# COP 290 Assignment 2

## Complaint Management System


**Aditi**
2014CS10205

**Ayush Bhardwaj**
2014CS10091

**Nikhil Gupta**
2014CS50462

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# Contents

# 1 Objectives

Design an App which is :

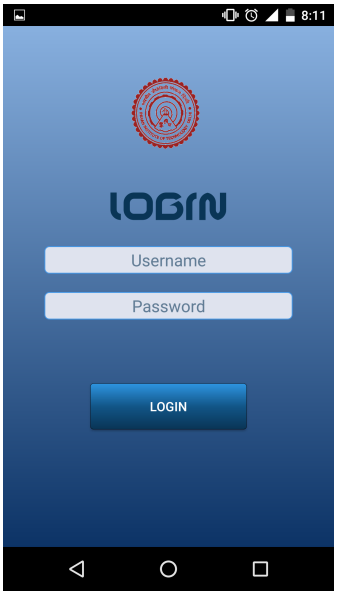
- Complaint Management System for IIT Delhi
- The Users of the App would be the people of the institute such as faculties, students, and institute employees
- Addresses three levels of complaints:
  1. Individual Complaint
  2. Hostel-level Complaint
  3. Institute-level complaint
- The users can submit their grievance to the the concerned authorities

# 2 Overall Design

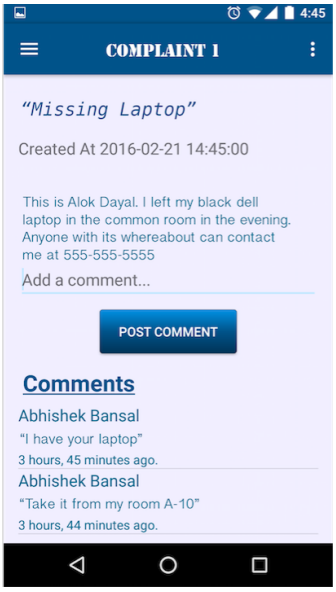
1. The server side will be programmed in Web2py [2]
2. The android app will be made using Java
3. The app would be extended to other phones as well as web clients
4. Volley will be used to send requests and receive responses
5. Shared Preferences will be used to maintain the feature of Persistent login
6. Doxygen will be used to create HTML documentation of the entire code base.
7. App would support multiple screen sizes [1]
8. Users can select their preferred topics.Only complaints related to selected topics will be visible to the user.
9. The entire code will be split up in multiple files to ensure modularity in code.

# 3 User Interface


(a) Splash Screen

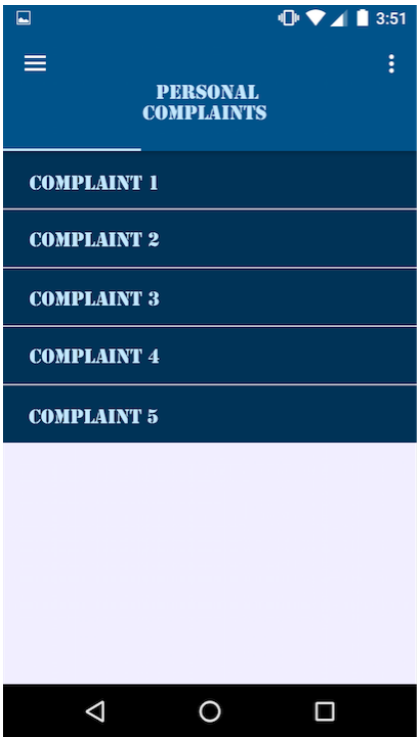



(b) Login Page




(a) Complaint Information UI


(b) Complaints List View




(a) Complaint Type Screen

## 3.1 Front End

### 3.1.1 Splash Screen

- This is the first screen that is displayed on the starting of the app.
- It has been made dynamic and interactive by adding animations and gesture recognitions

### 3.1.2 Login Screen

- The login page requests for the user's username and password and validates the login.
- It is displayed only after left swiping the splash screen.

### 3.1.3 Complaint List Screen

- This screen is a tabbed activity that contains the following tabs:
  1. Notifications (Displays new complaints)
  2. Complaints (Displays all the complaints, sorted by their types)

3. Alerts (Displays the complaints important to the user )

- The tabs contain information using ListViews

#### 3.1.4 Complaint Type Screen

- This screen lists all complaints of the same type in an ExplandableList type.
- Clicking on a particular complaint will list some basic detains about the complaint.
- Appyling the sliding gesture on the complaint will open up the detailed complaint information screen.

#### 3.1.5 Complaint Information Screen

- This screen contails all the indepth details of the complaint.
- It allows the user to add comments to the thread of the complaint.

# 4 Features

## 4.1 Individual Complaints

- The end user's complaint will be visible to the concerned authority only.
- Once the complaint is addressed,the user should be able to mark it as resolved
- The user can mark the complaint as resolved or take the complaint to the higher authority

#### 4.1.1 Options for the user

The person filing the complaint can fill in the following options:

1. Name
2. Entry Number or Employee Number
3. Phone Number
4. Complain category
5. Address/Hostel Name
6. Content of the Complain
7. Extra details

#### 4.1.2 Options for the receiver

1. See all details
2. Request user to mark as completed
3. Take to higher authority

#### 4.1.3 Follow up options

1. Mark the complain as completed
2. Take to higher authority

#### 4.1.4 Complaint Categories

1. Room Maintenece
2. Student Counselling Services
3. BSW
4. Academic

### 4.2 Hostel Level Complaints

- The end user's complaint would be visible to all the hostel residents who will be affected by the complaint.
- The concerned authority would have the right to mark the complaint as resolved.
- The complaint will be referred to a higher authority in a hierarchical order if
    1. Authority has marked the complaint as resolved but majority of users are not satisfied
    2. The time taken to resolve the complaint has exceeded a given time
- The Warden will be the highest authority.Veto powers will be given to the Warden

#### 4.2.1 User Options

1. Name or Anonymous
2. Entry Number or Anonymous
3. Phone Number or Anonymous
4. Complain category
5. Contents
6. Additional Information

#### 4.2.2 Other's Options

1. People can Upvote, Downvote or be neutral to the complain.
2. If the problem is not resolved in 7 days according to the majority, then the complain gets sent to the higher authority.
3. People can add comments to the complain.

#### 4.2.3 Receiver's Options

1. Mark as resolved.
2. Send to higher authority

#### 4.2.4 Follow Up options

1. Mark as resolved based on majority
2. Send to higher authority based on majority

#### 4.2.5 Complaint Categories

1. Mess
2. Maintenence
3. Sports
4. BSW
5. Cultural Clubs

### 4.3 Institute Level Complaints

- The end user's complaint would be visible to all the institute residents who will be affected by the complaint.
- The concerned authority would have the right to mark the complaint as resolved.
- The complaint will be referred to a higher authority in a hierarchical order if
    1. Authority has marked the complaint as resolved but majority of the users are not satisfied
    2. The time taken to resolve the complaint has exceeded a given time
- The Concerned Dean will be the highest authority possessing Veto powers

#### 4.3.1 User Options

1. Name or Anonymous
2. Entry Number or Anonymous
3. Phone Number or Anonymous
4. Complain category
5. Contents
6. Additional Information

#### 4.3.2 Other's Options

1. People can Upvote, Downvote or be neutral to the complain.
2. If the problem is not resolved in 7 days according to the majority, then the complain gets sent to the higher authority.
3. People can add comments to the complain.

#### 4.3.3 Receiver's Options

1. Mark as resolved.
2. Send to higher authority

#### 4.3.4 Follow Up options

1. Mark as resolved based on majority
2. Send to higher authority based on majority

#### 4.3.5 Complaint Categories

1. General Infrastructure Faults
2. Security
3. Network Connectivity
4. Cultural and Technical Clubs/Organisations
5. Academic

# 5 Sub Components

## 5.1 Server Back End

The back end has been divided into further sub components to facilitate the development process.

### 5.1.1 Databases

Table 1: User Database Table

| S.No. | Fields | Type | Description |
|---|---|---|---|
| 1 | Name | String | Name of the person |
| 2 | Unique Id | String | Entry Number for students or Employee Code for staff and faculty |
| 3 | User Type | Int | Information regarding user being a student or staff or faculty |
| 4 | Contact Number | String | Phone Number |
| 5 | Hostel | String | Hostel if any |
| 6 | Other Details | String | Any other details |
| 7 | Password | String | Password in hashed form |
| 8 | User Id | String | Entry Number for students or Employee Code |
| 9 | Hostel Preferences | String | Bit string to represent interest in Hostel activities |
| 10 | Institute Preferences | String | Bit string to represent interest in Institute activities |
| 11 | Extra Preferences | String | Bit String to represent interest in Other activities |

Table 2: Administrator Information

| S.No. | Fields | Type | Description |
|---|---|---|---|
| 1 | User Id | String | Unique user id |
| 2 | Complaint Area | Int | Integer code for complaint area |
| 3 | Level | Int | Priority level for person |
| 4 | Description | String | Extra information |
| 5 | Hostel Id | Int | ID of hostel if any |

Table 3: Responses to a Complaint

| S.No. | Fields | Type | Description |
|---|---|---|---|
| 1 | User Id | String | Entry Number for students or Employee Code for staff and faculty |
| 2 | Complaint Id | Int | Integer code for complaint area |
| 3 | Response | Int | Int corresponding to Upvote, Downvote or being neutral |

Table 4: Hostel Mapping

| S.No. | Fields | Type | Description |
|---|---|---|---|
| 1 | Hostel Id | Int | Integer for a hostel |
| 2 | Hostel Name | String | String for hostel |

Table 5: Complaint Category Mapping

| S.No. | Fields | Type | Description |
|---|---|---|---|
| 1 | Category Id | Int | Integer for a complaint category |
| 2 | Category Description | String | String for a complaint category |

Table 6: Comments on a complaint

| S.No. | Fields | Type | Description |
|---|---|---|---|
| 1 | Complaint Id | String | Unique Id for Complaint |
| 2 | User Id | String | Unique User Id |
| 3 | Description | String | Complaint comment |
| 4 | Time Stamp | Time | Time of Comment |
| 5 | Anonymous | Boolean | Whether user is anonymous |

Table 7: Complaint User Mapping

| S.No. | Fields | Type | Description |
|---|---|---|---|
| 1 | Complaint Id | String | Unique Id for Complaint |
| 2 | User Id | String | Unique User Id |

Table 8: Notifications

| S.No. | Fields | Type | Description |
|---|---|---|---|
| 1 | Complaint Id | String | Unique Id for Complaint |
| 2 | From User Id | String | Unique User Id |
| 3 | To User Id | String | Unique User Id |
| 4 | Description | String | Content of notifcation |
| 5 | Seen | Boolean | Marked as seen or not |

Table 9: User Satisfaction Response

| S.No. | Fields | Type | Description |
|---|---|---|---|
| 1 | User Id | String | Entry Number for students or Employee Code for staff and faculty |
| 2 | Complaint Id | Int | Integer code for complaint area |
| 3 | Response | Int | Int corresponding to Satisfied or not |

Table 10: Individual Complaint

| S.No. | Fields | Type | Description |
|---|---|---|---|
| 1 | Complaint Id | String | Unique Id for Complaint |
| 2 | User Id | String | Unique User Id |
| 3 | Complaint Type | Int | Complaint category |
| 4 | Complaint Content | String | Content of complaint |
| 5 | Extra Info | Image | Upload a photo |
| 6 | Admin Id | String | Id of person assigned |
| 7 | Time Stamp | Time | Time of filing the complaint |
| 8 | Resolved | Boolean | Resolved or Not |
| 9 | Mark for resolution | Boolean | Option for complaint addressee to seek approval |
| 10 | Comment | String | Any comments |
| 11 | Previous Id | Int | Previous complaint id if any |

Table 11: Hostel Level Complaint

| S.No. | Fields | Type | Description |
|---|---|---|---|
| 1 | Complaint Id | String | Unique Id for Complaint |
| 2 | User Id | String | Unique User Id |
| 3 | Complaint Type | Int | Complaint category |
| 4 | Complaint Content | String | Content of complaint |
| 5 | Extra Info | Image | Upload a photo |
| 6 | Admin Id | String | Id of person assigned |
| 7 | Time Stamp | Time | Time of filing the complaint |
| 8 | Resolved | Boolean | Resolved or Not |
| 9 | Mark for resolution | Boolean | Option for complaint addressee to seek approval |
| 10 | Comment | String | Any comments |
| 11 | Previous Id | Int | Previous complaint id if any |
| 12 | Hostel | Int | Hostel Id |
| 13 | Anonymous | Boolean | Anonymous or not |
| 14 | Number of Up-votes | Int | Number of Up-votes |
| 15 | Number of Down-votes | Int | Number of Down-votes |
| 16 | Number of Neutrals | Int | Number of Neutral people |
| 17 | Number of Satisfied | Int | Number of people satisfied |
| 18 | Number of Dissatisfied | Int | Number of people dissatisfied with solution |

Table 12: Institute Level Complaint

| S.No. | Fields | Type | Description |
|---|---|---|---|
| 1 | Complaint Id | String | Unique Id for Complaint |
| 2 | User Id | String | Unique User ID |
| 3 | Complaint Type | Int | Complaint category |
| 4 | Complaint Content | String | Content of complaint |
| 5 | Extra Info | File | Upload a photo |
| 6 | Admin Id | String | Id of person assigned |
| 7 | Time Stamp | Time | Time of filing the complaint |
| 8 | Resolved | Boolean | Resolved or Not |
| 9 | Mark for resolution | Boolean | Option for complaint addressee to seek approval |
| 10 | Comment | String | Any comments |
| 11 | Previous Id | Int | Previous complaint id if any |
| 12 | Anonymous | Boolean | Anonymous or not |
| 13 | Number of Up-votes | Int | Number of Up-votes |
| 14 | Number of Down-votes | Int | Number of Down-votes |
| 15 | Number of Neutrals | Int | Number of Neutral people |
| 16 | Number of Satisfied | Int | Number of people satisfied |
| 17 | Number of Dissatisfied | Int | Number of people dissatisfied with solution |

## 5.2 Network APIs

The following API's will be provided: [**?**]

1. **Login**
   URL: `/default/login.json>`
   Returns: JSON object with Success/Failure and UserDetails
   Request: POST containing UserName And Password

2. **Logout**
   URL: `/default/logout.json`
   Returns: JSON object with Success/Failure
   Request: GET

3. **Change Password**
   URL: `/default/change_pass.json?newpwd=<new_password>`
   Returns: JSON object with Success/Failure
   Request: POST containing the changed password

4. **Get Notifications**
   URL: `/default/notifications.json`
   Returns: JSON object containing list of all notifications.
   Request: GET

5. **Get Preferences**
   URL: `/user/preferences.json`

Returns: JSON object containing bitstrings of preferences and corresponding preference areas.
Request: GET

6. **Set Preferences**
URL: /user/update_preferences.json?hostel=<hostel_pref>&institute=<insti_pref>&extra=<extra_pref>
Returns: JSON object containing updated bitstrings and corresponding preference areas.
Request: GET

7. **Get Administrator**
URL: /admin/get_admin.json?complian_area=<Complain>&level=<level>&Hostel=<hostel_id>
Returns: JSON object containing the administrator of a Complaint at a particular level
Request: GET

8. **Get Response**
URL: /complaint/get_user_response.json?complian_id=<Complain>
Returns: JSON object containing the response of a user to a public complaint
Request: GET

9. **Set Response**
URL: /complaint/set_user_response.json?complian_id=<Complain>&Response=<response>
Returns: JSON object with Success/Failure.Sets the response of a user to a public complaint
Request: GET

10. **Complain Category Mapping**
URL: /complaint/get_desc.json?category_id=<cat>
Returns: JSON object containing the category description
Request: GET

11. **Hostel Mapping**
URL: /default/get_hostel.json?hostel_id=<hos_id>
Returns: JSON object containing the Hostel,ID pair
Request: GET

12. **Get Comment**
URL: /complaint/get_comments.json?complain_id=<id>
Returns: JSON object containing all the comments on the thread to a complain
Request: GET

13. **Post Comment**
URL: /complaint/post_comments.json?complain_id=<id>&comment=<comment>

Returns: JSON Success Response on posting a comment on the thread to a complain
Request: GET

14. **Get Notification**
URL: /notification/get_noti.json
Returns: JSON object containing the set of notifications concerning the user
Request: GET

15. **Set Notification Status**
URL: /notification/set_noti_status.json?compliant_id=<complain_id>&response=<seen/unseen>
Returns: JSON object with Success/Failure.Sets the seen/unseen status of the user
Request: GET

16. **Get User Satisfaction**
URL: /complaint/get_user_satus.json?compliant_id=<complain_id>
Returns: JSON object containing the user's satisfaction after the complaint is resolved
Request: GET

17. **Update user response**
URL: /complaint/put_user_satus.json?compliant_id=<complain_id>&response=<int>
Returns: JSON object with Success/Failure.Sets the user's satisfaction after the complaint is resolved
Request: GET

18. **Add Complaint**
URL: /complaint_data/add_complaint.json
Returns: JSON object with Success/Failure.Adds a complaint to the database
Request: POST containing complain type,complaint content,extra_info,anonymous_boolean

19. **Edit Complaint**
URL: /complaint_data/edit_complaint.json
Returns: Edits an existing complaint in the database
Request: POST containing complain type,complaint content,extra_info,anonymous_boolean

20. **Send to Higher Authority**
URL: /complaint/hig_auth.json?complaint_id=<id>
Returns: Sends the complaint to Higher Authority

21. **Get all Complaints** URL: /complaint_data/get_all.json
Returns: Return all the complaints concerning the user Request: GET

22. **Get Complaint Detail**
    URL: /complaint_data/get_complaint_details.json?complaint_id=<id>
    Returns: JSON object containing the details of a complaint
    Request: GET

23. **Get Complaints to be Addressed**
    URL: /admin_complaint/get_all_complaints.json
    Returns: JSON object containing all the complaints to be addressed
    Request: GET

24. **Get Complainant Details**
    URL: /admin_complaint/get_complainant.json?complaint_id=<id>
    Returns: JSON object containing the Complainant's detail
    Request: GET

25. **Mark Approved**
    URL: /admin_complaint/mark_resolved.json?Complaint_id=<id>&boolean_resolve=<bool_done>
    Returns: JSON object with Success/Failure.Success in marking for the Complainant's Approval
    Request: GET

26. **Add Administrator's Comment**
    URL: /admin_complaint/add_comment.json?complaint_id=<id>&desc=<description>
    Returns: JSON object with Success/Failure.Success in marking for the Complainant's Approval

27. **Take to Higher Authority**
    URL: /admin_complaint/take_to_higher.json?complaint_id=<id>
    Returns: JSON object with Success/Failure.Success in sending the complaint to higher authority
    Request: GET

28. **Add User**
    URL: /default/add_user
    Returns: JSON object containing the details of user added to the database
    Request: POST containing all the details of user

## 5.3 Further server tasks

1. Crontab tasks will be used to schedule periodic events like database cleanup and sending complaints to higher authorities.

2. Crontab will also be used to generate push notifications for devices.

## 5.4 Android App Back End

- Volley will be used to send requests and receive responses.
- A separate class will be used to maintain the Session Cookies.

Listing 1: App_Cookie Class

```
class App_Cookie extends Application
{
    CookieManager cookieManage;
    // Manages the Cookie Session for the Entire Application
    public:
    public void onCreate()
    {
        cookieManage = new CookieManager();
        CookieHandler.setDefault(cookieManage);
        super.onCreate();
    };
};
```

- Shared Preferences

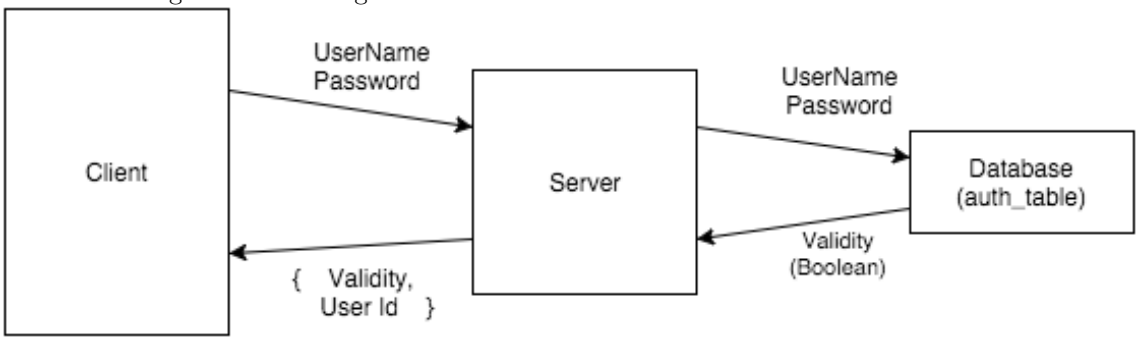
Listing 2: Persistent Login

```
EditText username, password;
public static final String AppPREFERENCES = "AppPrefs";
public static final String UserId = "userId";
SharedPreferences sharedpreferences;
public void check_logged_in()
{// Checks if the user is already logged.
 // If logged in, he is directed to the HomePage.
 sharedpreferences = getSharedPreferences
                (AppPREFERENCES, Context.MODE_PRIVATE);
 SharedPreferences.Editor editor = sharedpreferences.edit();
 int user_id= sharedpreferences.getInt("userID", 0);
 if(user_id!=0) // User_id is zero, if none is logged in
 {   Intent i = new Intent(Login.this,HomePage.class);
     i.putExtra("userID",user_id);
     startActivity(i);
 // Logged in user is directed to his Home Page
 }
 return;
};
```

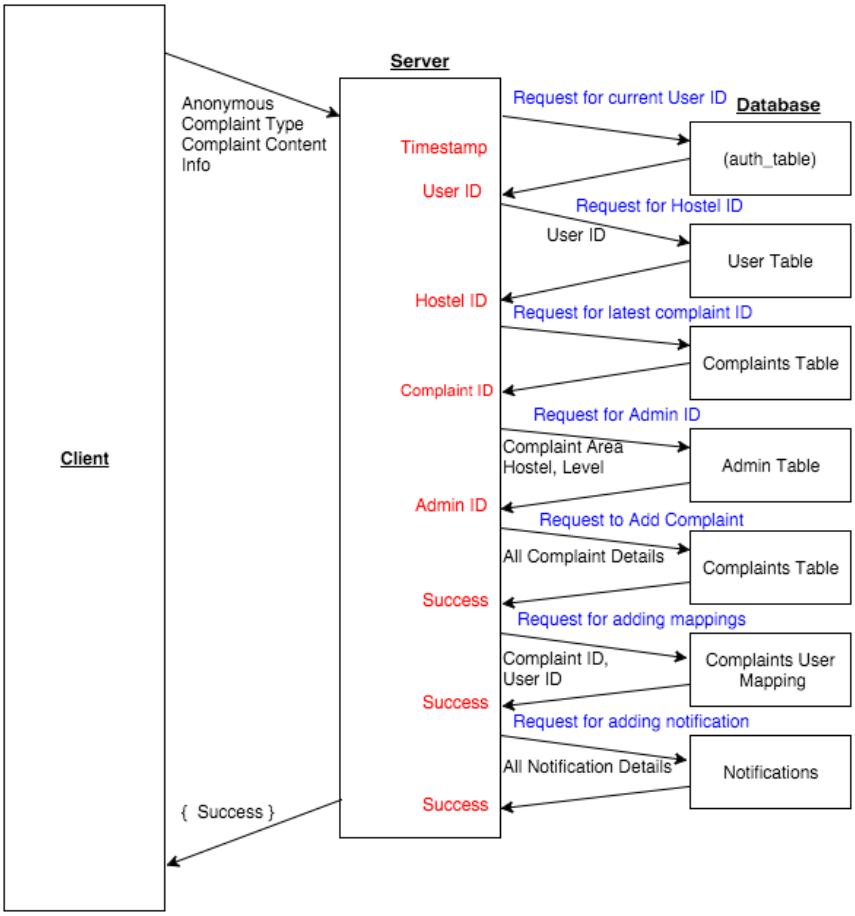
# 6 Interaction amongst Sub Components

## 6.1 API and Server

1. Event flow diagram for user login

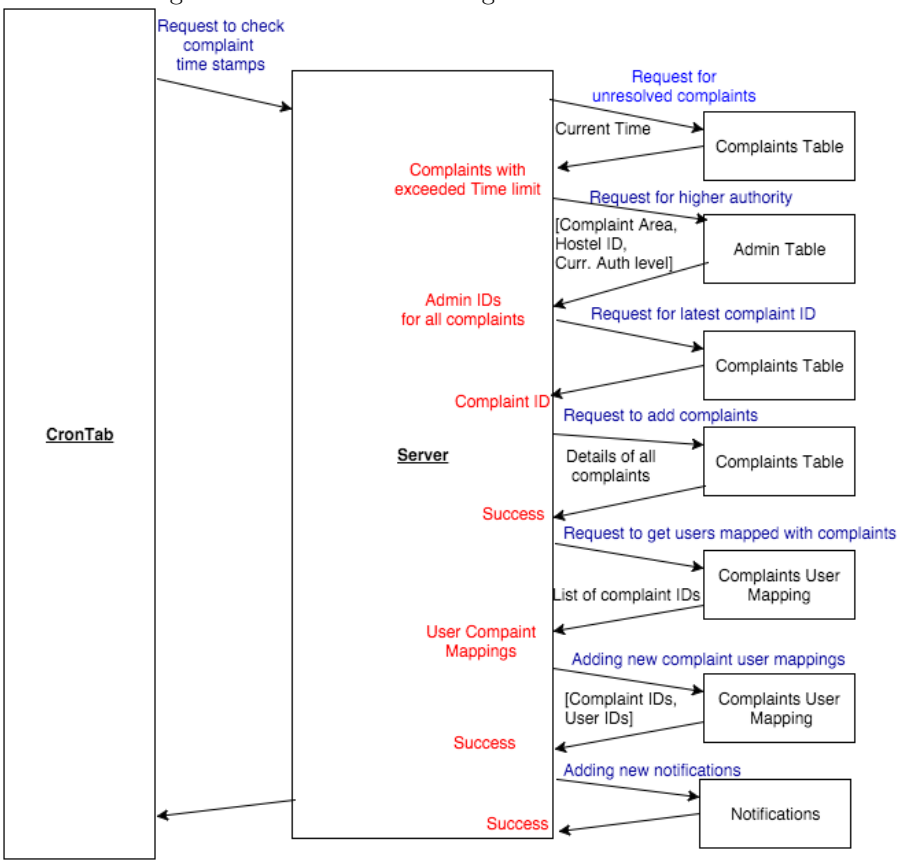



2. Event flow diagram for user adding a complaint.


Client
Server
Database
Anonymous
Complaint Type
Complaint Content
Info
{ Success }
Timestamp
User ID
Hostel ID
Complaint ID
Admin ID
Success
Success
Success
Request for current User ID
(auth_table)
Request for Hostel ID
User ID
User Table
Request for latest complaint ID
Complaints Table
Request for Admin ID
Complaint Area
Hostel, Level
Admin Table
Request to Add Complaint
All Complaint Details
Complaints Table
Request for adding mappings
Complaint ID,
User ID
Complaints User Mapping
Request for adding notification
All Notification Details
Notifications

## 6.2 Internal Server

Event flow diagram for crontab scheduling.




# 7 Testing Of Components

## 7.1 Server and APIs

- Unit testing will be used to check if the server and end points are working correctly.
- For each endpoint, stress testing will be done via python or bash scripts to verify that the APIs perform as expected in various situations.

## 7.2 Android App

We will use the Unit Testing component of Android studio to test each class created in the app for correctness. By doing this we will ensure that no errors take place on the android app and the user has a bug free experience.

### 7.3 Overall Testing

We will use the app on our phones once it is ready to identify and squash any remaining bugs in the app or the server.

## 8 Extra Features

- The scope of the Application will be extended to Web Clients
- Hierarchy of Authorities would be maintained for every Complaint Type and Category
- In public level complaints option to register complaint as anonymous would be provided
- Users would be allowed to select the categories that affect them.Only public level complaints related to these categories will be displayed to the user
- Notification would be marked seen/unseen
- Users will get option to mark as satisfactory/unsatisfactory after the complaint is resolved
- Users will be able to post comments in the thread related to the concerned complaint
- The admin has an option to make a phone call or send an email through the app to the person who lodged the complaint.

## 9 Future Endeavors

- Keep local cache of changes done, at mobile level and sync them with the global server as soon as Internet connectivity is supplied.
- To extend the scope of Application to Windows as well as iOS client.Same Networking API's will be used.
- Users to be synchronized into the database via their Kerberos ID
- View location in google map/instiapp

## 10 Source Code

The source code of the project is maintained in the following repository:
https://github.com/aditi741997/COP290_Assignment_2.git

# References

[1] Supporting tab and phone view. http://developer.android.com/training/multiscreen/screensizes.html.

[2] Web2py. http://www.web2py.com/appliances/.