

City Complaint System

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Introduction

Introduction

- This project is about developing a city complaint system in a city
- The geographical scope is a city in Malaysia, for example Penang city
- Other scopes are:
 - Only for individual complainant (not for organisation)
 - Only for those with valid IC number (which means citizen or permanent resident)

First Objective

- The first objective is to develop a city complaint system website
- The website will allow complainant to lodge complaint and check complaint status
- The website will also allow complaint handler to search for complaint case and handle specific complaint case

Second Objective

- The second objective is to implement statistical reporting feature in the website
- This feature will allow administrator to view the overall statistics about the complaint cases in the system

Type of Users

- The system has 3 types of users:
 - Complainant
 - Complaint handler
 - Administrator

Complainant

- Complainant is a person who creates a complaint case
- A complainant:
 - Upon registration need to verify email address through OTP
 - Can lodge complaint by filling up complaint form
 - Can view his own complaint status and history
 - Can reply to complaint handler's message
 - Will receive notification in his email when there is new changes in his case

Complaint Handler

- Complaint handler is a person who handles complaint case
- A complaint handler:
 - Is registered by the administrator
 - Can search for complaint cases
 - Can view complaint case's details (includes complainant's personal details)
 - Can change status of complaint case
 - Can send message to complainant

Administrator

- Administrator is a complaint handler who has higher privileges
- An administrator:
 - Can only be added from the code or from database
 - Can do everything complaint handler can do
 - Can add and remove:
 - Complaint handler
 - List of areas available in complaint form
 - List of categories available in complaint form
 - Can access statistical reporting page

Literature Review

Existing / similar system

- Reviewed the general workflow of public complaint system
- Reviewed the complaint form and personal details fields
- Reviewed the mechanism of status update

Statistical Reporting

- Reviewed the type of charts used
- Reviewed the type of information presented

Method

Methodology

- The methodology used in this project is waterfall methodology
- The stages are:
 - Requirement analysis
 - System design
 - Implementation
 - Testing

Requirement Analysis

- Wrote the problem statement
- Defined the scope
- Carried out literature review

System Design

- Drawn the use case diagram
- Drawn the entity relationship diagram
- Drawn the flow chart

Use Case Diagram - Complainant

- https://drive.google.com/file/d/1gK0mnMtkK_FDvWX01QHPD90Y7EqS-bjy/view?usp=sharing

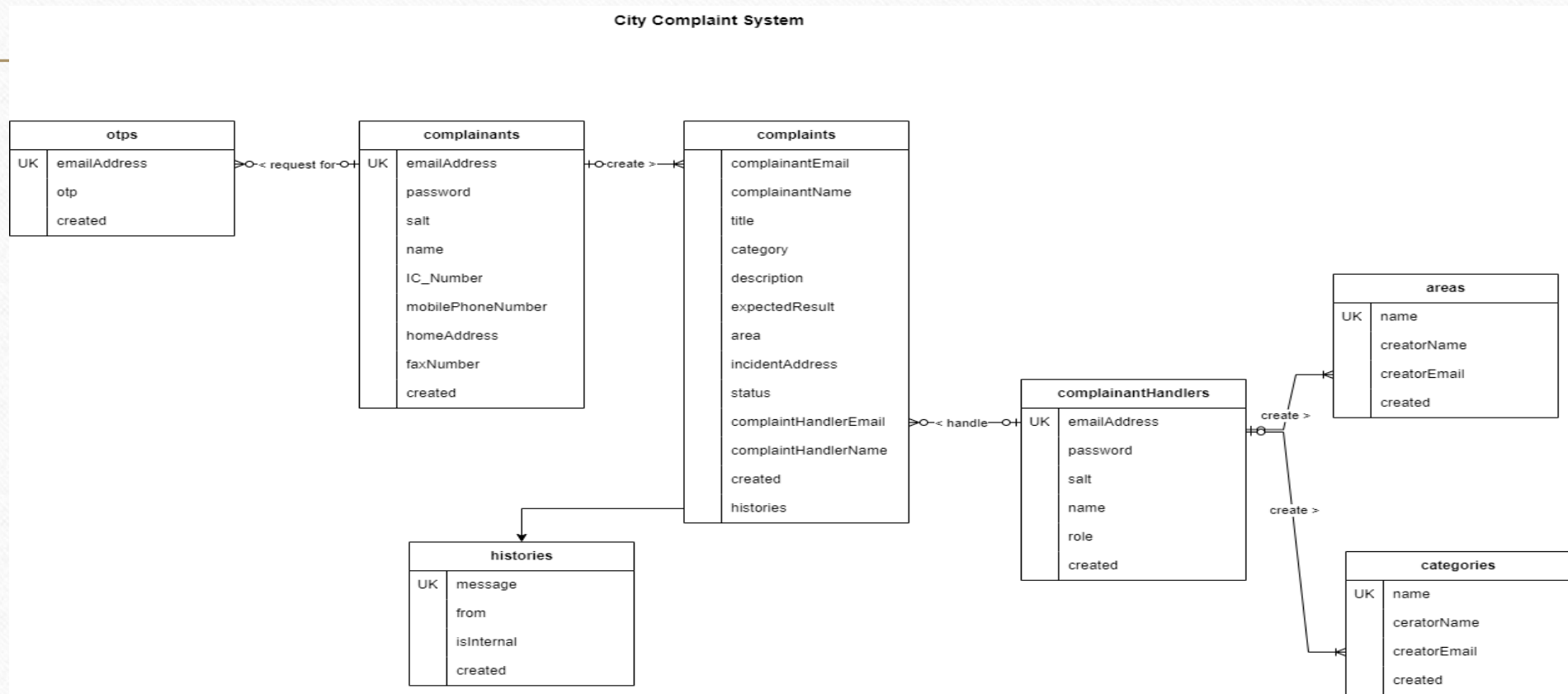
Use Case Diagram – Complaint Handler

- <https://drive.google.com/file/d/1pbaAX0z12lV7rplQM4dqeTwpa9T5czw6/view?usp=sharing>

Use Case Diagram - Administrator

- <https://drive.google.com/file/d/1qABDEepxQqbX6KTBUNnv6YKQTF0vZInA/view?usp=sharing>

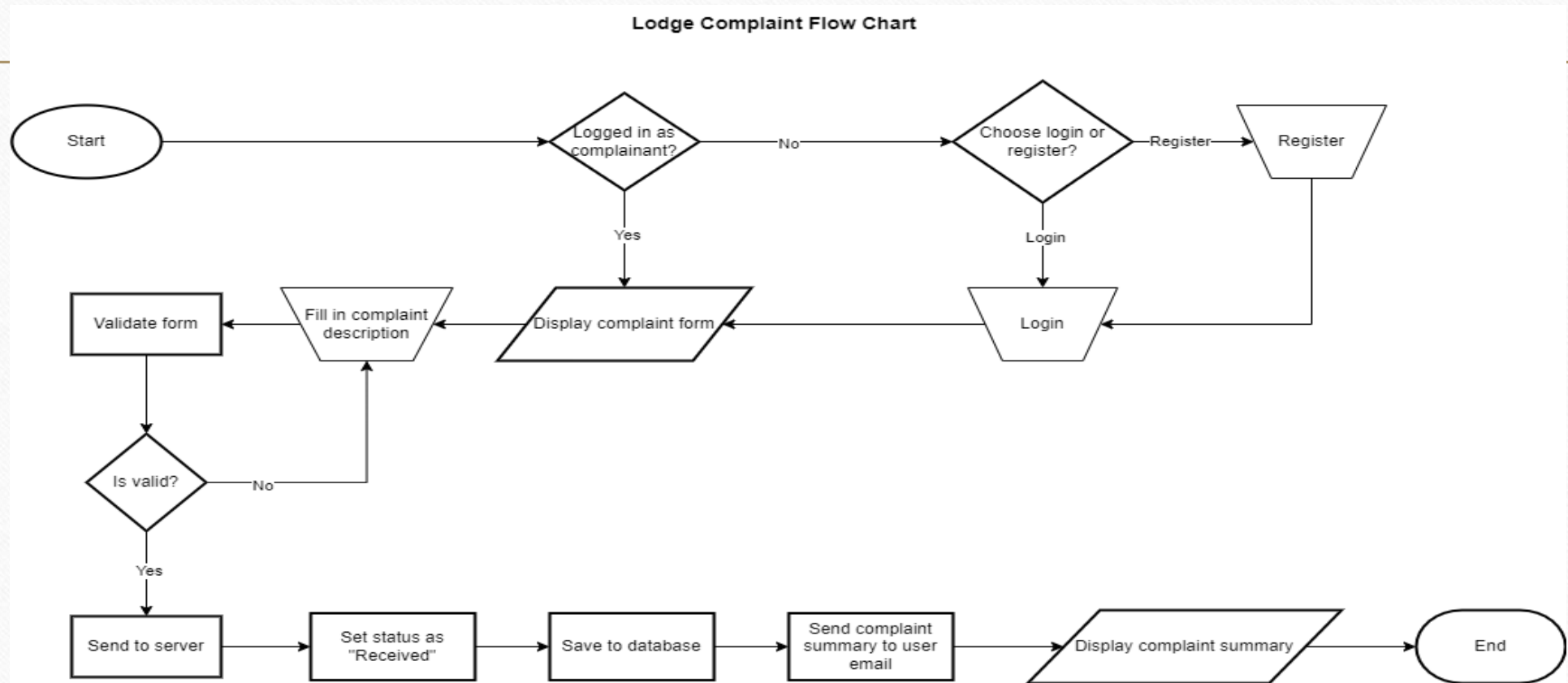
Entity Relationship Diagram



Entity Relationship

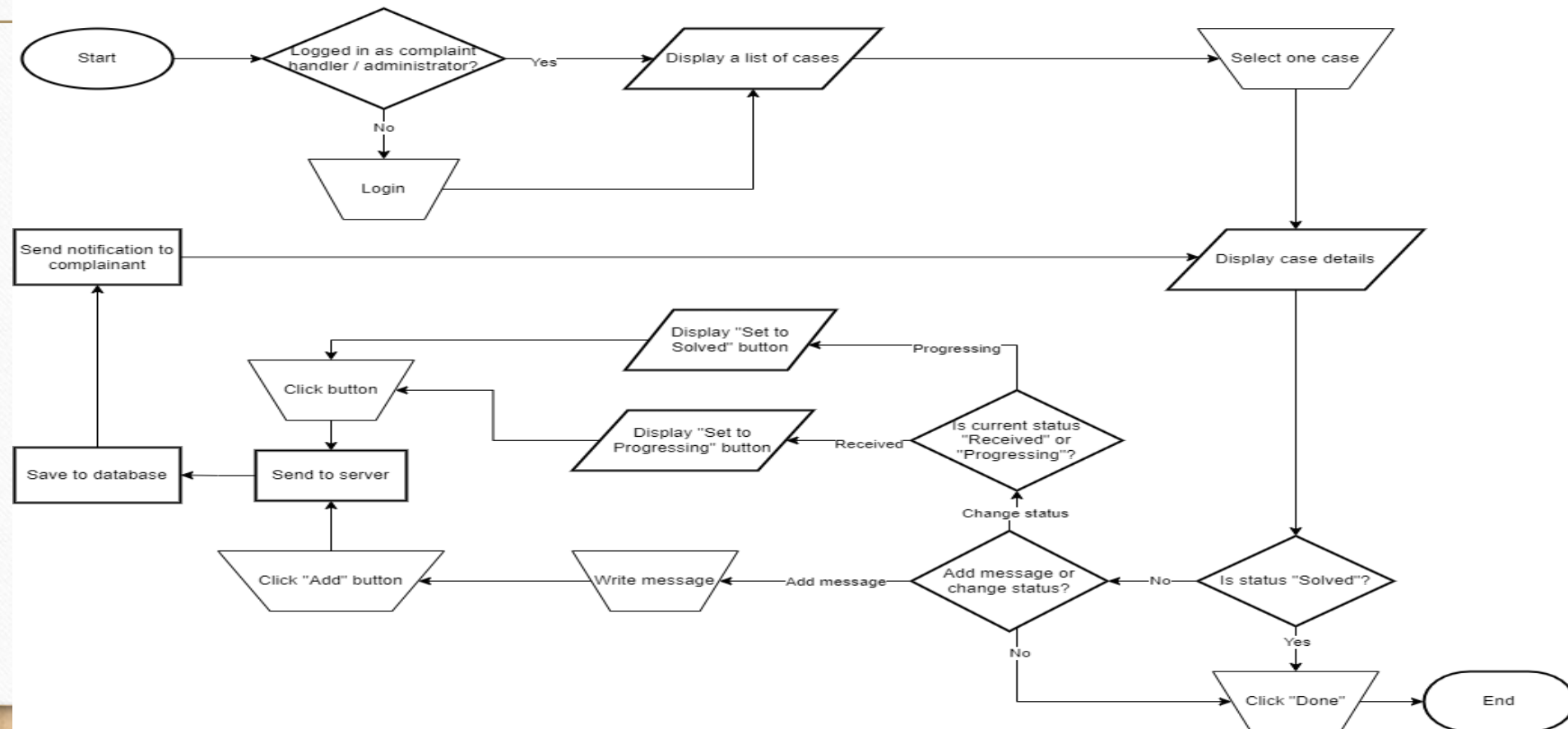
- The main entity is complaints
- A complaint is created by a complainant and is handled by a complaint handler
- A complaint has histories which records the past

Flow Chart – Lodge Complaint



Flow Chart – Handle Complaint

Handle Complaint Flow Chart



Implementation

- The system is implemented based on MongoDB – Express.js – React.js – Node.js (MERN) stack
- All types of users will access the website from the React server
- Express server will be the back-end, which will handle the connection to MongoDB database

Implementation - Modules

- The system can be split into several modules:
 - Complainant registration page
 - Login page and Manage Account Page
 - Lodge Complaint Page
 - Check Complaint Page
 - Complaint Details Page
 - Manage System Page
 - Statistical Reporting Page

Testing

- In this project, the following testing are conducted:
 - Unit testing
 - Integration testing
 - Security testing (against No-SQL injection)

Complainant Registration Page

Module Description

Complainant Registration

- During registration, the complainant needs to provide:
 - Email address
 - Password
 - Name
 - IC number
 - Mobile phone number
 - Home address (Optional)
 - Fax number (Optional)
- These personal information is necessary to keep track of the identity of the complainant

Email Verification

- After filling up the registration form, the complainant need to verify their email address
- The system will generate a random 6-digit One Time Password (OTP) to the complainant's email address
- The complainant need to enter the correct OTP and submit in 5 minutes
- If the OTP matches, then email verification is completed

Set / Forget Password Page

Module Description

Set / Forget Password Page

- This page is available to all types of user
- First, the user need to enter his email address
- Second, the user need to complete email verification through OTP
- Finally, the user is allowed to set / reset his password
- This page is used as the forget password page for all types of user
- This page is also used as the set password page for complaint handler upon his first login

Login Page and Manage Account Page

Module Description

Login Page

- All types of user must login to access the system
- All modules before this slide does not require user login
- User need to login to access all modules after this slide
- To login, user need to enter his email address and password

Manage Account Page

- Manage Account page is the default landing page upon successful login
- In this page, the following information will be displayed:
 - Email address
 - Name
 - Role
- From this page, user can navigate to other pages

Lodge Complaint Page

Module Description

Lodge Complaint Page

- Only complainant can access the lodge complaint page
- This is the start of the complaint process
- The complainant must login to access this page, as the complaint case is tied to the complainant's account

Complaint Form

- On the complaint page, the complaint form will be displayed
- The complaint form includes the following fields:
 - Title
 - Description
 - Category
 - Area
 - Expected result (Optional)
 - Incident address (Optional)

After Submit

- After the complainant filled in and submitted the complaint form, the complaint status is by default set as “Received”
- The complaint summary is delivered in two ways:
 - Sent to complainant’s email
 - Displayed on-screen
- At this moment, the complaint case is already available in the check complaint page
- The complainant’s job is done

Check Complaint Page

Module Description

Check Complaint Page

- All types of user can access the check complaint page
- On the check complaint page, the list of complaint cases is displayed
- Complainant can view complaint case that is lodged by himself only
- Complaint handler can view complaint case that is handled by himself or does not have handler yet
- Administrator can view all complaint case in the system

Search

- All types of user can search complaint case by specifying the complaint case title
- All types of user can specify the range of date of the complaint cases displayed
- Administrator has one extra feature: Search complaint case by specifying complaint handler name or email address

Filter

- All types of user can filter complaint case by the following criteria:
 - Title
 - Category
 - Area
 - Status

Sort

- All types of user can sort the complaint cases in ascending or descending order, based on the following criteria:
 - Title
 - Date
 - Category
 - Area
 - Status

Complaint Details Page

Module Description

Complaint Details Page

- Upon clicking on the details button on the check complaint page, the user will be navigated to the complaint details page
- All types of user can view:
 - Complaint case description and relevant information
 - Histories section
- Complaint handler and administrator can also view:
 - Complainant personal details
 - Complaint handler details

Histories

- Histories section will display the timeline of important events of the complaint case
- This includes:
 - Change of status
 - Change of the case's complaint handler
 - All messages added by both complaint handler and complainant
- Complainant cannot view the change of the case's complaint handler

Add Message

- All types of user can add message to the case
- Message added by the complainant is recorded as “Complainant Side”
- Message added by the complaint handler and the administrator is recorded as “Complaint handling side”
- Administrator can add message regardless he is the handler of the case or not
- The message is seen by both sides

Change Status

- The complaint handler and the administrator can change the status of the complaint case
- The change of status must follow the following order:
Received => Progressing => Solved
- The administrator can change the status regardless he is the handler of the case or not
- In histories, the change of status and change of complaint handler are marked as from “System”

Auto-send email notification upon changes

- During the following events, an email will be auto-sent to the complainant to notify him:
 - Change of status
 - New message from complaint handling side

Assign Handler of Case

- There are two ways of assigning handler of the case:
 - Self-assign
 - Administrator assign

Assign Handler of Case - Self Assign

- This only happens on a complaint case that does not have a handler
- The first complaint handler or administrator who makes any changes to the case will be auto-assigned as the handler of the case
- These changes include:
 - Add message
 - Change status

Assign Handler of Case - Administrator Assign

- Administrator can specifically assign any complaint handler as the handler of the case
- The administrator can also assign himself but not other administrators
- This applies to all cases, regardless the case already have handler or not
- This is useful when the administrator is deleting a complaint handler who has a case that is not yet in “Solved” status

Manage Complaint Page

Module Description

Manage System Page

- Only administrator can access the manage system page
- This page contains the functionality to view, add and delete:
 - Category
 - Area
 - Complaint handler

Add / Delete Category or Area

- In the complaint form, the available options of the category and area are dynamically rendered from the database
- This can be added or deleted by the administrator
- This can happen when there is a change of definition of district or area
- This also can happen when there is a change of definition of the grouping of the complaint category

Add / Delete Complaint Handler

- The administrator can add and delete complaint handler in the system
- This can happen when there is a new complaint handler joining or an existing complaint handler leaving
- For adding complaint handler, the administrator has to provide the name and email address of the complaint handler
- For deleting complaint handler, if the complaint handler has a case which is not yet in “Solved” status, then the deletion cannot be proceeded

Statistical Reporting Page

Module Description

Statistical Reporting Page

- Only administrator can access the statistical reporting page
- By default, all cases will be included in statistical reporting
- The administrator can also specify the range of date of the cases to be included
- On statistical reporting page, the following elements will be displayed:
 - Simple dashboard
 - Charts
 - Table

Simple Dashboard

- In the simple dashboard, the following information will be displayed:
 - Total number of cases
 - Number of cases in each status: Received, Progressing, Solved

Pie Charts

- The pie charts will illustrate the fraction of cases grouped based on:
 - Category
 - Area
 - Status
- Only the 6 largest groups will be displayed
- This does not affect status because status only have 3 groups

Stacked Bar Chart

- The stacked bar charts will illustrate the number of cases grouped by:
 - Category
 - Ares
- Each group in the bar chart is stacked by status
- Only the 6 largest groups will be displayed

Table

- The table will display the number of cases in detailed
- The case will be grouped by both category and area
- Then for each category and area, the following information will be displayed:
 - Case count of each status: Received, Progressing, Solved
 - Total case count

Table - Sort

- Each row in the table can be sorted based on the following:
 - Category
 - Area
 - Received counts
 - Progressing counts
 - Solved counts
 - Total counts

Demonstration

Discussion and Conclusion

Discussion and Conclusion

- In this project, a simple city complaint system with statistical reporting features is developed
- One possible future enhancement is developing a mobile version of the system

The End

Thank you