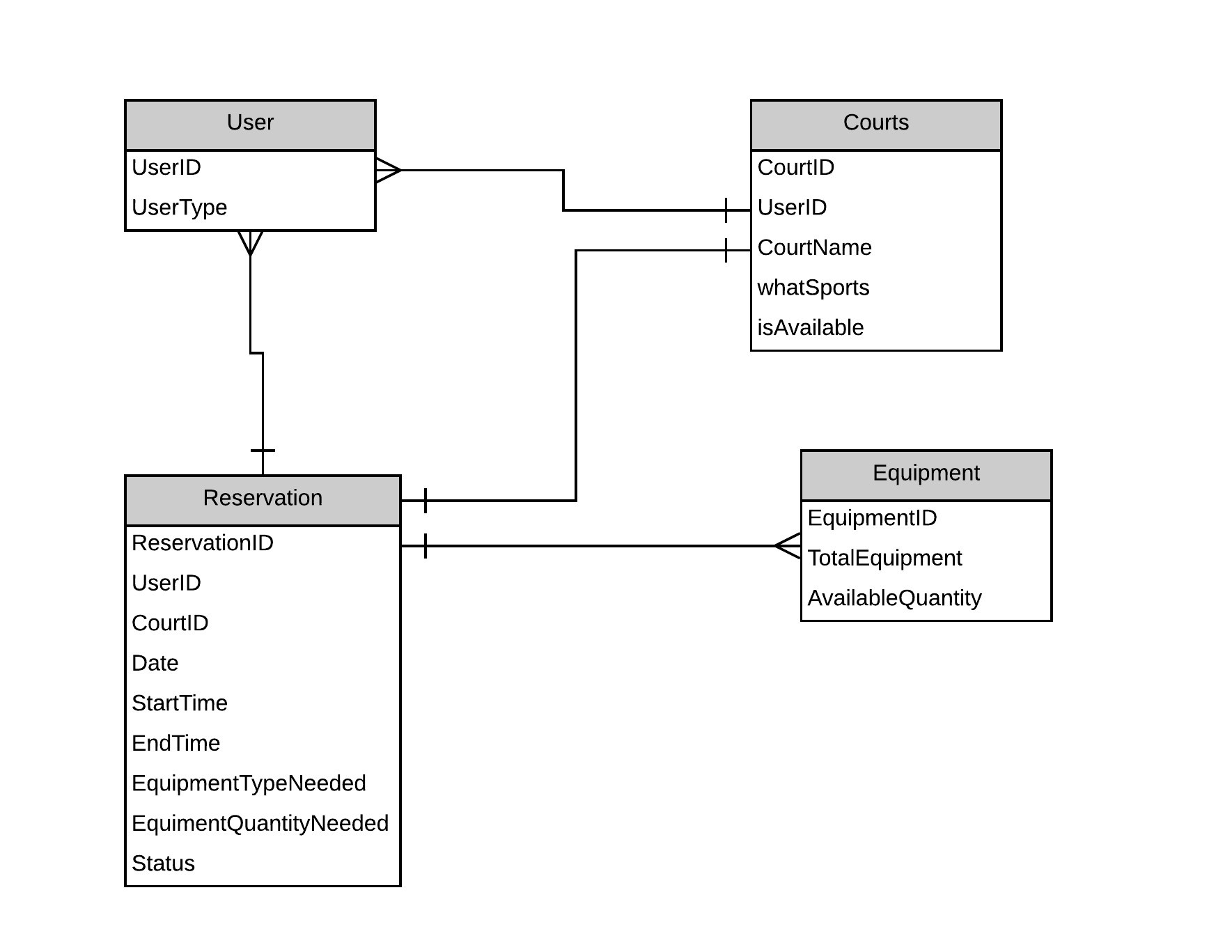
# DATABASE DESIGN

* **Student**(UserId, UserType ( Faculty/Student/Alumni), Password)  
  UserId is the primary key for Student table
* **StudentAndAlumni** (UserID + isEligible)
* **Faculty** (UserID + isEligible)
* **Court**(CourtID, CourtName,CourtType(Sport Type), Capacity)

CourtID should be unique and non-null.

* **CourtAvailable** (CourtID,Availability)
* **Equipment**  (EquipmentID + EquipmentType + TotalEquipmentQty + EquipmentCurrentlyQty)
* **BookCourt**(BookID,CourtID,UserID,NumberofHours,TimeofBooking,StartTime,EndTime,Day, EquipmentTypeNeeded,EquipmentQtyNeeded, AvailableForShare, IsActive)  
  BookID is the booking ID which is unique. CourtID and UserID are the foreign keys.
* **CancelCourt**(CancelID,CourtID,BookID,TimeofCancelling)  
  CancelID is the primary key and BookId is the foreign key in the BookCourt table.

# DATABASE MODEL



# SOFTWARE DESIGN

## **Sample Java Code**

import java.util.\*;

class Main {

   static Scanner sc = new Scanner(System.in);

   String name, pass;

  static boolean courts[] = new boolean[]{false, true, false};

  public static void main(String[] args) {

    String exitCode;

     boolean flag = false;

    System.out.println("hello ");

    for(int i = 0; i<courts.length;i++){

      if(courts[i] == false){

        flag = true;

      }

    }

    Main m = new Main();

 if( m.authenticate() == true && flag == false){

  System.out.println("All courts are booked");

  }else{

     courtAvailablity();

  }

  System.out.println("do you wish to continue? press e to exit");

  exitCode = sc.nextLine();

  if(exitCode.equals("e")!= true){

  //System.out.println("lloop");

  //goto label;

  }

  boolean authenticate(){

    System.out.println("Enter Email: ");

    name = sc.nextLine();

    System.out.println("Enter password: ");

    pass = sc.nextLine();

    if(name.equalsIgnoreCase("User1") && pass.equalsIgnoreCase("User1\_Pass")){

      return true;

    }else if(name.equalsIgnoreCase("User2") && pass.equalsIgnoreCase("User2\_Pass")){

      return true;

    }else if(name.equalsIgnoreCase("User3") && pass.equalsIgnoreCase("User3\_Pass")){

      return true;

    }else{

      System.out.println("Access denied");

      return false;

    }

  }

  int courtAvailablity(){

    System.out.println("Enter the court number for booking: 1 or 2 or 3");

    int courtNumber = sc.nextInt();

    if(courts[courtNumber-1] == false){

      courts[courtNumber-1] = true;

      System.out.println("court booked. Your court number is: "+ courtNumber);

      return 1;

    }else{

      System.out.println("Request for another court. Court number "+ courtNumber + " is booked for this time slot.");

      return 0;

    }

  }

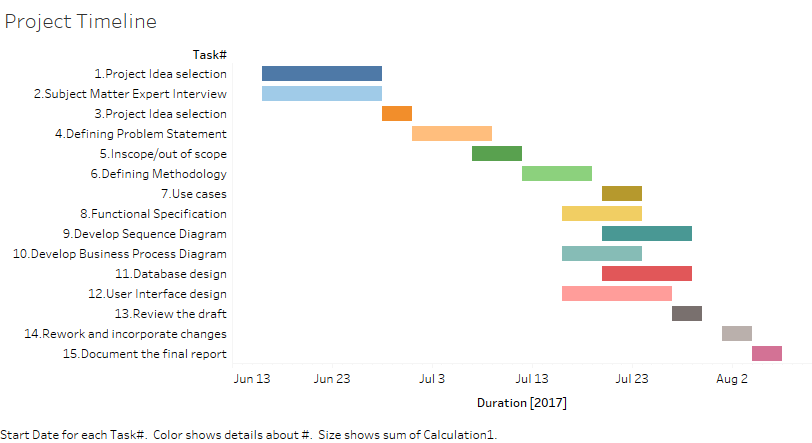
}

}

# SYSTEM CONTROL DESIGN

* Availability of data to calculate occupied and unoccupied court rooms.
* GET having more control over calculating available rooms, equipments and sharing of rooms with people, making activity center facilities quite efficient for students, alumni and faculties.
* Scheduling of events can be made more easier and provides user to plan his activity time more efficiently and is made more accessible using GET app.
* Reduce waste of time and gives control over selection of your own favorite activity with your desired time.

# PROJECT ACTIVITIES

****

# MINUTES OF THE PROJECT MEETINGS

## **Meeting 1:**

|  |  |
| --- | --- |
| Meeting 1 | Meeting for Group 6 – June 16th, 2017 8:00 PM– 9:30 PM |
| Meeting Type | SAPM Group Discussion |
| Attendees | Anuj Yadav, Priyesh Agarwal,Shalaka Pravin Mantri, Samrudhi Patil, Supriya Tated |
| Discussion | Project Idea selection- Discussion carried out on different ideas – Walmart Cart automated shopping, Online shopping,Dental purchasing system, UTD Activity Center |
| Conclusion | Discussed scope of each idea , decided to research more and finalise topic in next meeting |
| Next Meeting | June 24th, 2017 |

## **Meeting 2:**

|  |  |
| --- | --- |
| Meeting 2 | Meeting for Group 6 – June 24th, 2017 8:00 PM– 9:00 PM |
| Meeting Type | SAPM Group Discussion |
| Attendees | Anuj Yadav, Priyesh Agarwal,Shalaka Pravin Mantri, Samrudhi Patil, Supriya Tated |
| Discussion | Finalizing on one topic- UTD Activity Center; Discussed the scope at length: improve service and efficient allocation of activity center facilities to students. |
| Conclusion | Discussed all the facilities that should be provided and formed a layout of further meetings discussions. |
| Next Meeting | July 9th,2017 |

## **Meeting 3:**

|  |  |
| --- | --- |
| Meeting 3 | Meeting for Group 6 – July 9th, 2017 8:00 PM– 9:30 PM |
| Meeting Type | SAPM Group Discussion |
| Attendees | Anuj Yadav, Priyesh Agarwal,Shalaka Pravin Mantri, Samrudhi Patil, Supriya Tated |
| Discussion | Discussed current system and its problems in detail and objectives and outline for new system proposed |
| Conclusion | Documented the problem statement and objective of new system |
| Next Meeting | July 16th,2017 |

## **Meeting 4:**

|  |  |
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| Meeting 4 | Meeting for Group 6 – July 16th, 2017 8:00 PM– 10:00 PM |
| Meeting Type | SAPM Group Discussion |
| Attendees | Anuj Yadav, Priyesh Agarwal,Shalaka Pravin Mantri, Samrudhi Patil, Supriya Tated |
| Discussion | Discussed on Use case Diagrams ,sequence diagram and data dictionary |
| Conclusion | UML Diagrams to be completed as soon as possible. |
| Next Meeting | July 29th,2017 |

## **Meeting 5:**

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| Meeting 5 | Meeting for Group 6 – July 29th, 2017 8:00 PM– 9:30 PM |
| Meeting Type | SAPM Group Discussion |
| Attendees | Anuj Yadav, Priyesh Agarwal,Shalaka Pravin Mantri, Samrudhi Patil, Supriya Tated |
| Discussion | Class diagram and database design discussion. |
| Conclusion | Class Diagram should be completed till next meeting. |
| Next Meeting | August 5th,2017 |

## **Meeting 6:**

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| --- | --- |
| Meeting 6 | Meeting for Group 6 – August 5th, 2017 8:00 PM– 9:00 PM |
| Meeting Type | SAPM Group Discussion |
| Attendees | Anuj Yadav, Priyesh Agarwal,Shalaka Pravin Mantri, Samrudhi Patil, Supriya Tated |
| Discussion | Took note of whether everything is going according to the timeline posted and whether we are not missing on something crucial. |
| Conclusion | Final reporting needs to be reviewed and changed if required. |
| Next Meeting | August 7th,2017 |

## **Meeting 7:**

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| Meeting 7 | Meeting for Group 6 – August 7th, 2017 4:00 PM– 6.00 PM |
| Meeting Type | SAPM Group Discussion |
| Attendees | Anuj Yadav, Priyesh Agarwal,Shalaka Pravin Mantri, Samrudhi Patil, Supriya Tated |
| Discussion | Completed report documentation and proof-read |
| Conclusion | Completed report to be submitted. |

# REFERENCES

http://www.utdallas.edu/urec/