Road Repair and Tracking Software (RRTS)

Software Requirement Specification Documentation-

Version<1.0>

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DATE- 18 |01 |24

Revision History

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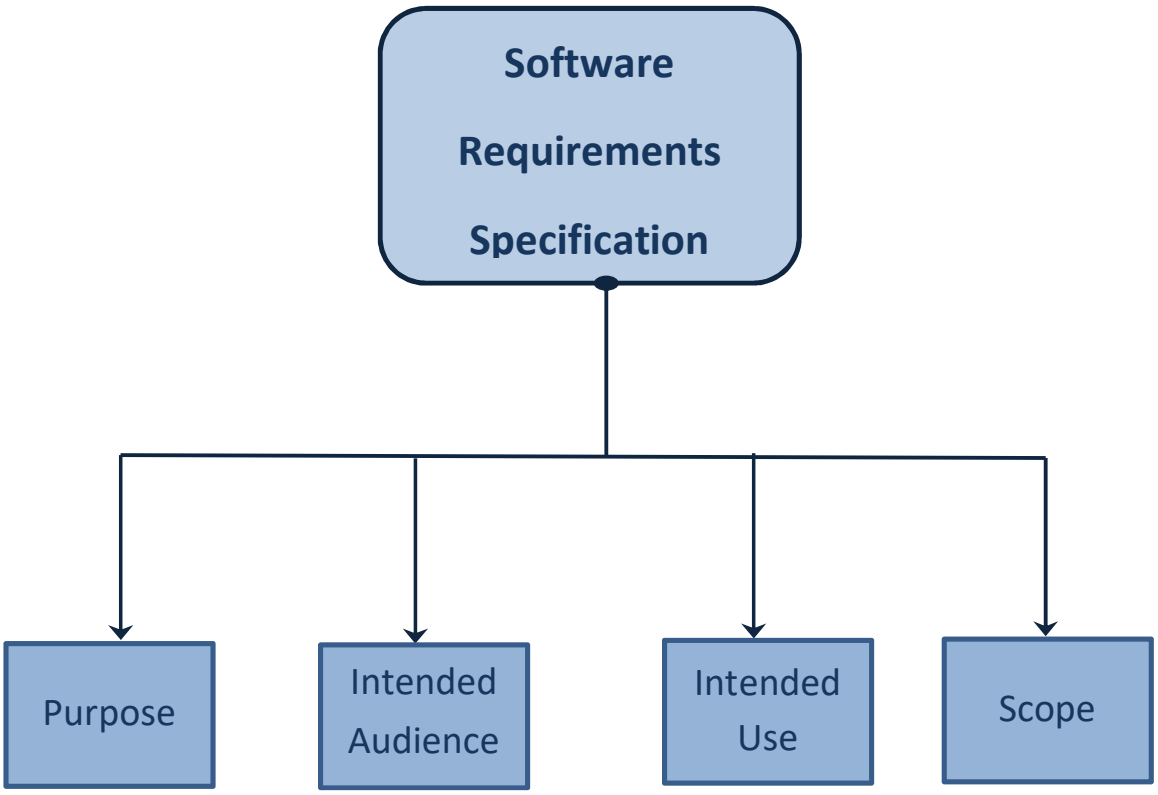


- **Purpose-** the Road Repair and Tracking System (RRTS) is designed to make fixing roads in a big city easier. It helps the people in charge by organizing repair requests, figuring out which roads need fixing the most, and planning when and how to do it. The goal is to make road repairs more efficient and clear.

- **Intended Audience-**

  City Corporation Staff:-

  1. **Clerks:** They put repair requests into the system.
  2. **Supervisors:** They use the system to decide which roads to fix first and plan what's needed.
  3. **Administrators:** They update info about the people and machines available for repairs.
  4. **Mayor:** Looks at stats to decide things and keep track of how repairs are going.

Residents: - People who live in the city can ask for road repairs by making complaints.

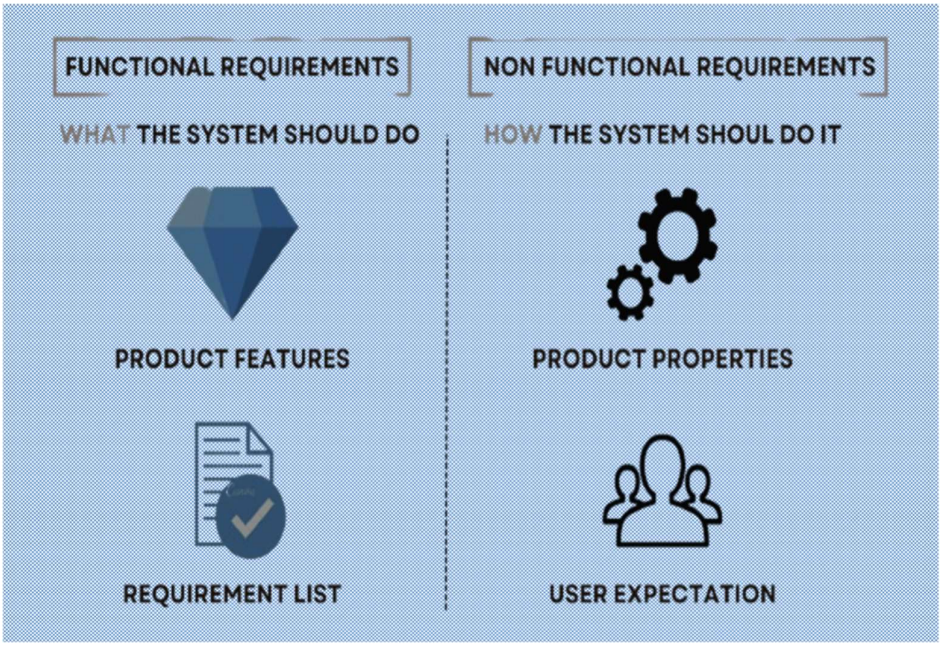
- **Intended Use-** the Road Repair Tracking System is like a digital helper for fixing roads. It helps the people in charge keep track of which roads need fixing and when. This system makes it easier to organize and manage the repair work. It's like a smart tool that tells the workers where to go and what needs to be done. This way, the roads can be fixed faster, and everyone can enjoy smoother and safer journeys.

- **Product Use-**

  The RRTS system will do the following things:-

  Complaint Management: - Keep track of repair requests from residents and sort them based on how urgent they are.
  Supervisor Tools: - Give a daily list of new complaints to the supervisors. It helps supervisors to decide which roads need fixing first and plan what's needed.
  Resource Scheduling: - Plan when to fix each road based on urgency and what materials, machines, and people are available.
  Administrator Tools: - Let's administrators update info about the people and machines available for repairs. Changes plan if something is not available.
  Statistics and Reporting: - Make reports for the mayor with info on how many repairs were done and what's left. It shows stats on how the people and machines are being used. The RRTS system makes it easier for everyone to work together and use resources wisely to fix the city's roads.

Functional and Non-Functional Requirements:-



Functional Requirements-

- **Inputs-** It records the complaint by the user raising the repair request for a road clearly mentioning the name of the road, exact location where the problem has occurred and a brief description of the problem that is associated with the road that the user wants to bring to the notice of the officials.
  b) It also records the data regarding severity of damage to roads including the priority order of the unrepair work and the exact requirement of resources like manpower, machines, raw materials etc. from the supervisors.
  c) Update the resource availability data at any time from the administrators.
- **Processing-** Process the complaint list of roads in various areas from users and generate a list of damaged roads for the supervisors

to inspect by allocating the workload based on geographic area to the supervisors.

b) Analyze the priority order of repair work and optimally decide a schedule for the work taking into consideration the availability of resources.

c) Process and update the resource availability data from the administrators.

d) Retrieve and generate the statistics for the overall status of work completed or outstanding including data like number of roads repaired and the resource usage for any particular work like money, manpower, machines etc.

- **Outputs-** Generate the area-wise list of fresh complaints for the respective supervisors based on previous allocation.

  b) Generate a detailed and scheduled report for repairing of the roads.

  c) Generate statistics regarding all the repair work completed or pending and distinctly mention the resource utilized for the commencement of the work.

- **Requirements-**

  1. **User Authentication and Authorization:** The system must provide secure user authentication and authorization mechanisms to control access levels for different users, such as administrators, supervisors, and field workers.
  2. **Road Data Management/Info:** The system should allow users to input, update, and manage information related to road conditions, repair history, and other relevant data.
  3. **GIS Integration/Maps:** The system must integrate with Geographic Information Systems (GIS) to map and visualize road networks, making it easier to identify repair locations and plan efficient routes.
  4. **Work Order Generation:** Users should be able to generate and assign work orders for specific repair tasks. Each work order should include details such as location, type of repair needed, and priority.

5. **Real-time Tracking:** The system should provide real-time tracking of repair activities, allowing users to monitor the progress of ongoing repairs and view the current status of different projects.
6. **Communication Platform:** A communication module should facilitate seamless communication between field workers, supervisors, and administrators, enabling them to share updates, report issues, and coordinate activities.
7. **Resource Tracker:** The system should include features for managing and tracking resources such as equipment, materials, and workforce, ensuring optimal utilization and efficient planning.
8. **Mobile Accessibility:** The system should be accessible via mobile devices to enable field workers to input data, receive updates, and access information while on-site.
9. **Reporting and Analytics:** Users should be able to generate reports and access analytical tools to analyze trends, assess the effectiveness of repairs, and make informed decisions for future maintenance strategies.

Non-Functional Requirements-

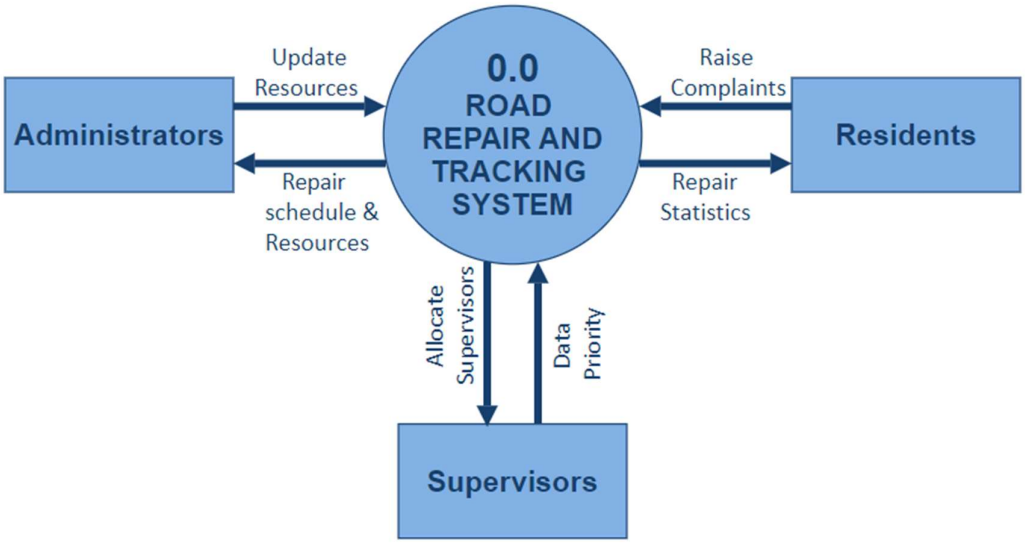
- **Performance Requirements-** The primary performance requirement is the capability of the system to function with low speed of the internet connection and consumption of low data.
- **User-friendliness-** The system will have a user interface that is very intuitive and easy to register complaint for the users. The Front-End of the system will be very intuitive and easy to understand.
- **Security-** The primary security concern of the system is not to leak the information of the users registering the complaint and strictly being able to maintain the anonymity of the users. Under no

circumstances is the anonymity of the users registering complaint will be made public

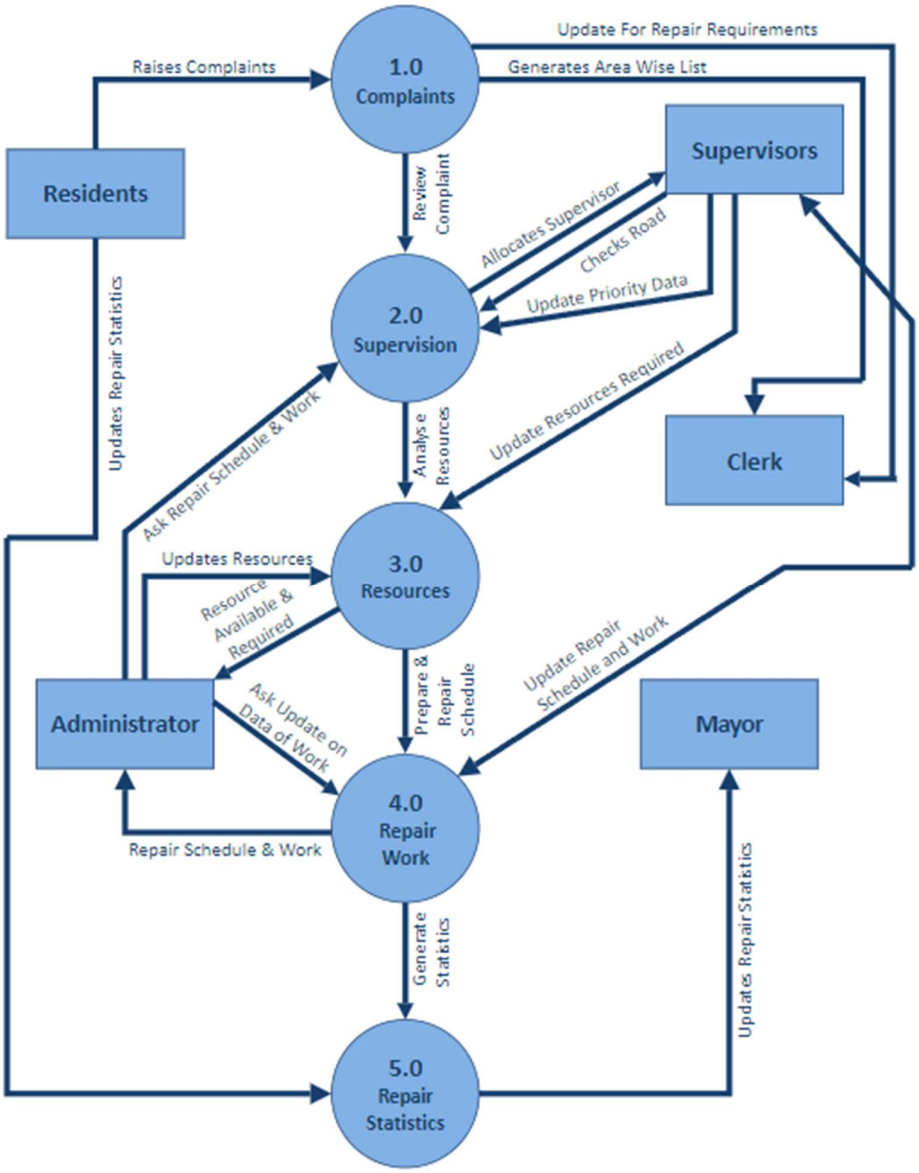
- **Scalability-** The system should be scalable to accommodate an increasing volume of data, users, and concurrent transactions as the road network and repair activities expand.
- **Reliability-** The system must be reliable, with minimal downtime and a robust backup and recovery mechanism to prevent data loss in case of system failures.
- **Usability-** The system should be user-friendly, with an intuitive interface that requires minimal training for users to navigate and perform tasks effectively.
- **Compatibility-** The system should be compatible with various devices, browsers, and operating systems to ensure accessibility for a diverse user base.
- **Compliance-** The system must comply with relevant regulations and standards related to data privacy, road safety, and infrastructure management.
- **Maintainability-**The system should be designed for ease of maintenance, with modular components, clear documentation, and efficient update procedures.

These functional and non-functional requirements provide a comprehensive framework for the development and evaluation of a road repair and tracking system, ensuring it meets both user needs and technical standards.

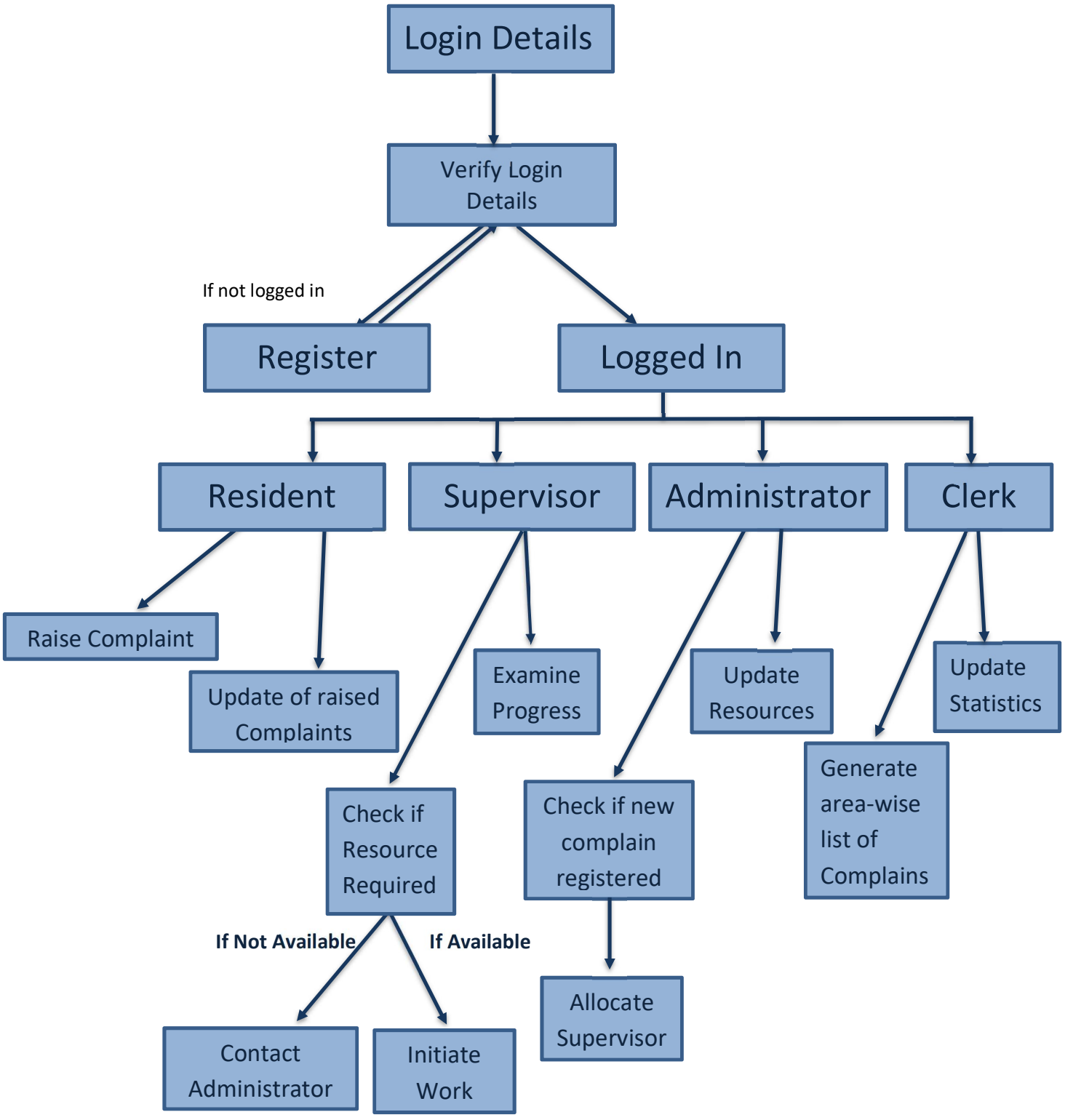
DATA FLOW DIAGRAMS-
Level 0-



Level 1-


1.0
Complaints
2.0
Supervision
3.0
Resources
4.0
Repair
Work
5.0
Repair
Statistics
Residents
Supervisors
Clerk
Administrator
Mayor
Raises Complaints
Update For Repair Requirements
Generates Area Wise List
Review
Complaint
Allocates Supervisor
Checks Road
Update Priority Data
Updates Repair Statistics
Ask Repair Schedule & Work
Analyse
Resources
Update Resources Required
Updates Resources
Resource
Available &
Required
Prepare &
Repair
Schedule
Update Repair
Schedule and Work
Ask Update on
Data of Work
Repair Schedule & Work
Generate
Statistics
Updates Repair Statistics

Structure Chart



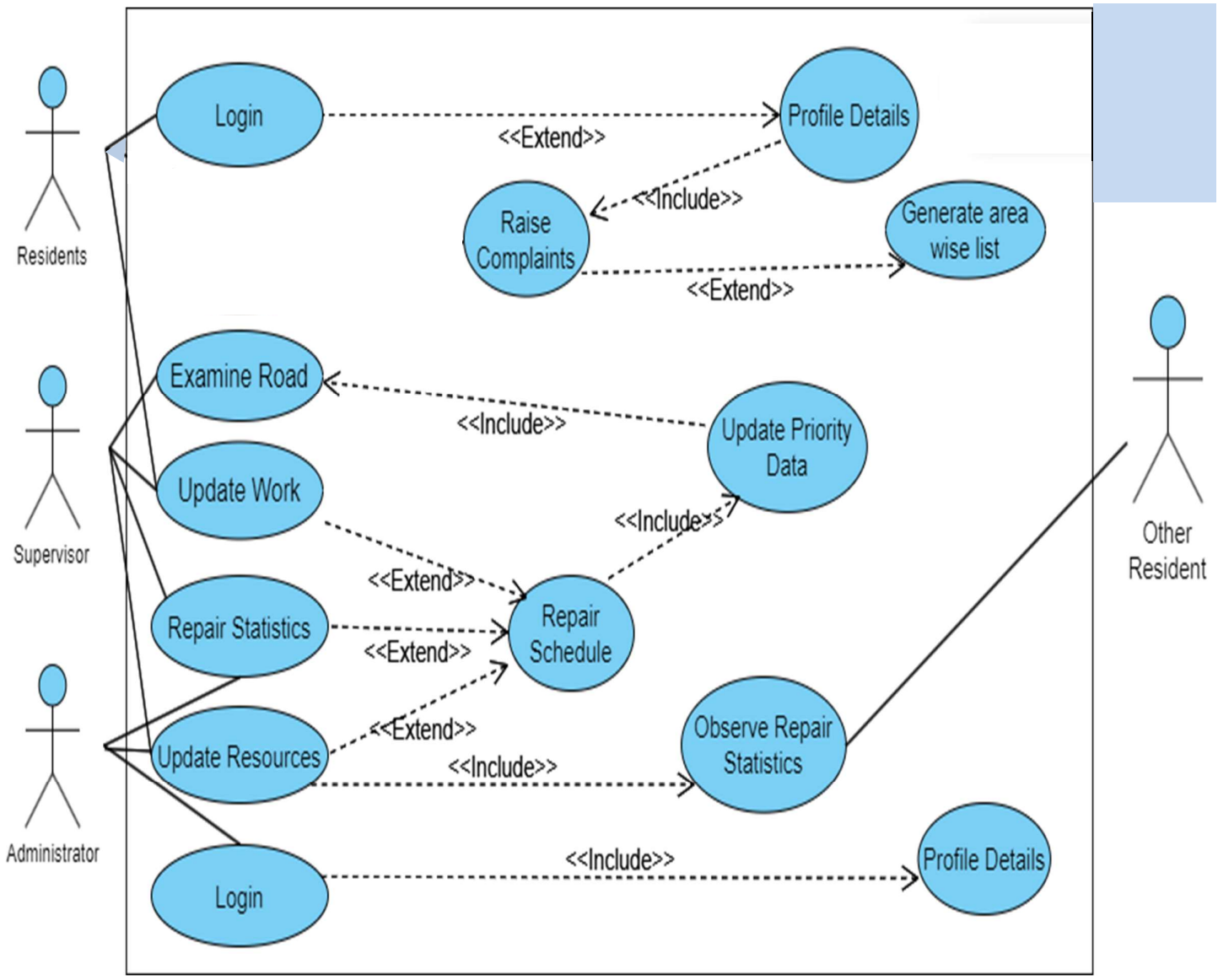
Functional Dependencies-

It is a relationship between two sets of attributes in a database, where one set (the determinant) determines the values of the other set (the dependent).

The attributes associated with each entity and how their dependencies are as follows-

1. **Clerk-**
    - Attributes- Repair Request ID, Road ID, Description, Date of Request
    - Functional Dependencies: Repair request ID -> Road ID, Description, Date requested
2. **Supervisors-**
    - Attributes- Road ID, Priority, Estimated Repair Time
    - Functional Dependencies: Road ID -> Priority, Estimated Repair Time
3. **Administrators-**
    - Attributes- Person ID, Machine ID, Availability status
    - Functional Dependencies: Person ID -> Availability Status, Machine ID -> Availability Status
4. **Mayor-**
    - Attributes- Repair Progress, Repair Statistics
    - Functional Dependencies: He's not dependent on anyone as it looks to specific statistics (Repair Progress Track) and data for decision-making.
5. **Residents-**
    - Attributes- Resident ID, Complaint ID, Road ID, Description, Date of Complain
    - Functional Dependencies: Complaint ID -> Resident ID, Road ID, Description, Date of Complain

Use Case Diagram-



Class Diagram-