

Makka Textile Management System

SE 2206: Software Requirement And Specification Analysis

Submitted by:

Group 6

Kazi Farhana Faruque - BSSE1506

Montakim Talukdar - BSSE1512

Akidul Islam Jim - BSSE1519

Md. Nafish Salehin - BSSE1527

Md. Khayrul Islam Sajib - BSSE1552

Submitted to:

Dr. Kazi Muheymin-Us-Sakib

Professor, IIT DU



Institute of Information Technology University of Dhaka

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Introduction

The textile industry in Bangladesh plays a pivotal role in the nation's economy, serving as one of the largest contributors to export earnings and employment. With a vast number of companies operating within this sector, there is increasing international attention on areas such as worker welfare, production efficiency, and sustainable resource management.

The **Textile Industry Automation System** is designed to help textile manufacturers automate their operations, streamline production workflows, improve quality control, and foster better engagement with stakeholders. This system aims to bring modern technological solutions to a traditionally labor-intensive industry, ensuring greater transparency, productivity, and compliance with global standards.

This document forms part of the Software Requirements Specification (SRS) for the project titled "**Textile Industry Automation System**." The objective of this project is to provide a comprehensive and well-structured documentation of a textile factory's operations. Our goal is to present this information in an insightful and easily understandable manner for all intended stakeholders, including factory management, technical teams, and external auditors.

Inception of Makka Textile Management System

Inception is the foundational phase in building a software system. Here we have to understand the stakeholders' requirements by communicating with them. To understand it properly, there are some steps that we have to take. The steps are:

- Identify the client of our project
- Icebreaking
- Identifying the stakeholders of the project
- Recognizing multiple viewpoints

For Makka Textile Company, this phase is crucial to understand the requirements and expectations of all involved stakeholders. In this stage, communication is established with key people involved in or impacted by the company's operations. The steps followed are:

1. Identify the Client of Our Project

The client of our project is Makka Textile Company, specifically the company owner or top management who are investing in automation to enhance the company's operations.

Other roles such as factory workers, supervisors, suppliers, delivery agents and buyers are also important to consider during the requirement gathering phase.

2. Icebreaking

Icebreaking is an essential activity to reduce the communication barrier between the development team and the stakeholders. It allows a smoother flow of discussion regarding the business process and pain points.

In this phase, we visited the Makka Textile Company, held informal and formal meetings with management, factory floor supervisors, and logistics personnel. We asked them about:

- Their current production workflow
- Inventory tracking issues
- Worker attendance and payroll systems
- Challenges in quality control
- Supplier and delivery management
- Communication with buyers

The stakeholders were cooperative and gave helpful insights. This helped us shape our understanding of the existing problems and what the system should solve.

3. Identifying the Stakeholders of the Project

Stakeholders are individuals or groups who will be directly or indirectly affected by the management system.

1. Owner

- Handles external affairs
- Responsible for buying and selling
- Oversees electric bills, product quality, and rate settings

2. Manager

- Focuses on observation

- Handles salary management

3. Supervisor

- Prepares weekly production reports
- Maintains records of raw material usage
- Checks attendance and discipline

4. Workers

Each worker has a specific role:

- Worker 1: Operates textile machines
- Worker 2: Handles thread preparation
- Worker 3: Works on cutting and trimming
- Worker 4: Assists with machine operation and wiring/connection
- Driver: Takes care of transport and delivery

4. Recognizing Multiple Viewpoints

Each stakeholder in Makka Textile Company has a different role, responsibility, and set of expectations from the system. Understanding these viewpoints ensures that the system we build is user-centric and supports real operational needs.

Owner's Viewpoint:

- Needs access to sales and purchase reports
- Wants to monitor product quality, pricing, and utility costs like electricity
- Interested in an overview of overall company performance and external communication

Manager's Viewpoint:

- Expects tools for daily observation logging
- Requires automated salary tracking and expense reports
- Needs alerts and summaries on production status and issues

Supervisor's Viewpoint:

- Wants features to prepare weekly production summaries
- Needs to track raw material usage

- Looks for an efficient system to manage attendance records and enforce discipline tracking

Worker 1 (Machine Operator):

- Needs a simple interface to report machine issues
- Should be able to log operational time or errors

Worker 2 (Thread Handler):

- Wants a way to track material usage and defects in thread preparation

Worker 3 (Cutter):

- Needs to report cutting progress and defects or rework

Worker 4 (Machine Assistant/Connector):

- Requires access to machine connection or setup tasks
- May report on machine connectivity issues or wiring needs

Driver (Transport Handler):

- Wants tools for delivery tracking, logistics planning, and transport requests

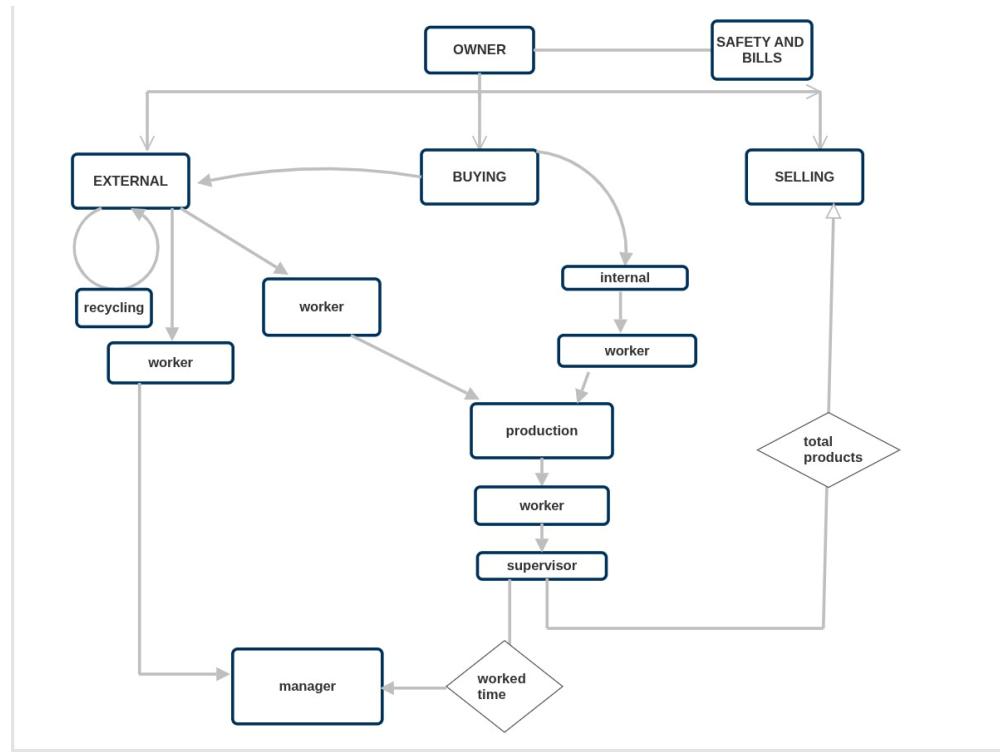


Figure : Regular workflow of Makka Textile Industry

Elicitation of Textile Management System

Requirements elicitation (also called requirements gathering) combines elements of problem solving, elaboration, negotiation, and specification. In order to encourage a collaborative, team-oriented approach to requirements gathering, stakeholders work together to identify the problem, propose elements of the solution, negotiate different approaches, and specify a preliminary set of solution requirements. In our elicitation phase, we completed the following tasks –

- Collaborative Requirements Gathering
- Quality Function Deployment
- Usage Scenarios

1. Collaborative requirements gathering

We have conducted meetings with the stakeholders, such as employees, admins and supervisors. These meetings helped us to identify the problem, propose elements of the solution, negotiate different approaches, and specify a preliminary set of solution requirements.

2. Quality function deployment

Quality Function Deployment (QFD) is a technique that translates the needs of the customer into technical requirements for software. Ultimately the goal of QFD is to translate subjective quality criteria into objective ones that can be quantified and measured and which can then be used to design and manufacture the product. It is a methodology that concentrates on maximizing customer satisfaction from the software engineering process. So, we have followed this methodology to identify the requirements for the project. The requirements, which are given below, are identified successfully by the QFD.

Normal Requirements:

Normal requirements are generally the objectives and goals that are stated for a product or system during meetings with the customer. The presence of these requirements fulfills customers' satisfaction. These are the normal requirements for our project.

1. User Account Creation & Categorization

- Users (Owners, Managers, Supervisors, Employees, Sellers, Buyers, Drivers) create accounts by providing:
 - Full name
 - Contact number
 - National ID (NID) number
- A predefined system admin account is provided with full access.
- The system admin assigns users to one of seven roles: Owners, Managers, Supervisors, Worker, Sellers, Buyers, or Drivers.

2. Weekly Bill Records

- Record weekly salary and bonus payments.
- Accessible to Managers and Business Owners.
- Exportable bill records.

3. Buyer Functionality

- Buyers access a dedicated "Buy" section to:
 - Specify the quantity of items they wish to purchase.
 - Set their desired purchase price.

4. Salary and Payment Management

- **Permanent Employees:**
 - Receive salary and bonuses weekly via mobile banking to their registered contact number.
- **Contract-Based Employees:**
 - Receive instant payments upon task completion via mobile banking to their registered contact number.

- Managers are responsible for disbursing salaries to employees via mobile banking.

5. Reporting

- Reports for salaries, leave, sales, and user activity.
- Customizable and exportable reports.

6. Leave Management

- System tracks and manages employee leave requests and approvals.

Expected Requirements:

Workforce Management System Expected Requirements

1. Secured System

- Secure user authentication and data protection.
- Role-based access control for all users.
- Audit logs for user actions.

2. Interactive User Interface

- Responsive and intuitive design for all devices.
- Role-specific dashboards.
- User-friendly navigation.

3. Notifications

- Real-time alerts for salary payments, tasks, and leave updates.
- Configurable notification preferences.

4. Yearly Overview and Price Trends

- Annual summary of buying and selling activities.
- Graphs showing price trends and sales volume.

5. Mobile Banking

- Salary and transaction payments via mobile banking.

- Transaction logging and receipts.

Exciting Requirements:

Workforce Management System Exciting Requirements

1. Driver Location Tracking

- Real-time GPS tracking for drivers.
- Live location updates for Business Owners and Managers.
- Driver interface for route viewing.

2. AI Profitability Predictions

- Predict optimal times for buying and selling.
- Recommendations for Buyers and Sellers.

3. Mobile App Version

- App for task management, leave requests, and notifications.
- Accessible on mobile devices.

4. Prediction System

- Forecasts for delivery times and employee performance.
- Visualized via dashboards.

5. Marketing Features

- Promotional campaigns for users.
- Analytics for campaign performance.

User Story

Account Management

In our Account Management Module, designed to securely manage user accounts for the Makka Textile Management System, the process begins when users, including Owner, Manager, Employees (categorized as Workers, Supervisor, Drivers, Sellers, and Buyers) register in the system. Each user initiates registration by providing required details: Full Name, Email Address, Present Address, Mobile Number, National ID, Birth Certificate Number, Bank Account Number and Password.

Upon submission, the module generates a 6-digit One-Time Password (OTP) and sends it to the user's registered mobile number via SMS. The user enters the OTP into the system for verification. If the OTP is correct, the module completes the registration process, marking the account as pending approval. If the OTP is incorrect or expired, the user can request a new OTP, which the module resends up to a predefined limit to ensure security. Once verified, the Manager assigns the user's role—either Admin (Owner or Manager) or Employee (Supervisor, Workers, Drivers, Sellers, Buyers)—and the Owner reviews and approves the account, finalizing the registration. The module notifies the user via SMS and dashboard alert upon approval, confirming their access credentials.

Registered users log in using their username (derived from their Full Name or a unique identifier) and password, triggering an OTP sent to their mobile number for verification. Upon successful OTP entry, the module grants access to role-specific functionalities, such as production tasks for Employees, stock viewing for the Manager etc. If the username, password, or OTP is incorrect, the module prompts the user to re-enter correct credentials. For forgotten passwords, users initiate a reset request, receiving an OTP to verify their identity. After successful verification, the module allows the user to set a new password, which must be confirmed before updating the account.

The Manager can update account details (e.g., contact information, role changes) for any user, with changes requiring OTP verification for security. The Owner has the authority to approve new accounts or deactivate existing ones, ensuring only authorized users access the system. The module logs all account activities, including registrations, logins, updates, and deactivations, in the system database for traceability. It supports mobile app access, allowing users to register, log in, or reset passwords on their devices, aligning with the system's mobile capabilities.

Human Resource management

The Human Resource Management Subsystem serves as the heartbeat of workforce coordination, seamlessly managing employee attendance, leave requests, and critical company announcements through three dedicated modules: Attendance, Leave Application, and Important Notice.

The day begins with Employees logging into the system via the web platform or mobile app. Through the Attendance Module, they mark their presence with a simple “Yes” click, capturing clock-in and clock-out times. The subsystem diligently records these entries, calculating daily working hours and flagging any absences. If a Worker forgets to check in, the subsystem sends an SMS and dashboard notification to the Manager, alerting them to follow up. The Manager, with a quick glance at the real-time attendance dashboard, monitors workforce availability, generating detailed reports that feed into payroll calculations for accurate salary disbursements.

When Employees need a break, they can turn to the Leave Application Module to request time off. Whether it’s a worker needing a sick day, a driver seeking annual leave, they submit their request through the system, specifying the leave type, duration, and reason. The Supervisor receives an instant SMS and dashboard notification about the new request, reviewing it. With a few clicks, the Supervisor approves or denies the leave, triggering an SMS and dashboard alert to inform the Employee of the decision. All leave records are stored in the system database, ready for audits or workforce planning.

The Important Notice Module keeps the workforce informed and aligned. The owner, keen to share updates like new company policies, holiday schedules, or upcoming meetings, logs into the system to craft notices with a clear title, timestamp, and description. These announcements are broadcast to all Employees via SMS and the dashboard notification panel, appearing prominently upon login. A Worker might see “Factory Closed for Eid Holiday, Aug 10-12, 2025” on their mobile app, marking it as read to acknowledge receipt. The subsystem tracks viewership, allowing the Manager to ensure critical messages reach the team. All notices are archived in the notification history, accessible anytime for reference.

Bill Management

The Bill Management Subsystem streamlines payments for Electricity, Water, Fuel, CCTV maintenance, Fire Extinguisher maintenance, Tax, and Gas bills. The owner logs into the subsystem via web or mobile app to enter bill details—type, amount, due date, and vendor—which are categorized and stored in a financial database, updating the ledger via the Financial Management Module.

Electricity and Water bills are logged annually, Fire Extinguisher maintenance yearly, Tax at fiscal year-end, Gas monthly, and CCTV maintenance monthly post-installation. Fuel bills, based on usage, trigger SMS and dashboard notifications to the Owner if scarcity is detected via the Stock Management Module. The subsystem schedules payments, sending reminders to the owner one week before and on due dates.

The Owner makes payments (Online banking system), verified by OTP sent to their mobile number. Completed payments, with digital receipts, are logged. It generates financial reports and dashboards, showing expenses and trends, integrated with the Reporting and Analytics Module.

Notification System

In the textile factory, the owner often needs to share important information with the workers. Sometimes it's a production update, sometimes a safety reminder, and sometimes a message about upcoming work schedules. Traditionally, these messages might get lost if passed verbally or on paper. To solve this, the factory introduces the Notification Management System.

Whenever the Owner composes a notice in the system, the information is immediately prepared for delivery. The system takes the notice and ensures it reaches the workers in two reliable ways. First, the system sends out an SMS alert. Each worker receives a short, clear message on their mobile phone. Even if they are outside the factory or not logged into the system, they still get the information instantly.

At the same time, the system also creates a Dashboard Alert. When workers log into their accounts, they see the notification right on their dashboard. Each alert comes with a title, timestamp, and short description, so it's easy to understand at a glance. If needed, workers can open their notification history and review past alerts. They can even mark messages as "read," which helps them keep track of what's new.

Verification

The Verification Subsystem ensures secure access and accurate payment confirmation, empowering the Owner to validate user logins and Workers to confirm receipt of their payments.

The process begins with login verification, where the Owner, as an Admin, oversees the validation of user credentials across the system. When any user—Owner, Manager, Supervisor, Workers, Drivers, Sellers, or Buyers—attempts to log in via the web platform or mobile app, the subsystem checks their username and password against the system database. The Owner receives a dashboard notification for any suspicious login attempts,

such as multiple failed tries or access from an unrecognized device. The subsystem allows the Owner to approve or block the login, ensuring only authorized users gain access.

For payment verification, Workers (including Supervisors and Drivers) confirm receipt of their salaries or task-based payments, processed through the Salary Management Module. When a payment is disbursed—via cash, bank transfer, or mobile banking (e.g., bKash, Nagad)—the subsystem notifies the Worker via SMS and dashboard alert, detailing the payment amount, date, and method. The Worker logs into the system to verify receipt by confirming the funds have been received in their bank account or cash in hand. The subsystem records this confirmation, updating the payment status as “Verified” in the financial ledger. If a Worker reports a payment issue, the subsystem flags it for the Manager, sending an SMS and dashboard notification for resolution.

Salary Management

The Salary Management System was built to ensure every employee receives their payment fairly and on time. It simplifies the way salaries are calculated, tracked, and disbursed, reducing manual effort and errors.

The process begins with the Supervisor, who records the work amount of employees. For example, the supervisor enters how many yards of fabric a worker has produced, how many beams were connected, or how many trips a driver has completed. This information is stored securely in the system’s database, where it becomes the foundation for salary calculations.

Once the work data is logged, the Manager steps in. The Manager uses the system to calculate salaries, considering both fixed and variable pay structures. Supervisors and some staff members may receive a fixed monthly salary, while others—such as fabric weavers, drivers, and bin connectors—are paid based on their output or completed tasks. The system automates these calculations to ensure accuracy and fairness.

When it comes to disbursing salaries, the Manager has two options:

- **Online Payment:** Salaries can be sent through bank transfers or mobile banking services such as bKash or Nagad. For each transaction, the system communicates with the Online Banking System (OBS), records transaction IDs, and ensures successful completion.
- **Offline Payment:** For employees preferring cash, the Manager records the payment in the system after handing it over physically, uploading a receipt as proof.

Once payments are completed, the system automatically generates notifications.

Employees receive an SMS alert on their mobile phones as well as a dashboard

notification, confirming that their salaries have been disbursed. This brings transparency and reassurance to every worker.

The Salary Management System also maintains a comprehensive record of all salaries, work logs, and transactions. These records are vital for audits and financial planning. The Manager can generate payroll reports at any time, reviewing summaries of payments and employee performance. By connecting with other modules—such as Human Resource Management for attendance data and Production Management for output details—the system ensures every calculation is based on verified information.

Location Tracker (GPS)

The Location Tracking System starts with the Driver, who uses a mobile application or GPS-enabled device installed in the vehicle to send their current address or location.

The Owner sends the address of delivery place to the driver and Admin can then track the live location of vehicles on a digital map within the system. This allows them to monitor the movement of goods, estimate delivery times, and ensure drivers are following the planned routes. If needed, they can also send addresses or updated delivery instructions directly to the drivers through the system, helping them adjust to changes in schedules or routes.

Beyond real-time monitoring, the system also keeps a history of location data, which can later be reviewed for auditing, performance evaluation, or route optimization. In cases of delay or emergency, the system can trigger alerts, enabling the management to respond quickly and support the driver.

Production management

The Production Management Module ensures smooth handling of threads, bobbins, beams, and fabrics, reducing waste and maintaining efficiency.

The process begins when the company purchases bobbins containing thick and thin threads. Upon arrival, the system records the quantities of both thread types and updates the inventory. Some of the thin thread bobbins, along with empty and recycled bobbins, are sent to an External Factory. There, threads are extracted and loaded into beams with precise measurements. The External Factory then returns the bobbins, along with a digital report that lists how many are empty and how many still contain residual thread. The Manager uploads this report into the module, which automatically updates inventory and categorizes the bobbins for the next stage.

For thread recycling, partially used bobbins are directed to the recycling section. Guided by the module, workers use automated rewinding machines to merge leftover threads from multiple bobbins into a single, larger bobbin, restoring it to its original size. The module logs

these recycling operations, tracks the thread amounts combined, and marks the recycled bobbins as ready for reuse.

The Workers play a key role in beam connections and tube loading.

- Beam Connection: Workers connect thin threads from beams to production machines. The module assigns a timer to each beam, monitors its usage, and sends alerts when a beam is nearing depletion. Once empty, the system logs it and prepares it for return to the External Factory for refilling.
- Tube Loading: Workers transfer thick threads from bobbins into small tubes, which are used in machines. The module tracks tube preparation and sends shortage alerts, ensuring a constant supply of tubes.

The Supervisor oversees fabric weaving. Fabric Weavers operate machines to merge thin and thick threads into fabric. The system records fabric production data, including yardage and thread types used. It also schedules fabric cutting two or three times per week, after which the Supervisor inspects the cut fabric for quality.

Whenever new shipments of thin thread bobbins are prepared for the External Factory, the module generates a dispatch report that includes both new and recycled bobbins.

Through these coordinated processes, the Production Management Module automates inventory updates, recycling, beam management, tube preparation, and fabric weaving.

Stock Management

The Stock Management Subsystem maintains a unified, real-time record of raw materials, fabrics, recycled bobbins, and waste products, reflecting every change caused by purchasing, production, or selling.

Whenever the Manager procures raw materials (such as thick or thin thread bobbins) via the Buying and Selling Management Subsystem, the Stock Management Subsystem automatically records the incoming stock, batch information, and supplier details.

The Supervisor, responsible for finished products, monitors the availability of fabrics ready for sale and waste products awaiting recycling or disposal. When fabrics or threads are sold through the Buying and Selling Management Subsystem, stock quantities are deducted. Waste is logged separately, marked as either recyclable or disposable.

The subsystem provides both the Manager and Supervisor with a dashboard displaying live stock levels. It also calculates the estimated production capacity that current stock can sustain, based on historical usage patterns. If shortages of raw materials or finished fabrics arise—or if waste accumulates beyond storage limits—the subsystem sends instant alerts

through the integrated Notification System, notifying the Manager and Supervisor via Alarm.

Buying and selling management

The Seller begins by submitting an offer through the system, providing all essential details such as the material type (for example, thick or thin threads), quantity required, proposed price, and the expiry date of the offer. This submission ensures that the Owner can review the proposal formally within the platform. Once the offer is placed, the Seller may receive negotiation requests from the Owner, where adjustments related to price, quantity, or terms are proposed. The Seller responds to these negotiation requests within the subsystem, allowing both parties to communicate transparently until a mutually acceptable agreement is reached. After successful negotiation, the Seller receives confirmation of the finalized deal via SMS and dashboard notifications, which clearly state the order details, delivery commitments, and agreed terms, ensuring the Seller has official acknowledgment of the transaction.

For the Buyer, the subsystem provides a structured way to interact with the Owner's listed products. Buyers are able to browse available finished textile goods displayed by the owner, making it easier to evaluate and decide on potential purchases. Once a decision is made, the Buyer places an order by entering specific details such as product type, quantity, preferred delivery requirements, and chosen payment method. This ensures that every purchase request is formally captured by the system. In cases where the Buyer wishes to adjust certain conditions, the subsystem allows negotiation with the Owner regarding the price, quantity, or delivery date, ensuring flexibility in aligning the order with business needs. Once an agreement is finalized, the Buyer receives confirmation through both SMS and dashboard notifications, which outline the deal details and delivery expectations.

For the Owner, the subsystem ensures complete control and oversight of both purchasing and selling processes. The Owner is immediately notified whenever a Seller submits an offer, enabling quick evaluation of procurement opportunities. By accessing the offer details, the Owner can review, negotiate, and confirm transactions with Sellers to secure the necessary raw materials efficiently. On the selling side, the manager has the capability to list finished textile goods within the system, allowing buyers to view and place orders directly. When Buyer orders are submitted, the Owner reviews and confirms them. The Owner also actively engages in negotiations with both Sellers and Buyers through the subsystem to establish mutually beneficial agreements. Payment handling is another critical function, where the Owner can either make payments to Sellers or receive payments from Buyers through various online options (such as card, bank transfer, or mobile banking platforms like bKash or Nagad) or offline methods (such as cash). All

payment transactions are logged, and receipts or transaction IDs are stored for traceability and financial accountability. Finally, the subsystem is fully integrated with stock management, meaning that inventory levels are automatically updated after each purchase or sale.

Report Analysis Panel

In the Report Analysis Panel, the Manager plays the primary role in monitoring and analyzing business performance. Within the Sales Analysis Module, the Manager reviews detailed sales reports that highlight both growth and decline trends over different periods. This allows the Manager to track fluctuations in sales volume, identify patterns in customer demand, and evaluate how effectively business strategies are driving revenue. By monitoring these insights, the Manager can pinpoint areas requiring improvement and develop informed strategies for boosting sales.

In addition to sales, the Manager also utilizes the Profit Analysis Module, where profit-related data is presented both in tabular format and through graphical representations such as charts and graphs. The Manager can analyze profit margins, visualize trends, and compare profitability across different time frames (daily, weekly, monthly, or yearly). These visual and statistical insights enable the Manager to make decisions that maximize overall profitability and reduce financial risks.

Beyond financial analysis, the Report Analysis Panel also supports Employee Performance Monitoring. The Manager can assess employee efficiency by evaluating attendance records, the volume of work completed, and other relevant performance indicators. This helps in identifying top performers, recognizing underperformance, and making data-driven decisions regarding workforce management.

The Owner, while not directly involved in data manipulation, has full visibility of the entire Report Analysis Panel. The Owner can access and view all reports generated and updated by Managers, ensuring oversight and transparency at the organizational level. This access allows the Owner to stay informed about sales performance, profit growth, and employee efficiency without interfering in the detailed reporting process.

Use case diagram

A use case is a list of actions or event steps typically defining the interactions between a role (actor) and a system to achieve a goal. The actor can be a human or other external system. In this modeling, use case diagram is a graphical depiction of a user's possible interactions with a system. A use case diagram shows various use cases and different types of users the system has and will often be accompanied by other types of diagrams as well. Use case diagrams are a blueprint for the system. Due to their simplistic nature, use case diagrams can be a good communication tool for stakeholders. The drawings attempt to mimic the real world and provide a view for the stakeholder to understand how the system is going to be designed. Use case diagrams consist of actors, use cases and their relationships. The diagram is used to model the system/subsystem of an application. A single use case diagram captures a particular functionality of a system.

Primary Actor

Primary actors interact to achieve required system function and derive the intended benefit from the system. They work directly and frequently with the software.

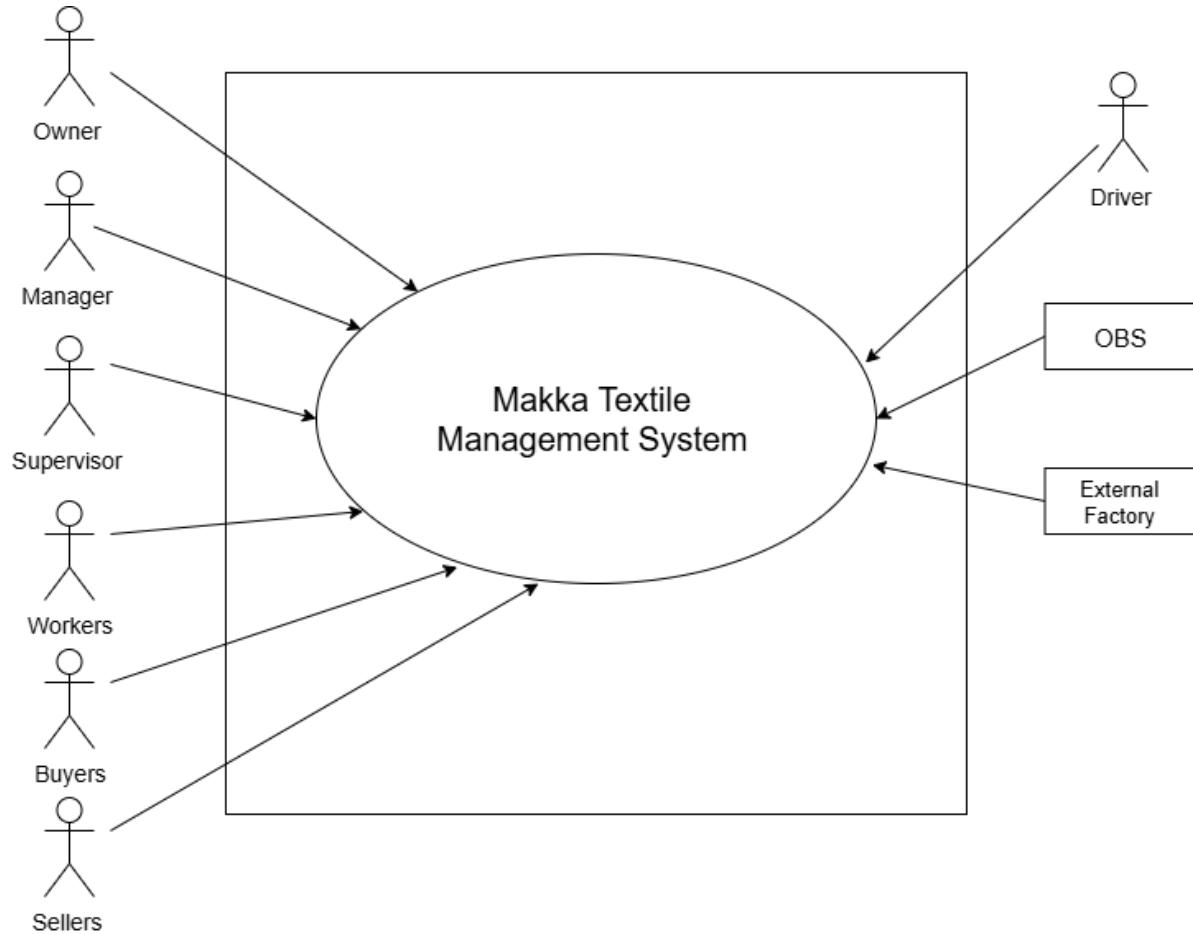
Secondary Actor

Secondary actors support the system so that primary actors can do their work. They either produce or consume information.

Level 0: Makka Textile Management System

Primary actors : Owner, Manager, Supervisor, Workers, Buyers, Sellers.

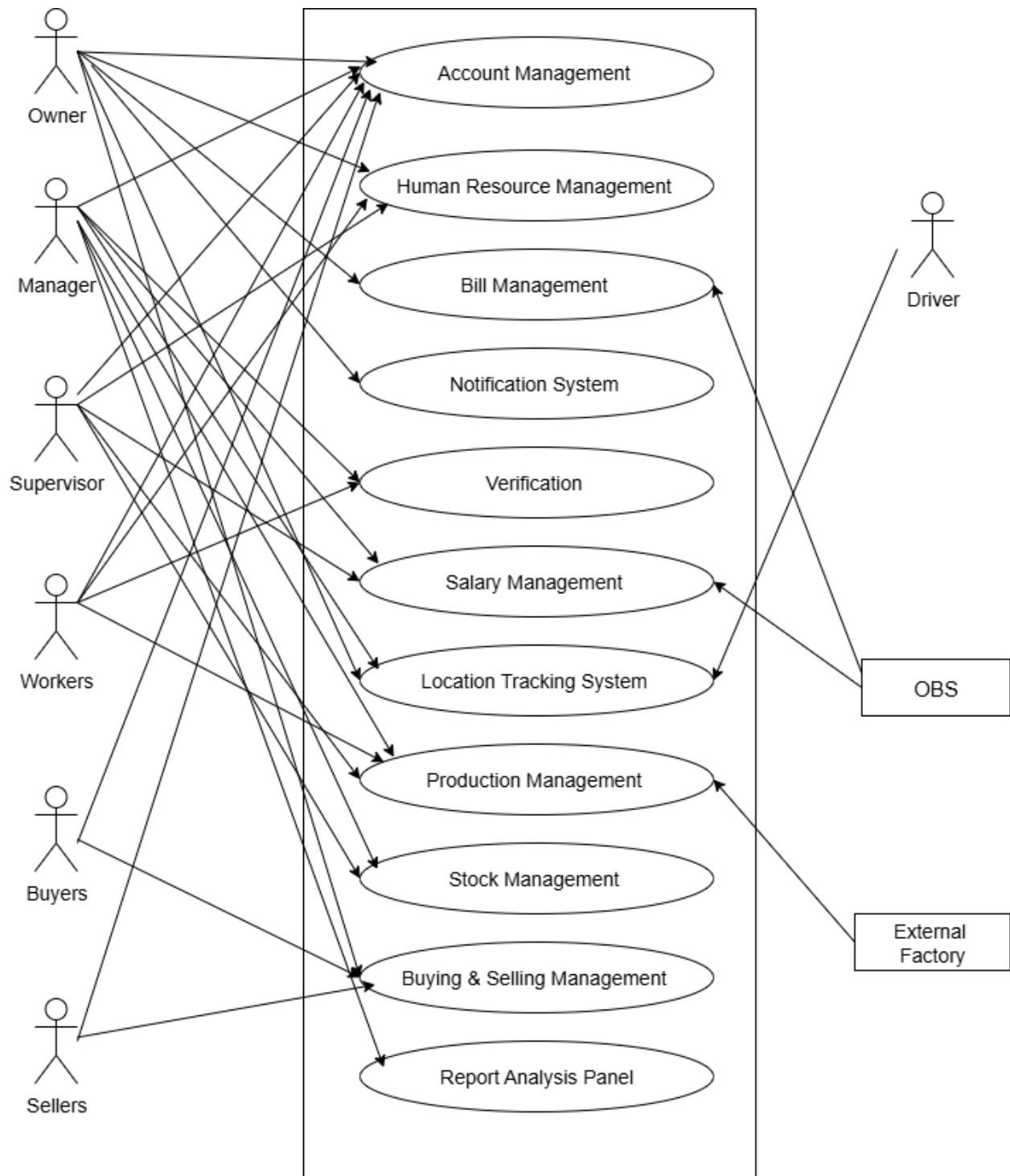
Secondary actors : Driver, OBS, External Factory.



Level 1: Makka Textile Management System

Primary actors : Owner, Manager, Supervisor, Workers, Buyers, Sellers.

Secondary actors : Driver, OBS, External Factory.



Description

Account Management System

- This module oversees the creation, access, and maintenance of user accounts for various roles such as admin, owner, manager, employee, workers, supervisor, driver, and seller. It ensures secure registration, login, account updates, and an approval process to maintain system integrity.

Human Resource Management

- This module manages human resource-related activities, including tracking worker attendance, processing leave and event applications, and disseminating important notices to ensure effective workforce coordination and communication.

Bill Management System

- This module provides tools for the owner to monitor and analyze financial obligations by generating detailed bill reports and managing accounts payable, supporting effective financial oversight.

Notification System

- This module facilitates communication by enabling the owner to send SMS notifications and post real-time alerts on the website dashboard, ensuring workers receive timely and critical updates.

Verification System

- This module ensures secure user authentication by allowing workers to generate one-time passwords (OTPs) and enabling managers to confirm these OTPs, enhancing system security.

Salary Management

- This module handles compensation processes by allowing supervisors to record work amounts, process online salary payments, and enable managers to manage offline payments, ensuring accurate and flexible payroll management.

Location Tracking System

- This module provides real-time location tracking of drivers, allowing the owner and manager to monitor their positions, while also enabling drivers to send their current addresses for operational coordination.

Production Management

- This module oversees manufacturing processes, including beam connections, tube loading, fabric waving, and thread recycling, ensuring efficient production workflows and quality control.

Stock Management

- This module tracks and manages inventory, allowing the manager to oversee raw materials and the supervisor to handle saleable products, facilitating stock level monitoring and distribution.

Buying & Selling Management System

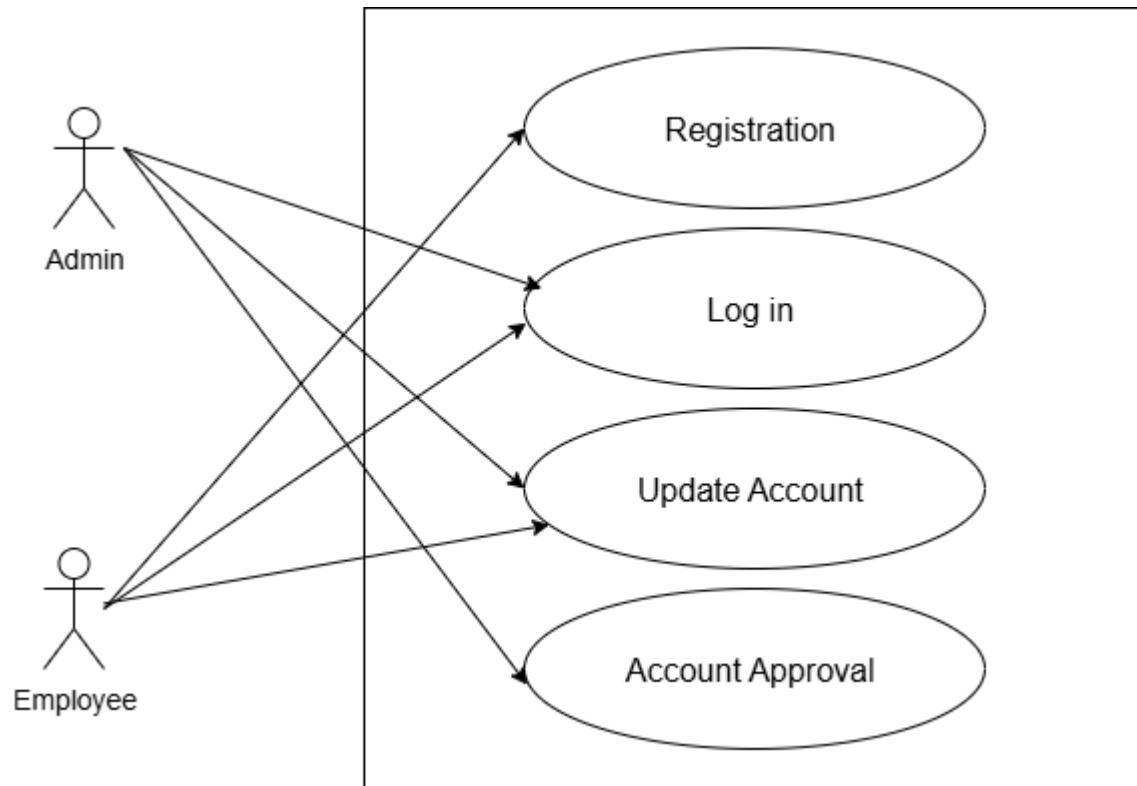
- This module supports commercial transactions by enabling buyers and sellers to create offers, conduct negotiations, and allowing the owner to confirm deals, streamlining the buying and selling process.

Report Analysis Panel

- This module provides analytical tools for managers and the owner to generate and review reports and graphs, such as sales analysis, profit analysis, and employee salary reports, aiding in data-driven decision-making.

Level-1.1 : Account Management System

Primary actors : Admin(Owner, Manager), Employee(Supervisor, Workers , Buyers, Drivers, Sellers).



Description :

Registration

- The system shall allow admin, owner, manager, employee, workers, supervisor, driver, and seller to register for an account.
- Registration shall collect necessary user details and assign appropriate roles.

Log In

- The system shall provide a login feature for all registered users to access their accounts.
- Login shall verify user credentials and grant access based on assigned roles.

Update Account

- The system shall allow users to update their account details.
- Updates shall be available to all user roles including admin, owner, manager, employee, workers, supervisor, driver, and seller.

Account Approval

- The system shall require account approval for new registrations and updates.
- The approval process shall be managed to ensure security and compliance with organizational policies.

Action & Reply :

Action1: Specify user type (Admin / Owner / Manager / Employee)

Reply1: System shows the registration/login interface for the selected user type

Action2: Enter username, email, and password

Reply2: System checks and shows the validity of the password

Action3: Confirm credentials

Reply3: System asks for email verification

Action4: Verify email

Reply4: System sends confirmation message and creates the account

Action5: (Admin only) Approve or reject pending accounts

Reply5: System updates account status and notifies the user

Action6: Log in with username and password

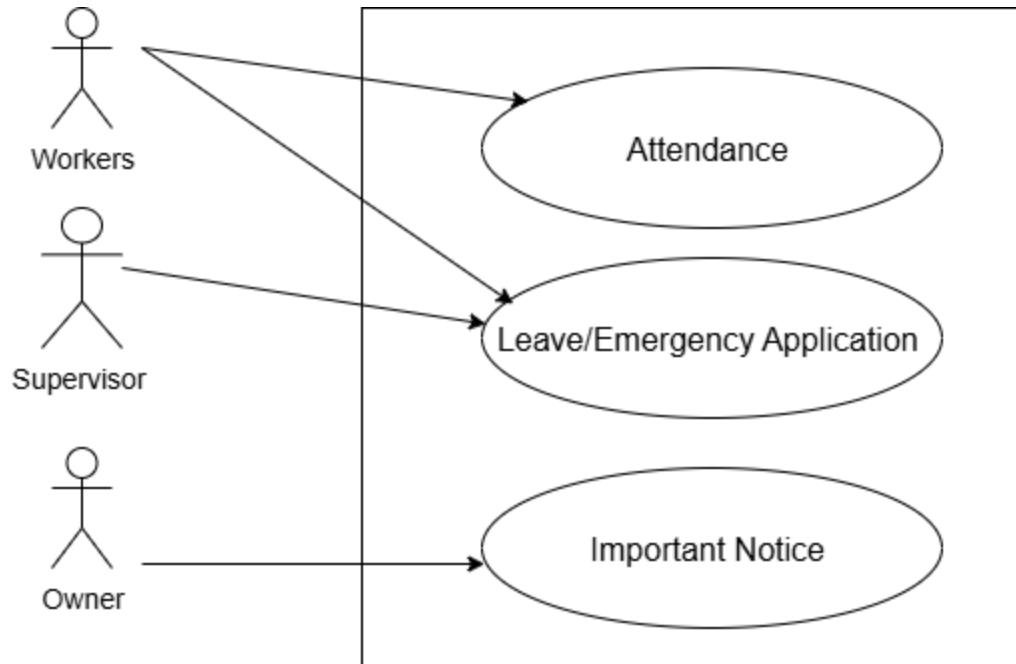
Reply6: System verifies credentials and opens the user dashboard

Action7: Update account information

Reply7: System validates and saves updated account data

Level-1.2 : Human Resource Management System

Primary actors : Workers, Supervisor, Owner.



Description :

Attendance

- The system shall allow workers to record and manage their attendance.
- Attendance data shall be accessible for review and tracking purposes.

Leave/Event Application

- The system shall enable workers and supervisors to submit applications for leave or events.
- The application process shall include submission and approval workflows.

Important Notice

- The system shall allow the owner to post important notices for workers and supervisors.

- Notices shall be visible to all relevant users for timely communication.

Action & Reply :

Action1: Workers select "Attendance"

Reply1: System opens attendance interface

Action2: Workers mark attendance

Reply2: System records attendance and shows confirmation

Action3: Supervisor selects "Leave/Event Application"

Reply3: System opens leave/event application form

Action4: Supervisor fills in leave/event details and submits

Reply4: System saves application and shows submission confirmation

Action5: Owner selects "Important Notice"

Reply5: System opens notice creation panel

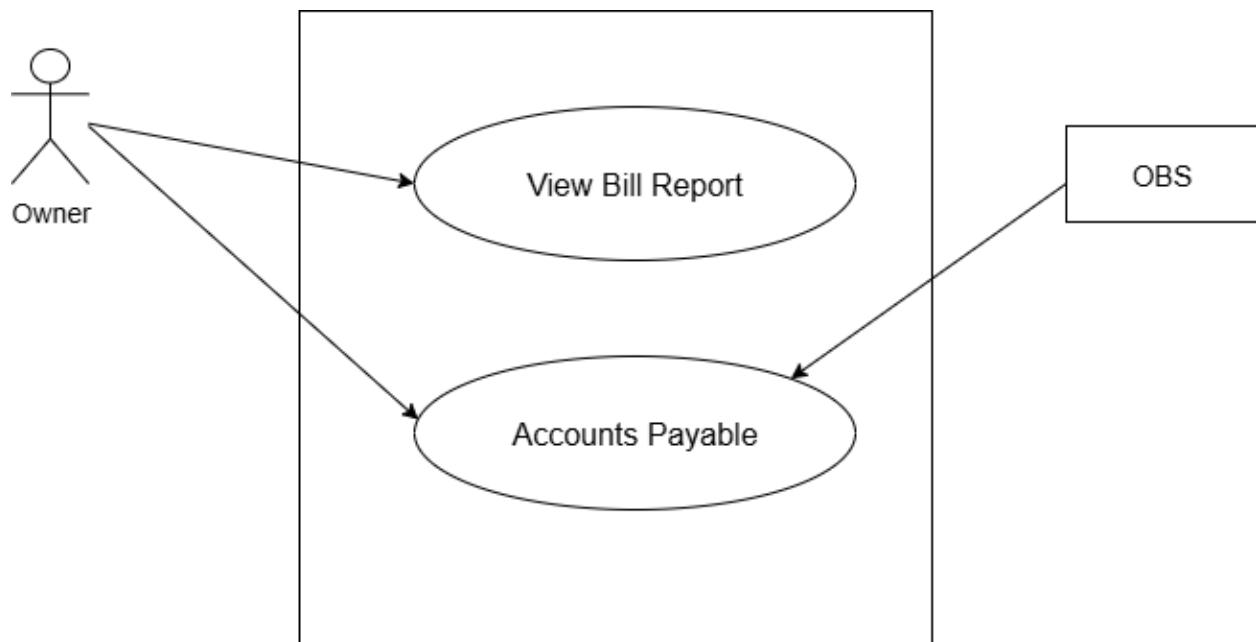
Action6: Owner writes and publishes notice

Reply6: System saves notice and sends it to all relevant users

Level-1.3 : Bill Management System

Primary actors : Owner.

Secondary actors : OBS.



Description :

View Bill Report

- The system shall allow the owner to view detailed bill reports.
- Reports shall include comprehensive data for analysis and review.

Accounts Payable

- The system shall enable the owner to manage and track accounts payable.
- The module shall support recording and updating payable transactions.

Action & Reply :

Action: Owner clicks view report

Reply: System opens the panel

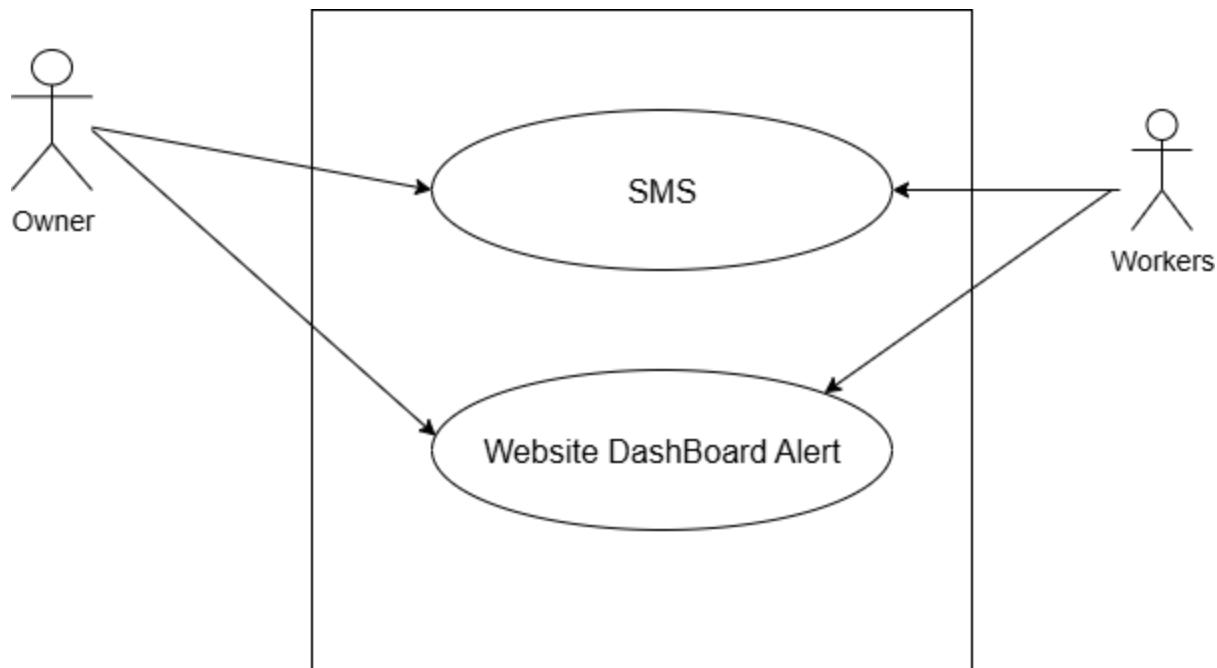
Action: Owner clicks on accounts payable

Reply: OBS initiates payment

Level-1.4 : Notification System

Primary actors : Owner.

Secondary actors : Workers.



Description :

SMS

- The system shall allow the owner to send SMS notifications to workers.
- The module shall support timely and reliable message delivery.

Website Dashboard Alert

- The system shall enable the owner to post alerts on the website dashboard for workers.
- The module shall provide real-time alert visibility and updates.

Action & Reply :

Action: Owner sends SMS

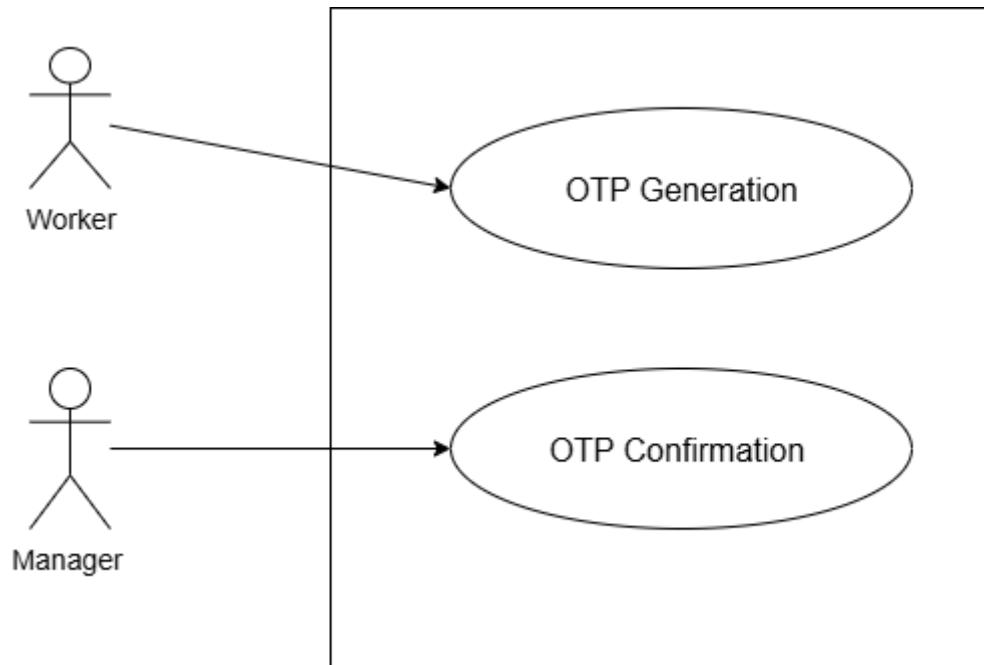
Reply: Workers Receive SMS

Action: Owner sends dashboard alert

Reply: Workers Receive receives dashboard alert

Level-1.5 : Verification System

Primary actors : Workers, Manager



Description:

OTP Generation

- The system shall allow the worker to generate a one-time password (OTP) for verification.
- The module shall ensure secure and unique OTP creation.

OTP Confirmation

- The system shall enable the manager to confirm the OTP provided by the worker.
- The module shall support validation and verification of the entered OTP.

Action & Reply :

Action: Worker Clicks resulting in otp creation

Reply: OTP generates.

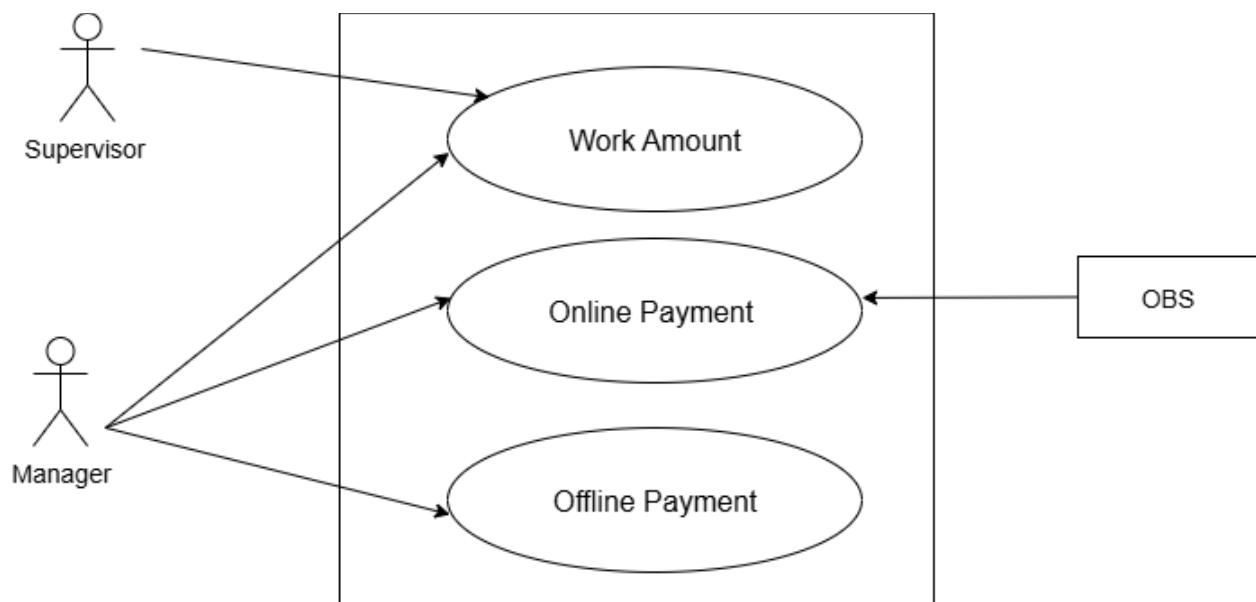
Action: System sends OTP

Reply: Manager Confirm OTP

Level-1.6 : Salary Management System

Primary actors : Supervisor, Manager

Secondary actors : OBS



Description:

Work Amount

- The system shall allow supervisors to record and manage the work amount for employees.

- Work amount data shall be available for review and calculation purposes.

Online Payment

- The system shall enable supervisors to process salary payments online.
- The module shall support secure online transaction methods.

Offline Payment

- The system shall allow managers to handle salary payments offline.
- The module shall support manual payment recording and verification.

Action & Reply :

Action: Supervisor calculates work amount

Reply: System saves the work amount and displays total for verification

Action: Manager initiates online payment

Reply: System integrates with OBS to process payment and confirms status

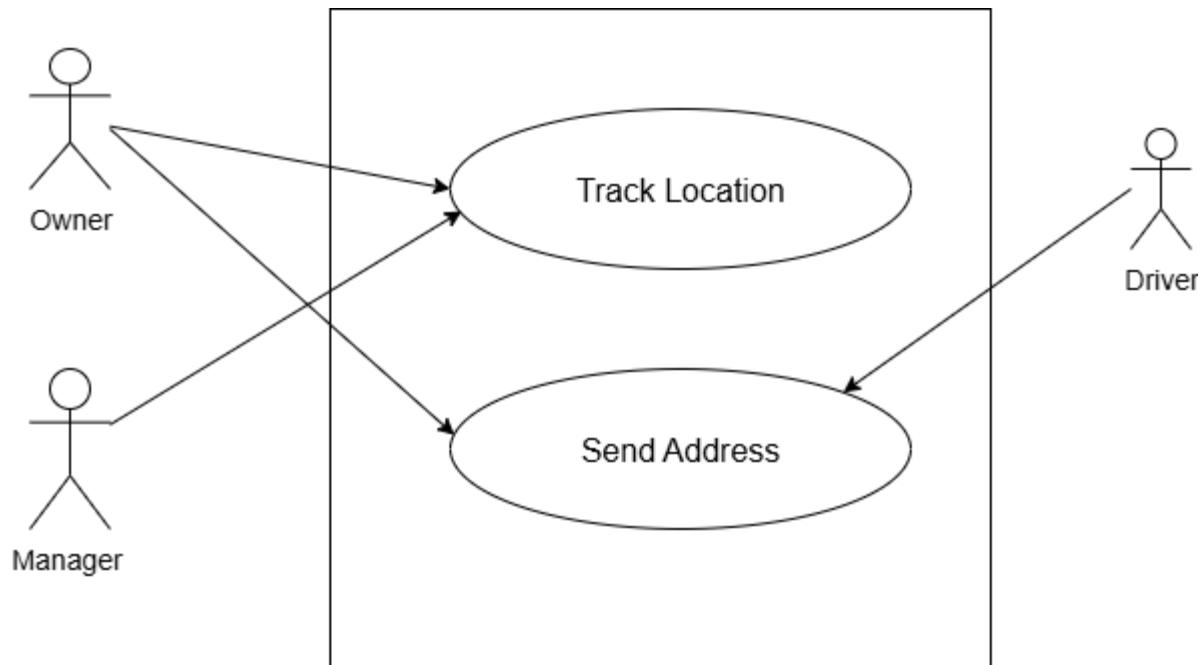
Action: Manager records offline payment

Reply: System generates a payment receipt for the offline transaction

Level-1.7 : Location Tracking System

Primary actors : Owner, Manager

Secondary actors : Driver



Description :

Track Location

- The system shall allow the owner and manager to track the real-time location of drivers.
- Location data shall be accessible for monitoring and management purposes.

Send Address

- The system shall enable the driver to send their current address to the owner and manager.
- The module shall support accurate address submission and updates.

Action & Reply :

Action: Owner requests to track location

Reply: System provides real-time location data to the Owner

Action: Manager requests to track location

Reply: System provides real-time location data to the Manager

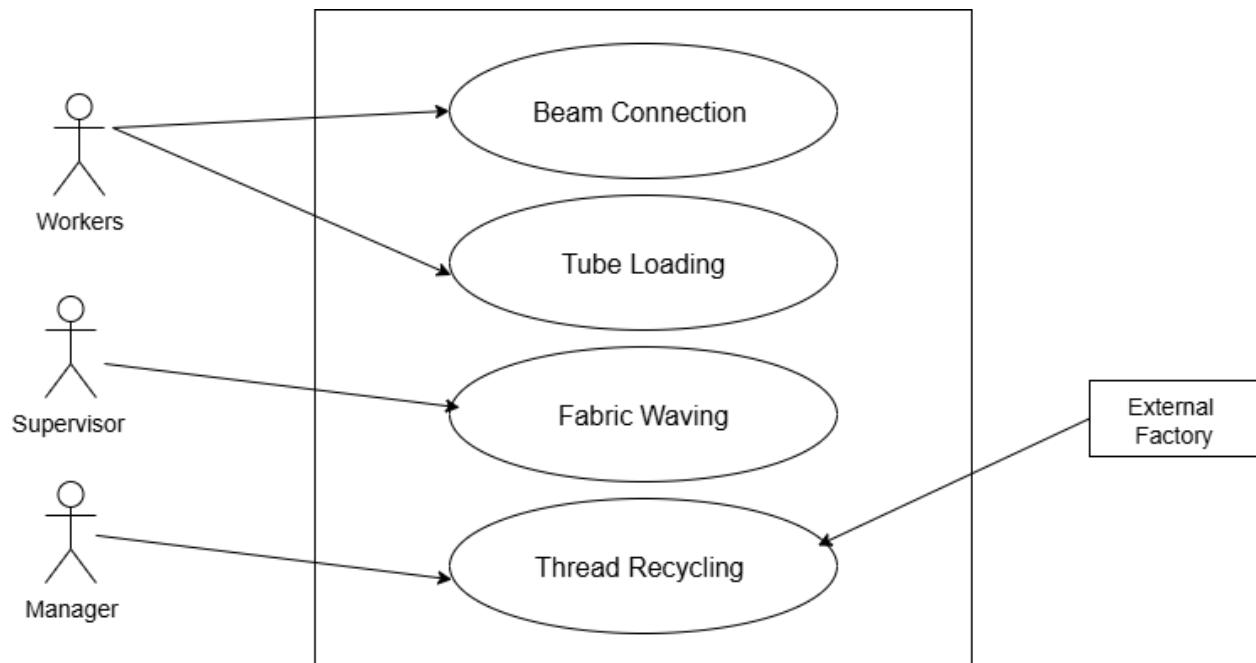
Action: Driver sends address

Reply: System updates and stores the address for tracking purposes

Level-1.8 : Production Management System

Primary actors : Workers, Supervisor, Manager.

Secondary actors : External Factory.



Description :

Beam Connection

- The system shall allow workers to manage and establish beam connections.

- The module shall support accurate connection setup and verification.

Tube Loading

- The system shall enable workers to perform tube loading tasks.
- The module shall ensure proper loading procedures and tracking.

Fabric Waving

- The system shall allow workers and supervisors to handle fabric waving processes.
- The module shall support quality control and monitoring.

Thread Recycling

- The system shall enable managers to oversee thread recycling activities.
- The module shall support efficient recycling and coordination with the external factory.

Action & Reply :

Action: Workers perform beam connection

Reply: System records the beam connection details and updates production status

Action: Supervisor loads tubes

Reply: System updates tube inventory and confirms loading completion

Action: Supervisor initiates fabric weaving

Reply: System monitors weaving process and logs production metrics

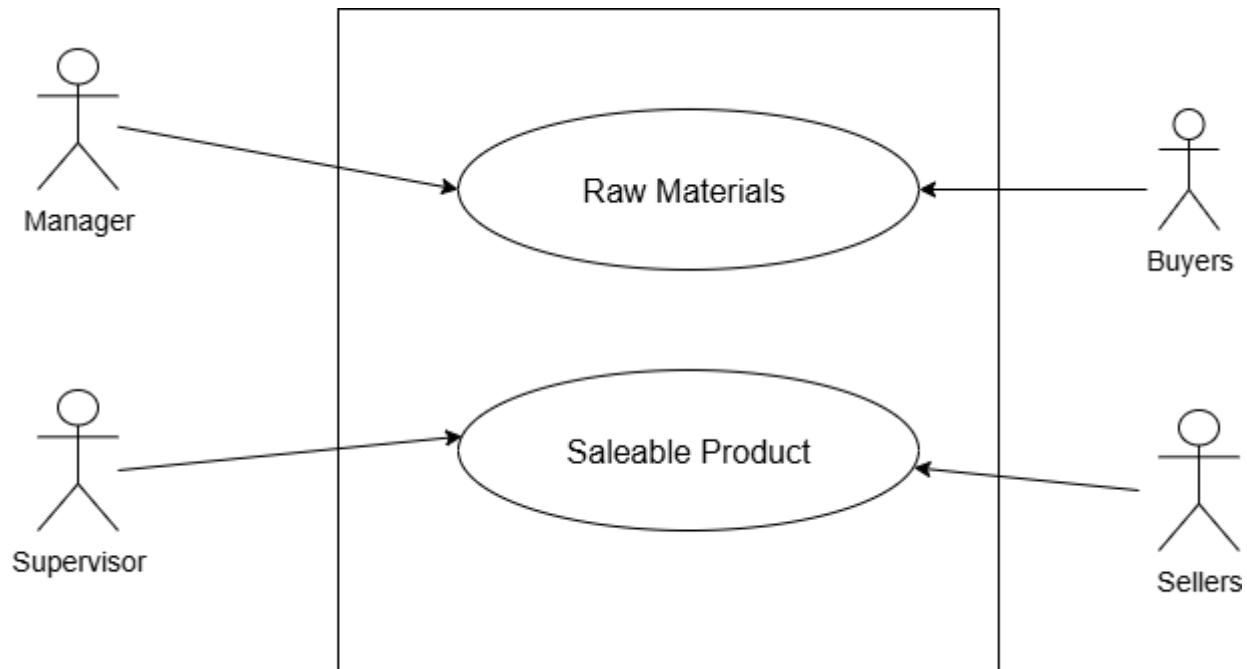
Action: Manager requests thread recycling

Reply: System coordinates with external factory to process and recycle threads.

Level-1.9 : Stock Management System

Primary actors : Manager, Supervisor.

Secondary actors : Buyer, Sellers.



Description :

Raw Materials

- The system shall allow the manager to manage and track raw material inventory.
- The module shall support recording and monitoring of raw material stock levels.

Saleable Product

- The system shall enable the supervisor to oversee and manage saleable product inventory.
- The module shall support tracking and distribution of saleable products to buyers and sellers.

Action & Reply :

Action: Manager updates raw materials

Reply: System records the raw materials inventory and updates stock levels

Action: Supervisor updates saleable product

Reply: System records the saleable product inventory and updates stock availability

Action: Buyers request saleable product

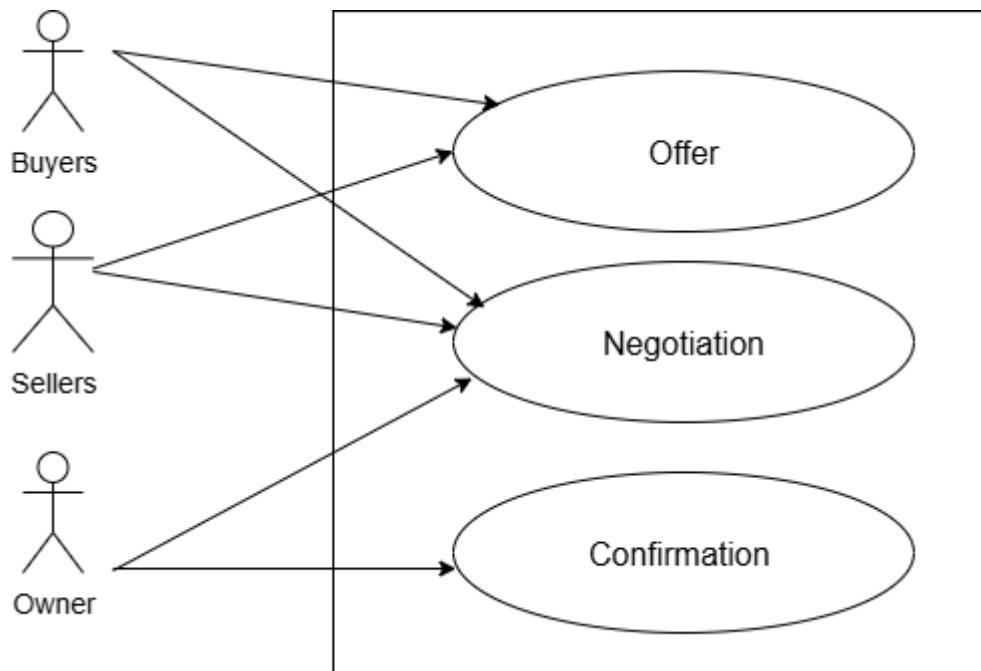
Reply: System processes the request and deducts the saleable product from stock

Action: Sellers supply raw materials

Reply: System adds the supplied raw materials to the inventory

Level-1.10 : Buying & Selling Management System

Primary actors : Buyers, Sellers, Owner.



Description :

Offer

- The system shall allow buyers and sellers to create and submit offers.
- The module shall support the management and review of offers by the owner.

Negotiation

- The system shall enable buyers and sellers to conduct negotiations on offers.
- The module shall facilitate communication and agreement processes.

Confirmation

- The system shall allow the owner to confirm negotiated deals.

- The module shall support the finalization and documentation of confirmed transactions.

Action & Reply :

Action: Buyers submit an offer

Reply: System records the offer and notifies relevant sellers

Action: Sellers engage in negotiation

Reply: System facilitates the negotiation process and logs updates

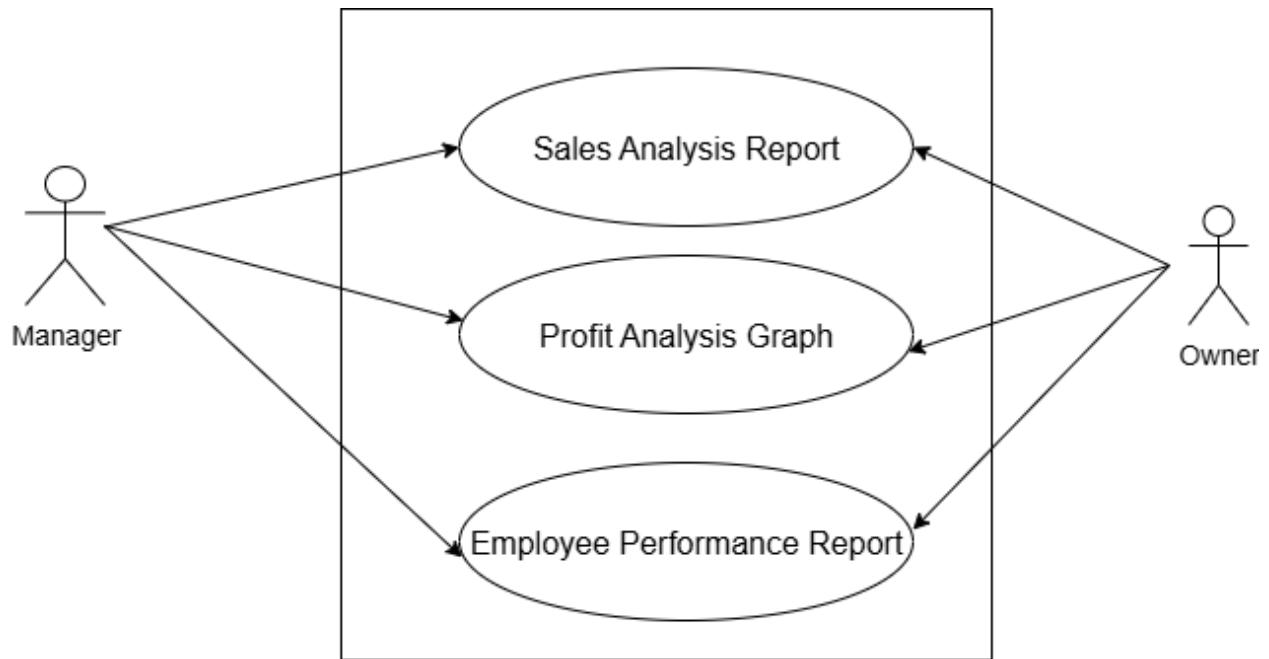
Action: Owner confirms the deal

Reply: System finalizes the confirmation and updates the transaction status

Level-1.11 : Report Analysis Panel

Primary actors : Manager

Secondary actors : Owner



Description :

Sales Analysis Report

- The system shall allow managers and owners to generate and view sales analysis reports.
- The module shall provide detailed insights into sales data, including trends, performance metrics, and summaries for decision-making.

Profit Analysis Graph

- The system shall enable managers and owners to visualize profit data through interactive graphs.
- The module shall support graphical representations of profit trends, comparisons, and forecasts to aid financial analysis.

Employee Salary Report

- The system shall allow owners to access comprehensive employee salary reports.
- The module shall include details on salary distributions, payments, and related expenses for HR and financial oversight.

Action & Reply :

Action: Managers request Sales Analysis Report

Reply: System generates and displays the Sales Analysis Report

Action: Managers request Profit Analysis Graph

Reply: System generates and displays the Profit Analysis Graph

Action: Owner requests Employee Salary Report

Reply: System generates and displays the Employee Salary Report

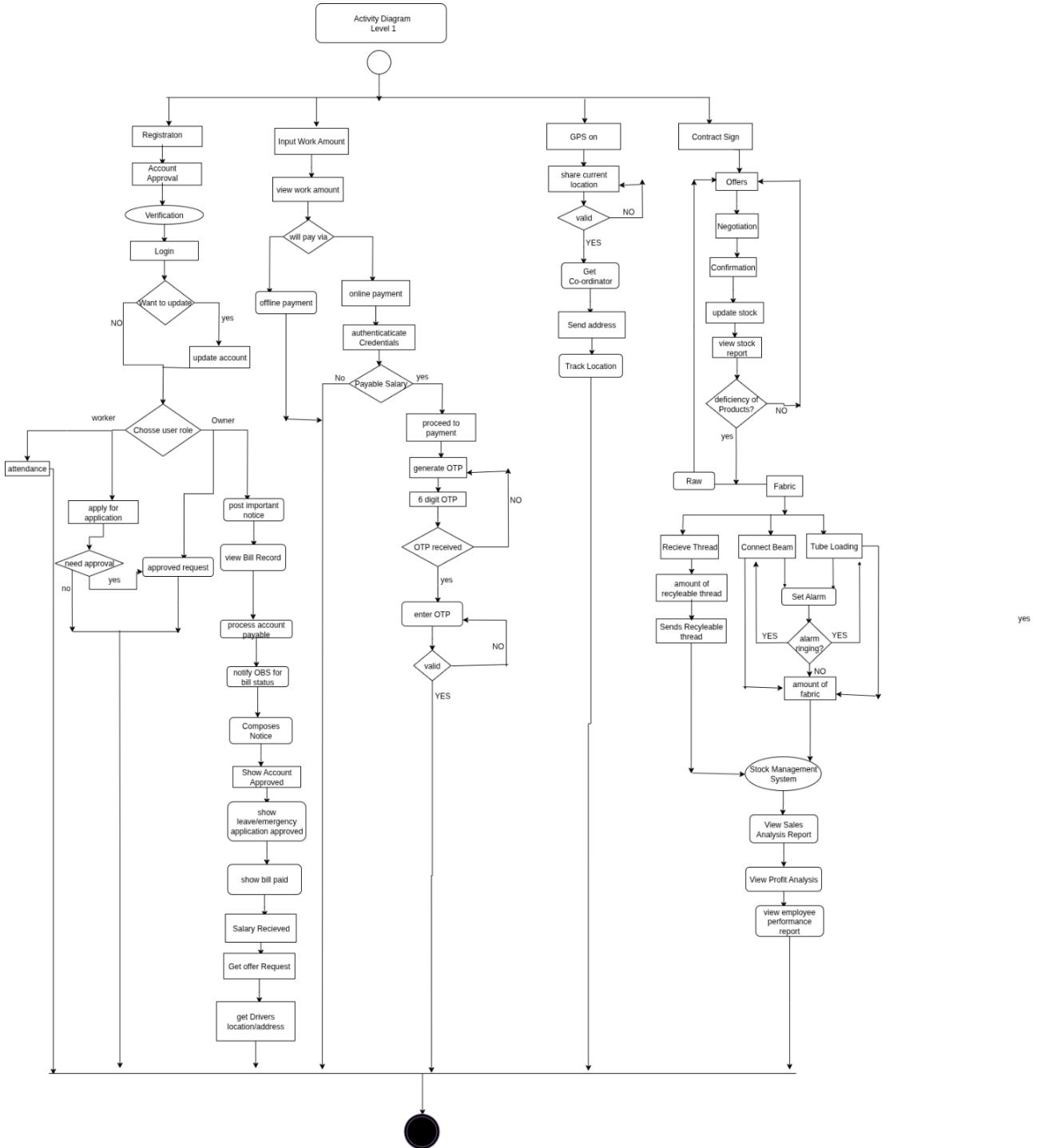
Activity diagram

Activity diagram is an important behavioral diagram in UML diagram to describe dynamic aspects of the system. Activity diagram is essentially an advanced version of flowchart that models the flow from one activity to another activity.

Level-1:

Name: Makka Textile Management System

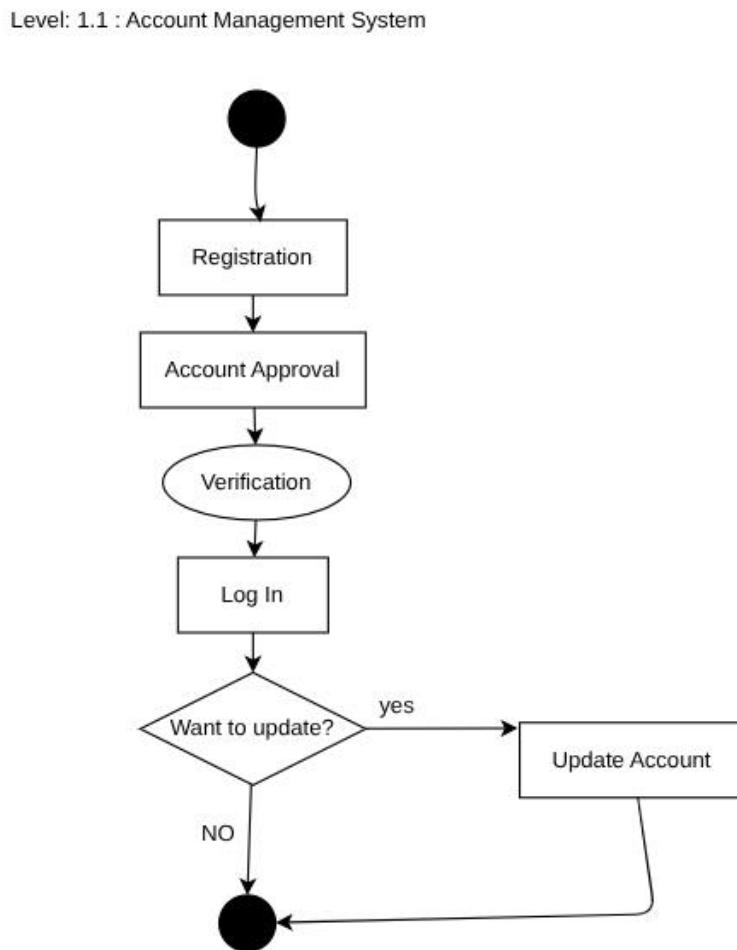
Reference: Use case diagram level-1



Level-1.1:

Name: Account Management System

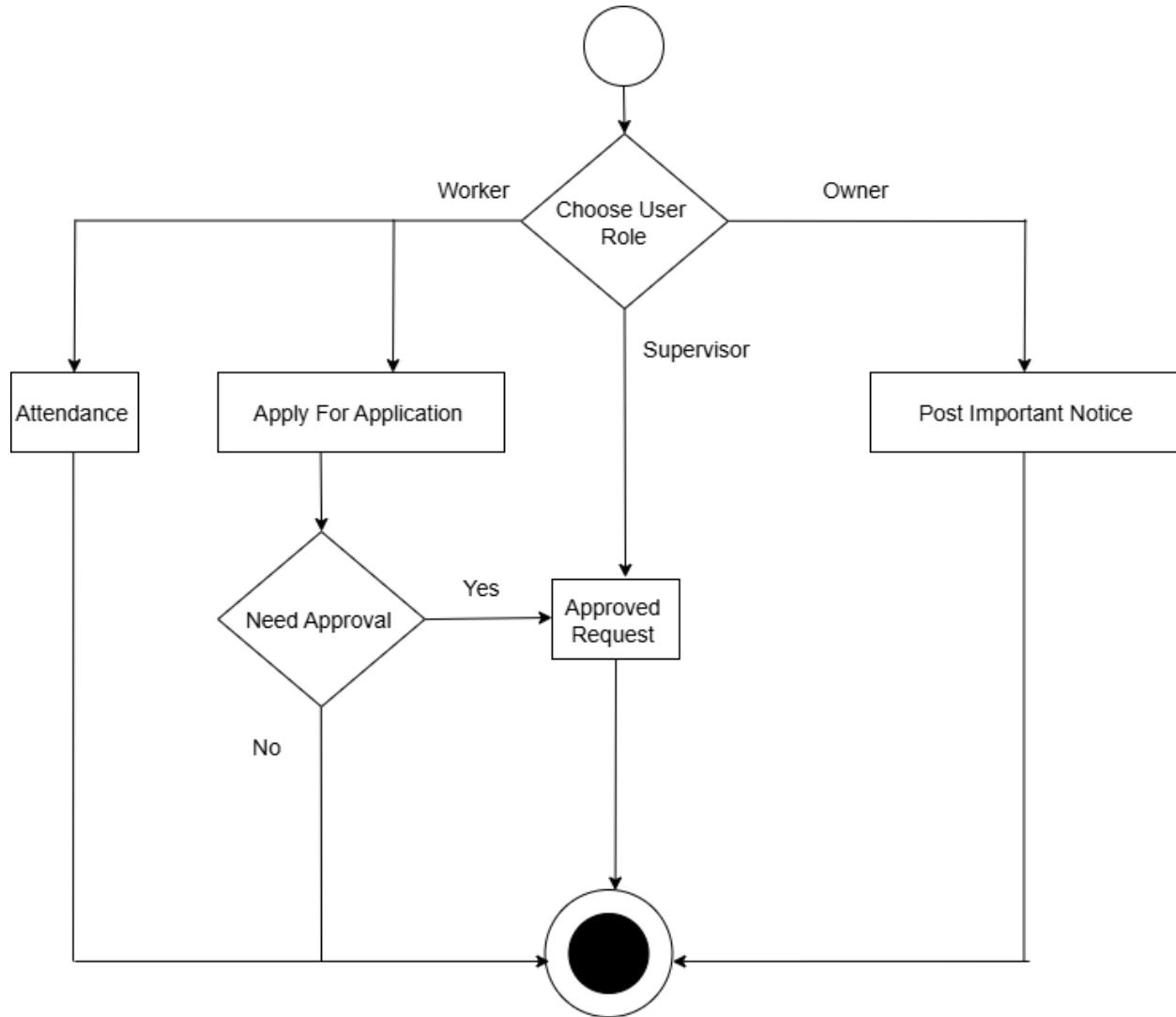
Reference: Use case diagram level-1.1



Level-1.2:

Name: Human Resources Management System

Reference: Use case diagram level-1.2

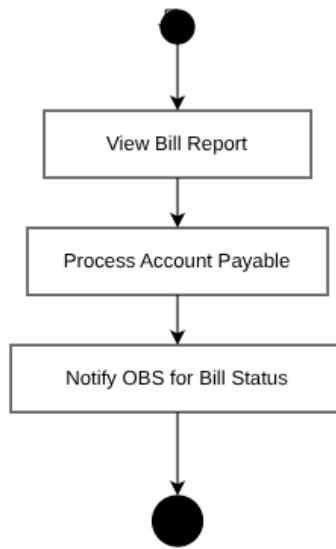


Level-1.3:

Name: Bill Management System

Reference: Use case diagram level-1.3

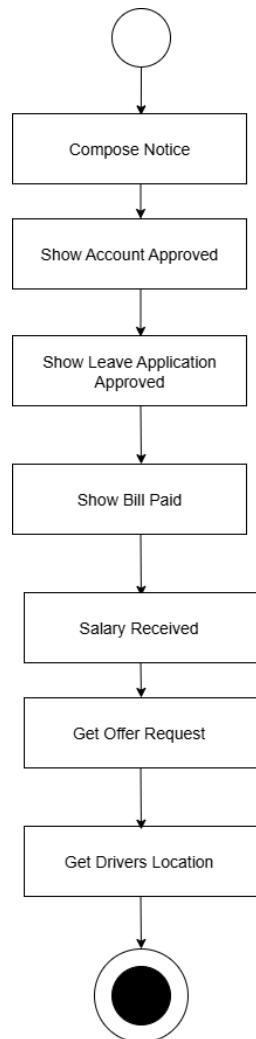
Level: 1.3 : Bill Management System



Level-1.4:

Name: Notification Management System

Reference: Use case diagram level-1.4

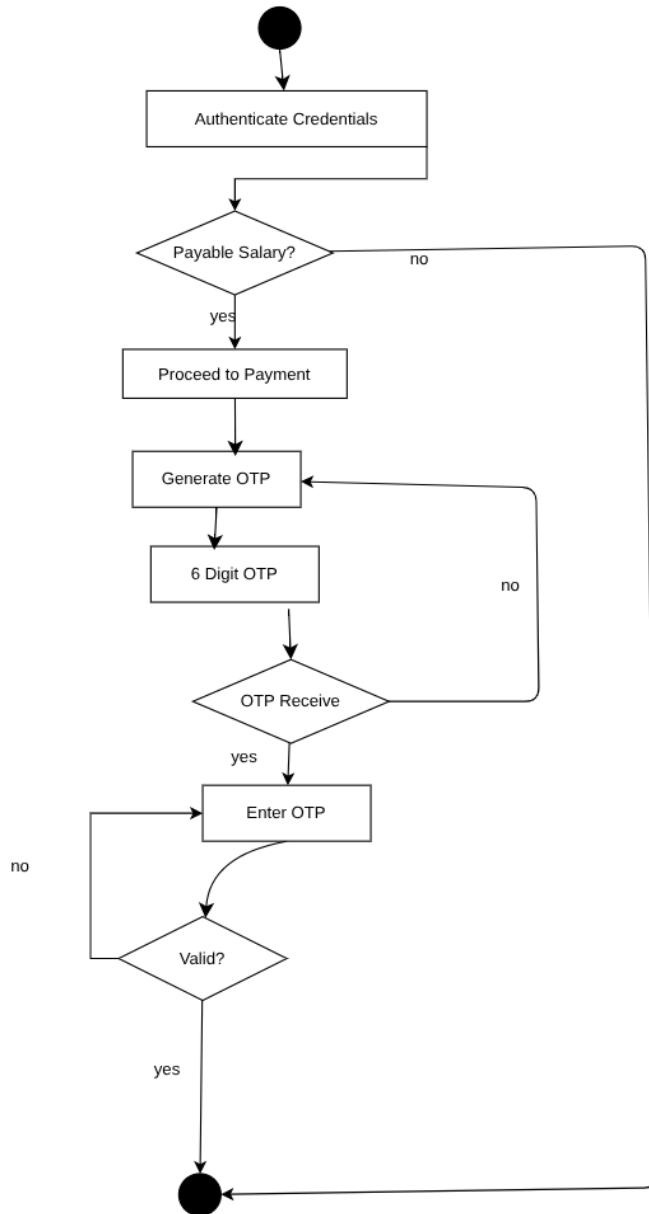


Level-1.5:

Name: Verification

Reference: Use case diagram level-1.5

Level: 1.5 : Verification Management System

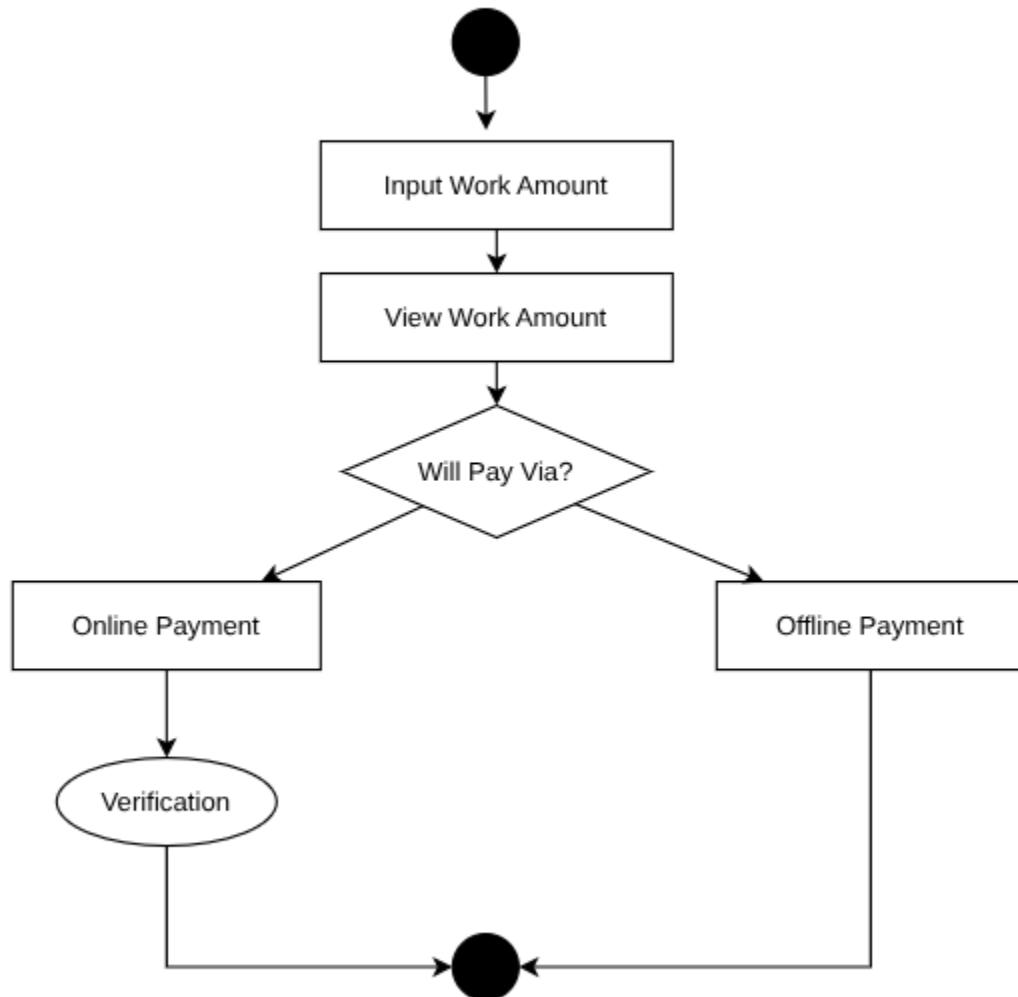


Level-1.6:

Name: Salary Management System

Reference: Use case diagram level-1.6

Level: 1.6 : Salary Management System

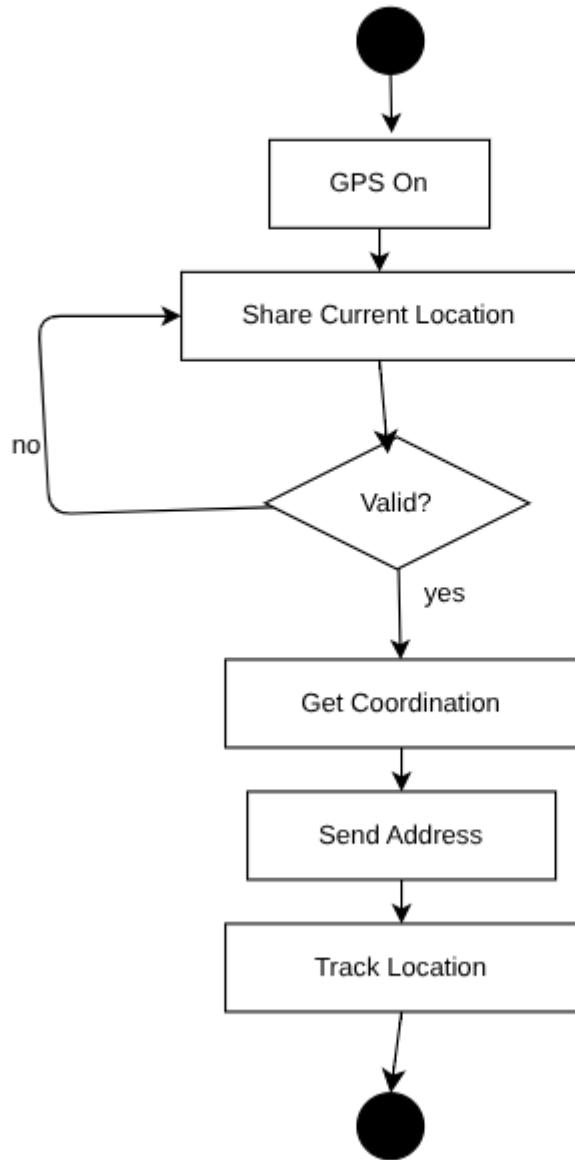


Level-1.7:

Name: Location Tracking System

Reference: Use case diagram level-1.7

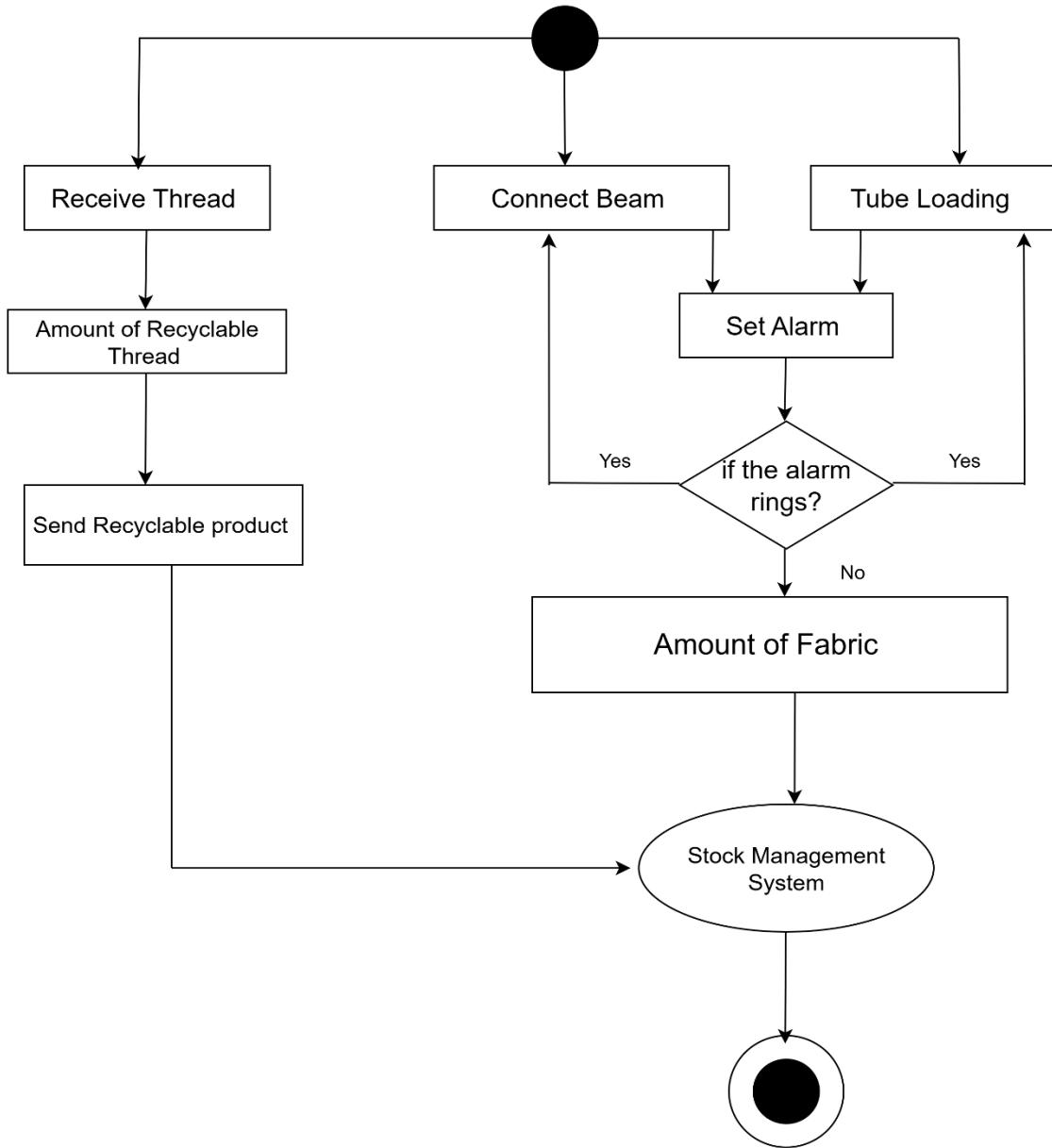
Level: 1.7 : Location Tracking System



Level-1.8:

Name: Production Management System

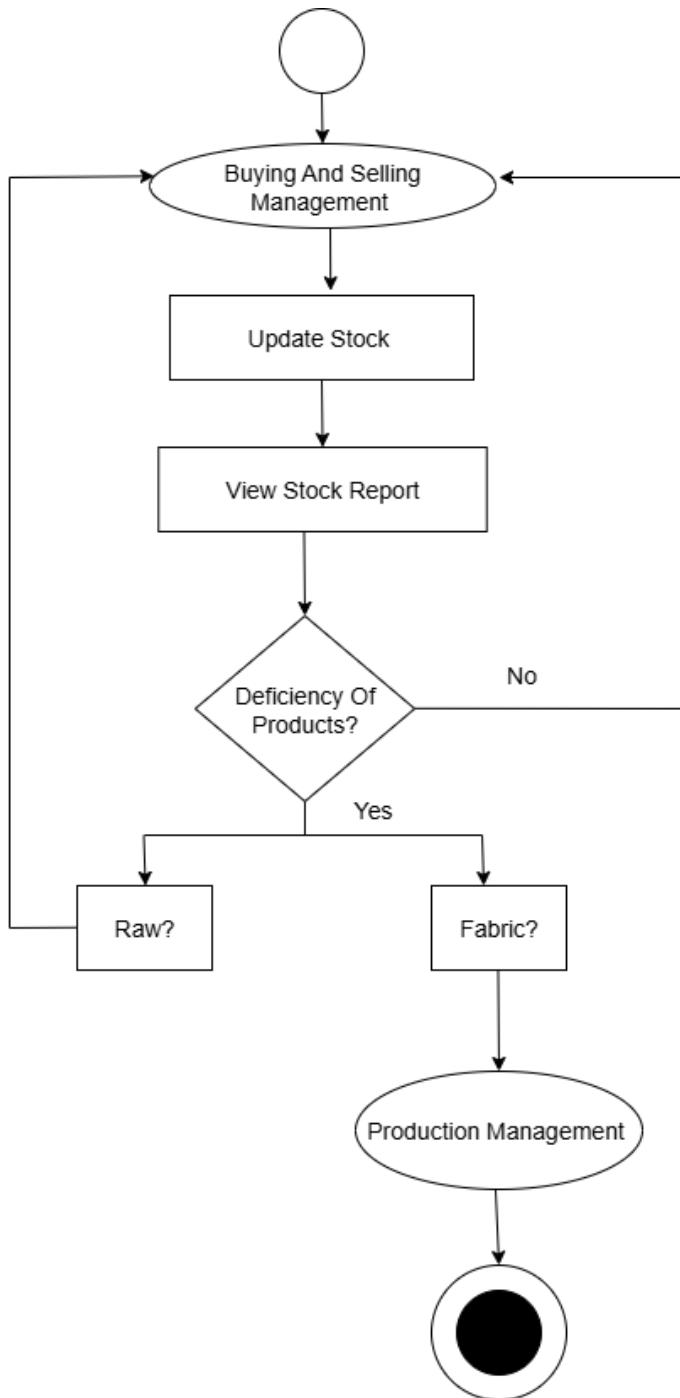
Reference: Use case diagram level-1.8



Level-1.9:

Name: Stock Management System

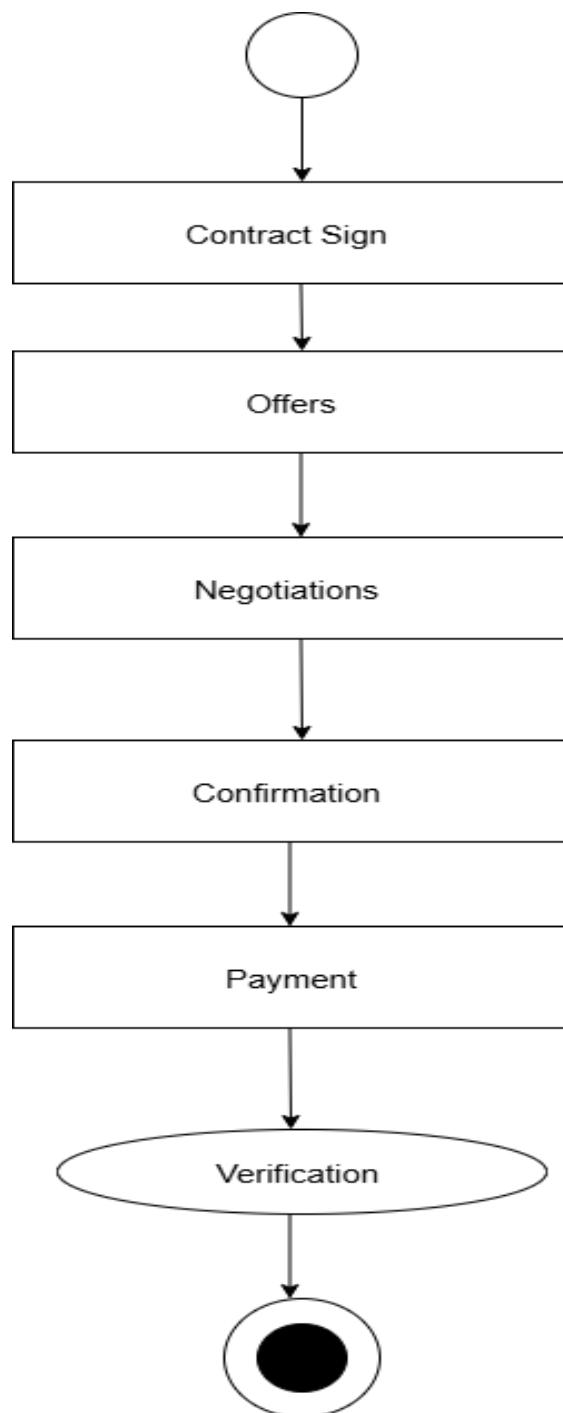
Reference: Use case diagram level-1.9



Level-1.10:

Name: Buying & Selling Management System

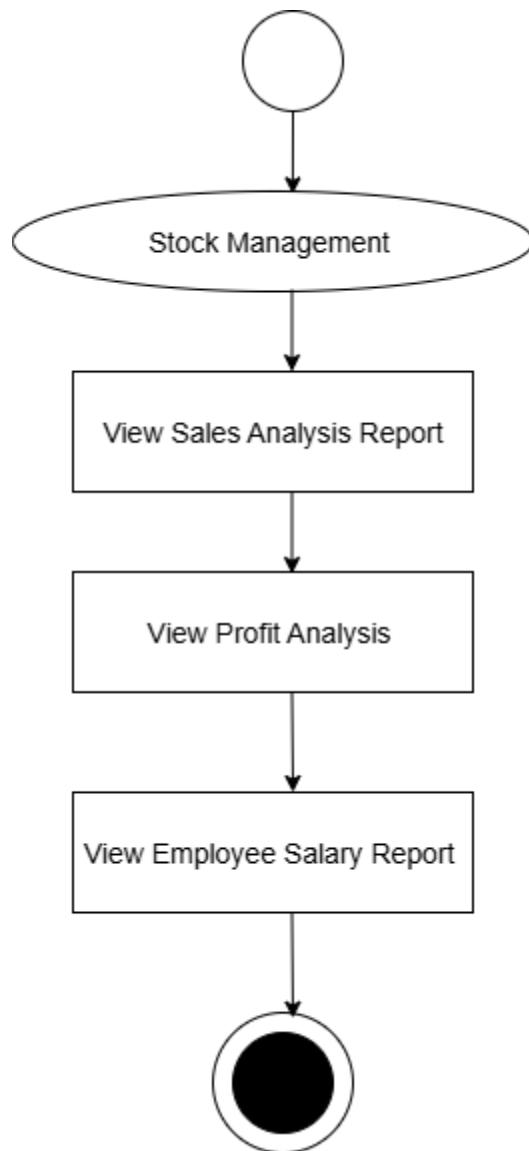
Reference: Use case diagram level-1.10



Level-1.11:

Name: Report Analysis Panel

Reference: Use case diagram level-1.11



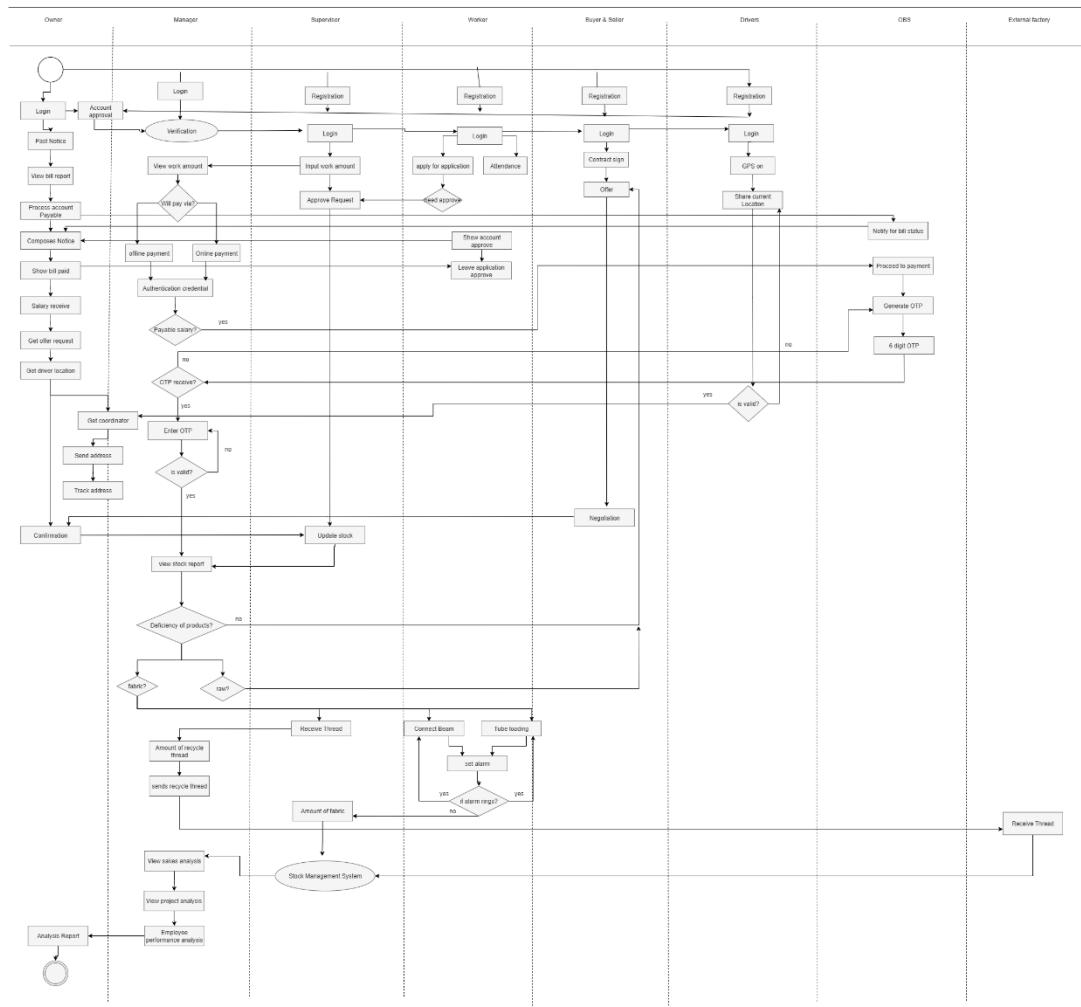
Swimlane diagram

A swimlane diagram is a type of flowchart, which diagrams a process from start to finish, but it also divides these steps into categories to help distinguish which departments or employees are responsible for each set of actions. It is based on the analogy of lanes in a pool, as it places process steps within the horizontal or vertical “swimlanes” of a particular department, work group or employee, thus ensuring clarity and accountability.

Level-1:

Name: Makka Textile Management System

Reference: Use case diagram level-1.1

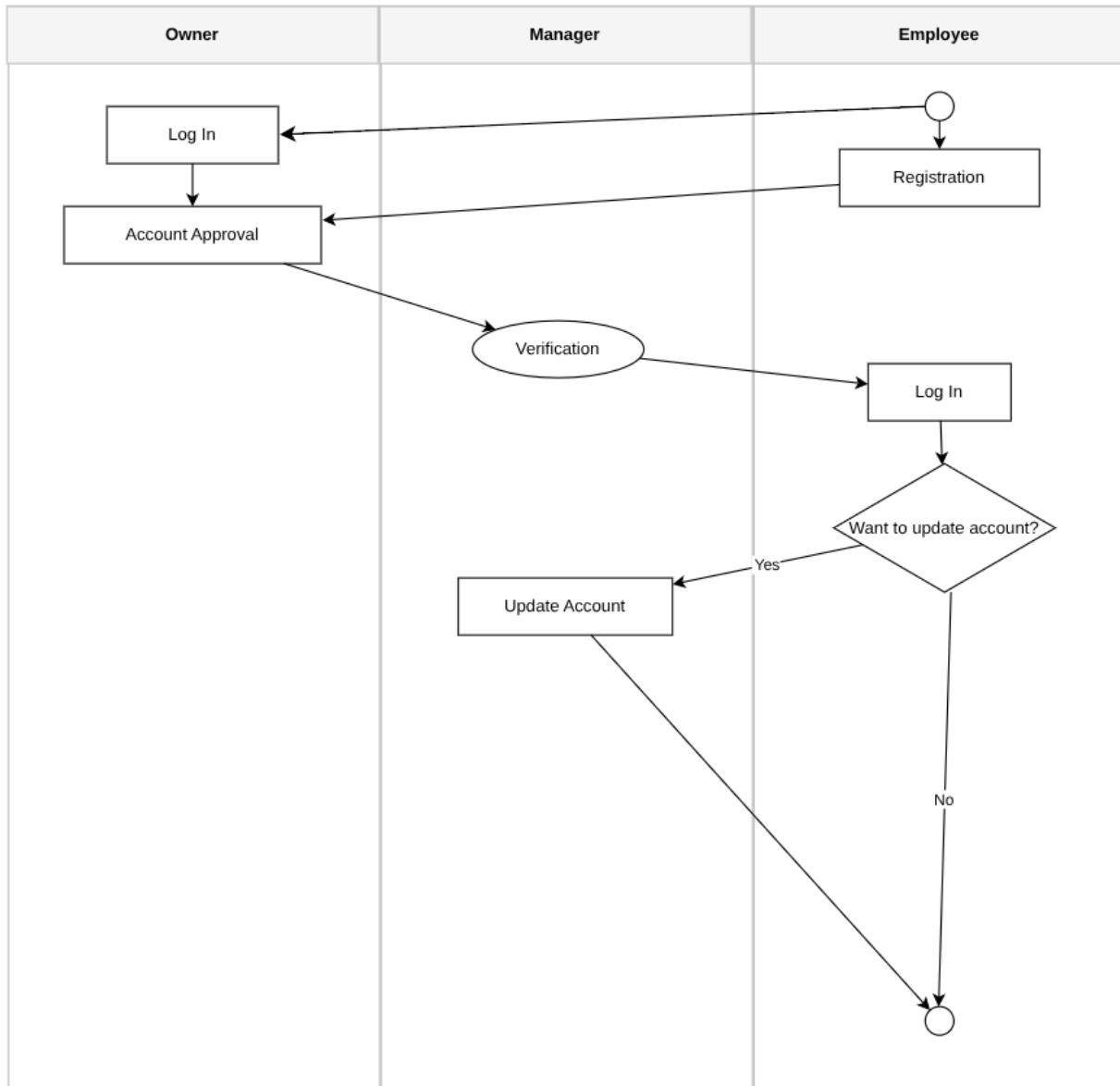


Level-1.1:

Name: Account Management System

Reference: Use case diagram level-1.1

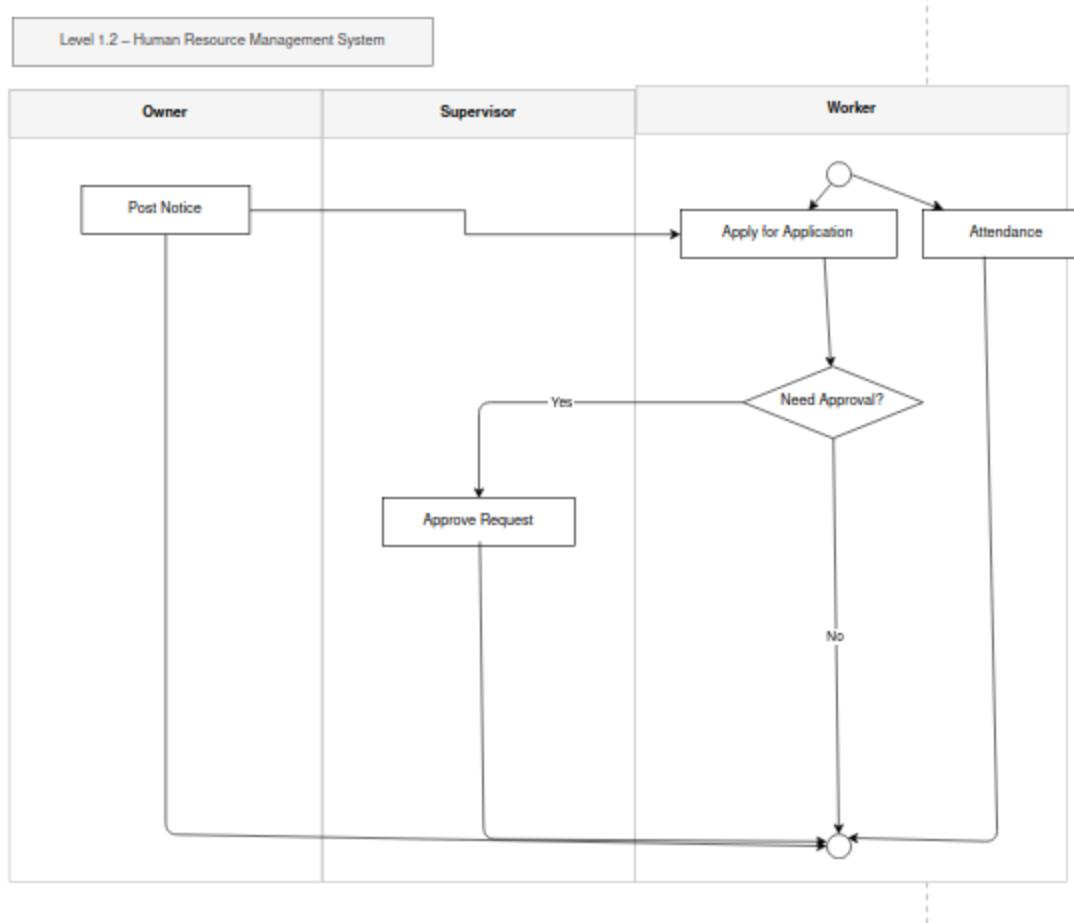
Level 1.1 – Account Management System



Level-1.2:

Name: Human Resources Management System

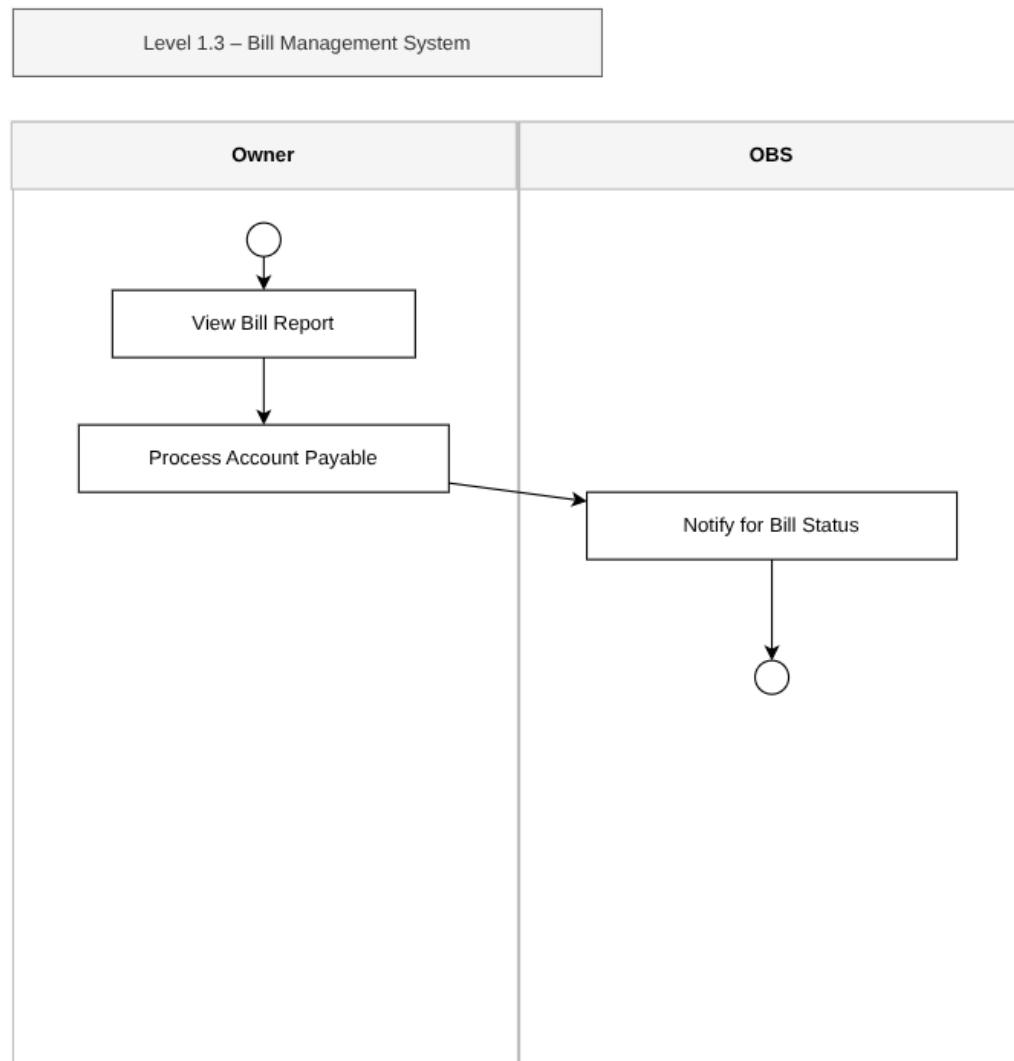
Reference: Use case diagram level-1.2



Level-1.3:

Name: Bill Management System

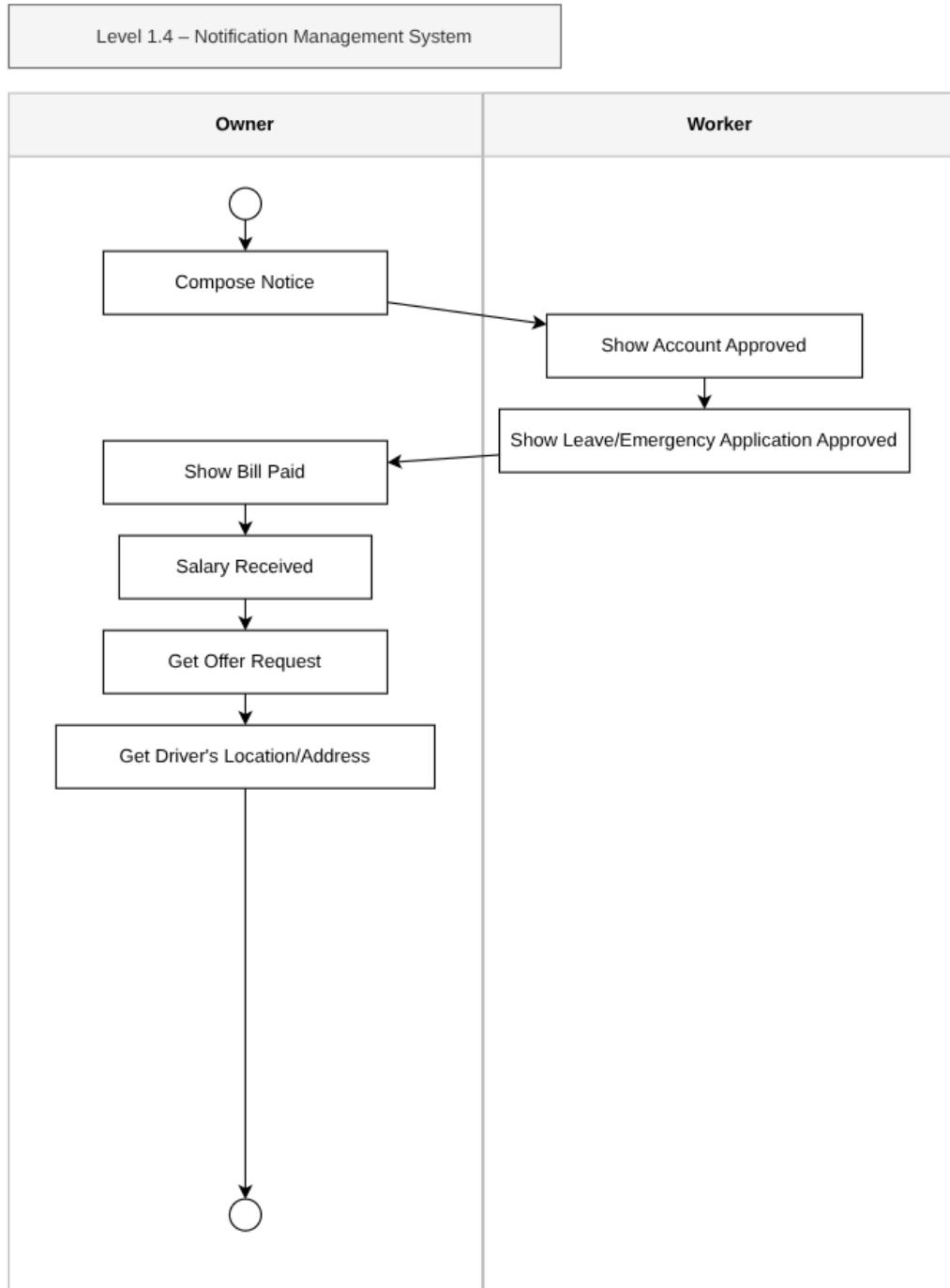
Reference: Use case diagram level-1.3



Level-1.4:

Name: Notification Management System

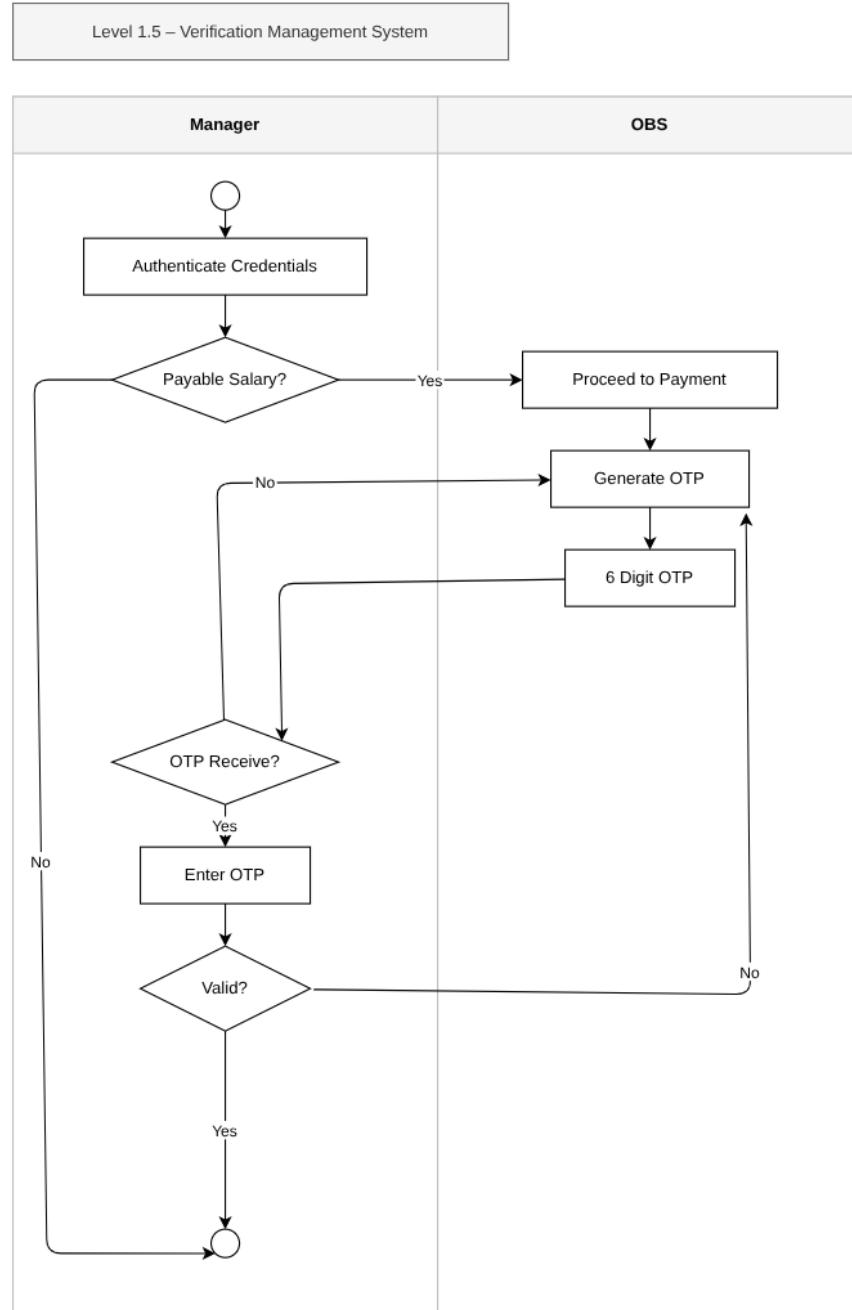
Reference: Use case diagram level-1.4



Level-1.5:

Name: Verification

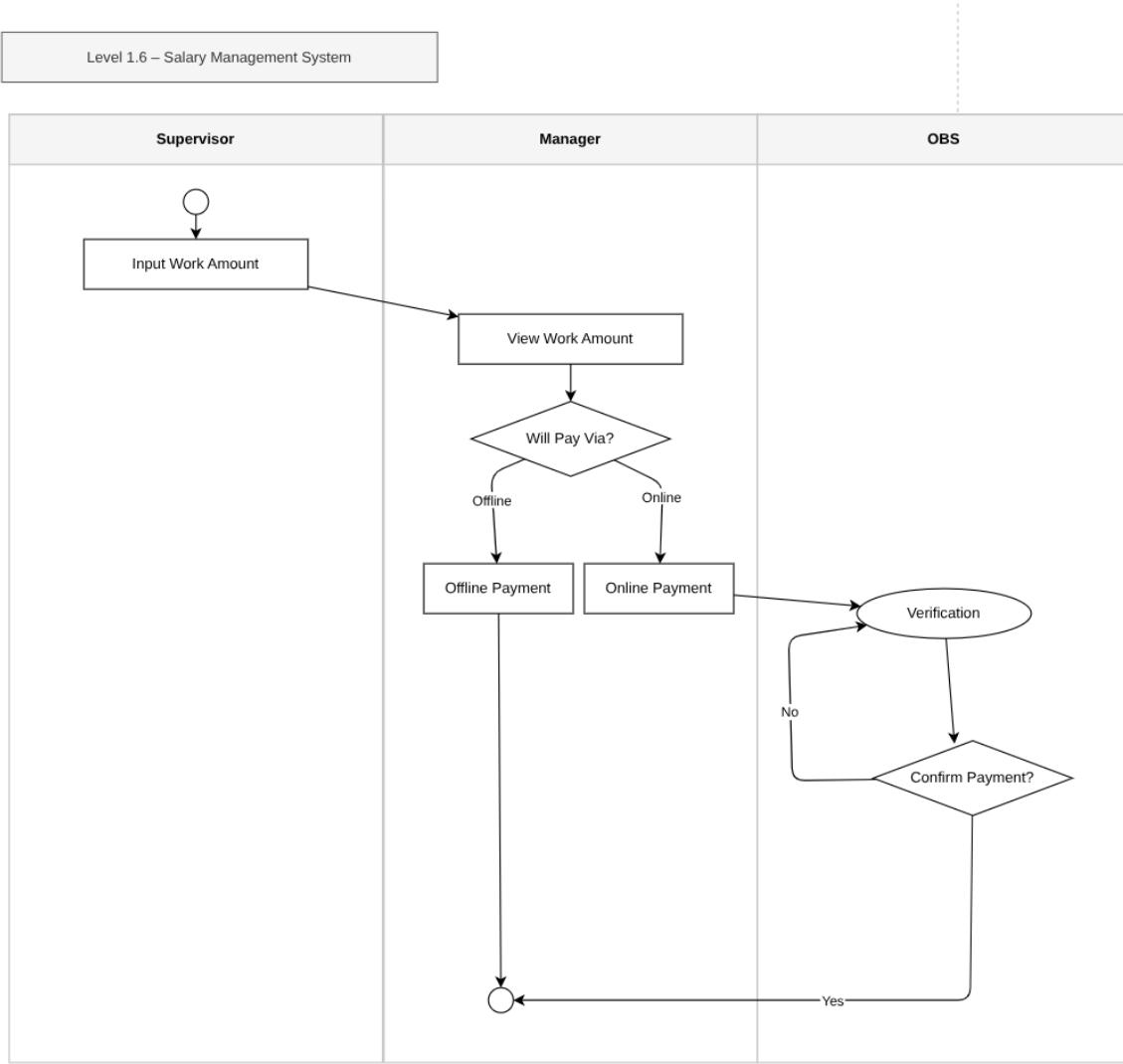
Reference: Use case diagram level-1.5



Level-1.6:

Name: Salary Management System

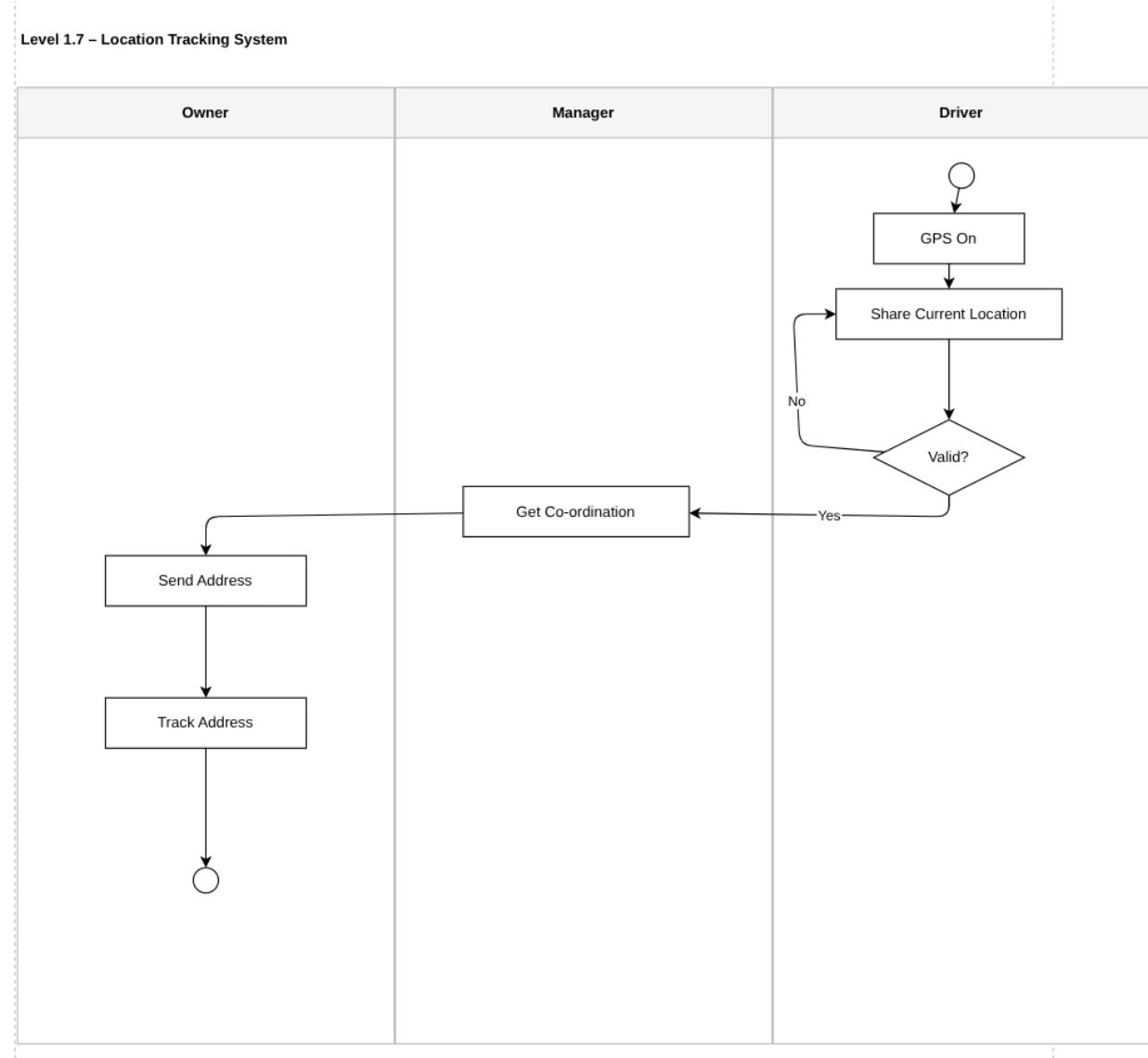
Reference: Use case diagram level-1.6



Level-1.7:

Name: Location Tracking System

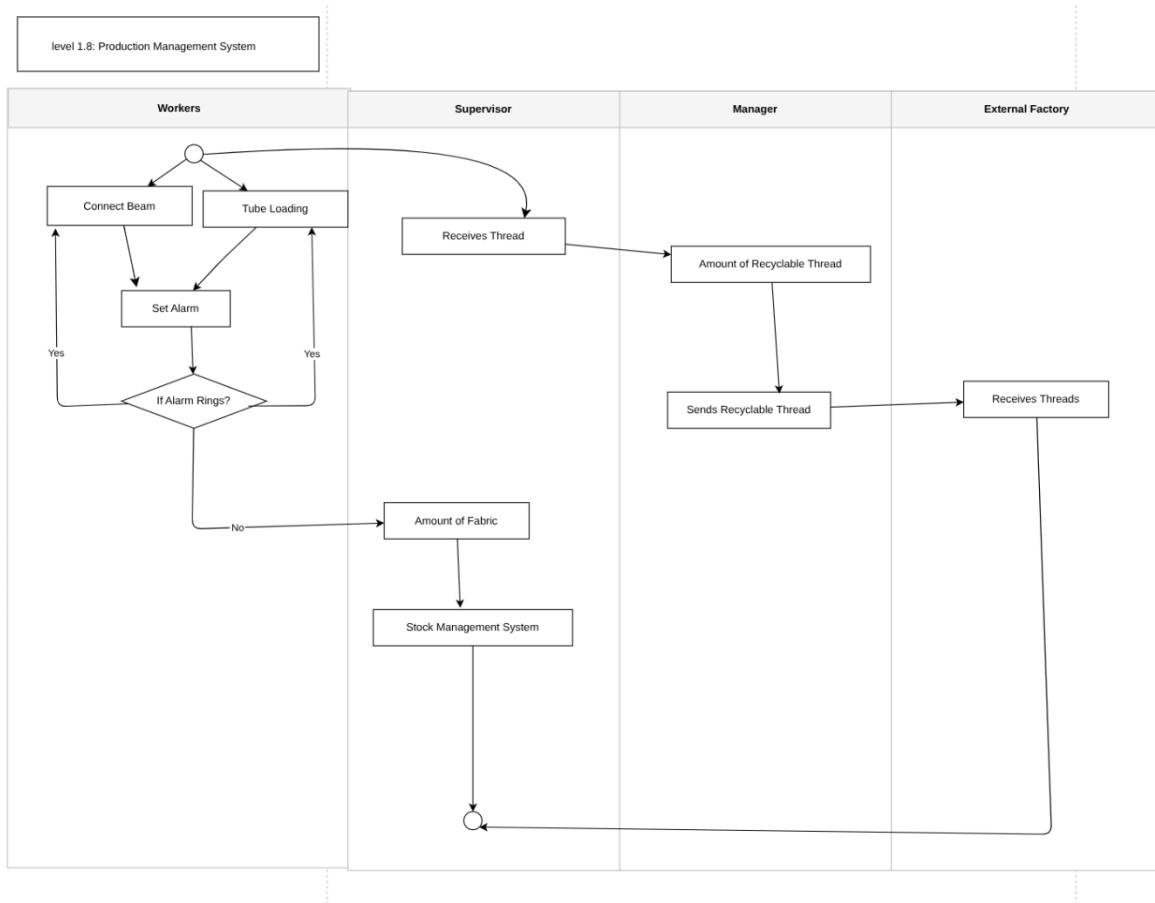
Reference: Use case diagram level-1.7



Level-1.8:

Name: Production Management System

Reference: Use case diagram level-1.8

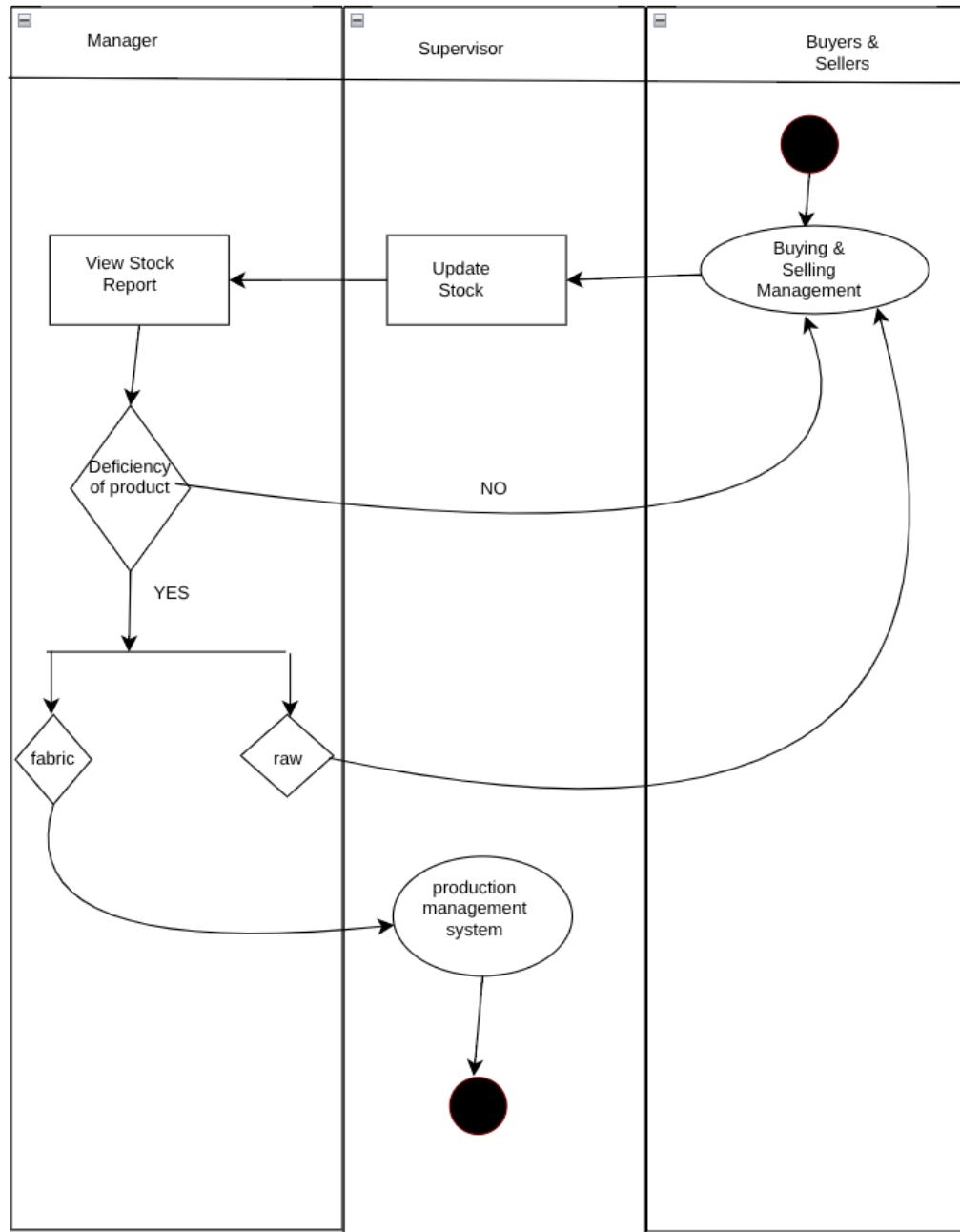


Level-1.9:

Name:

Reference: Use case diagram level-1.9

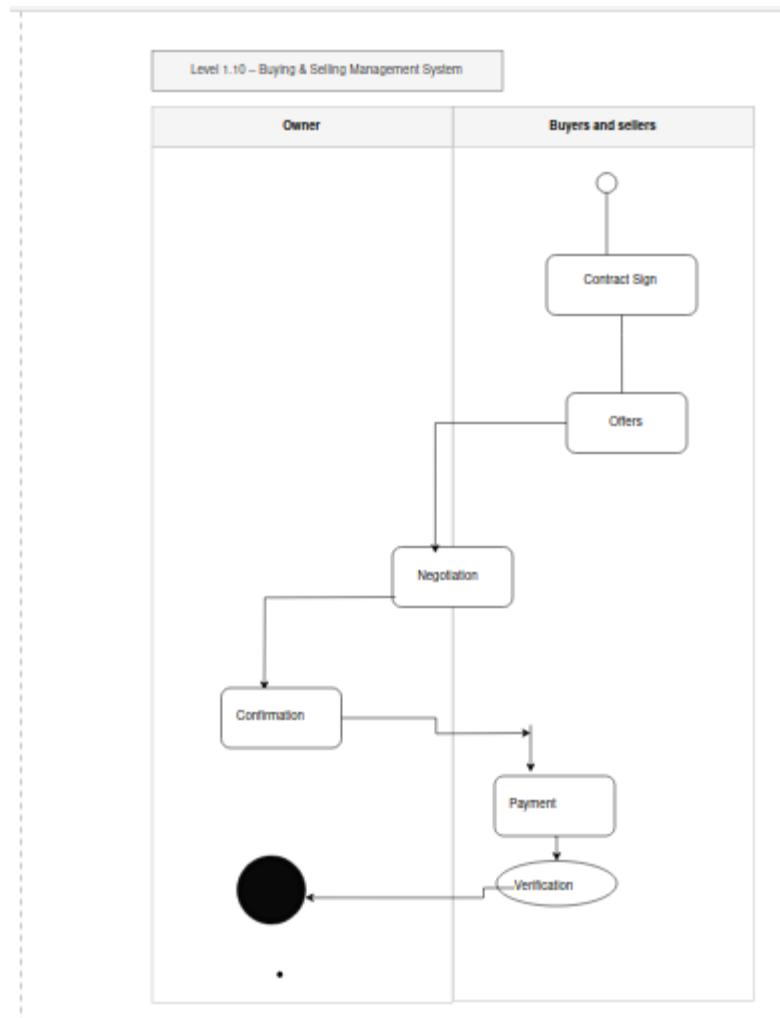
level 1.9 : Stock Management System



Level-1.10:

Name: Buying & Selling Management System

Reference: Use case diagram level-1.10

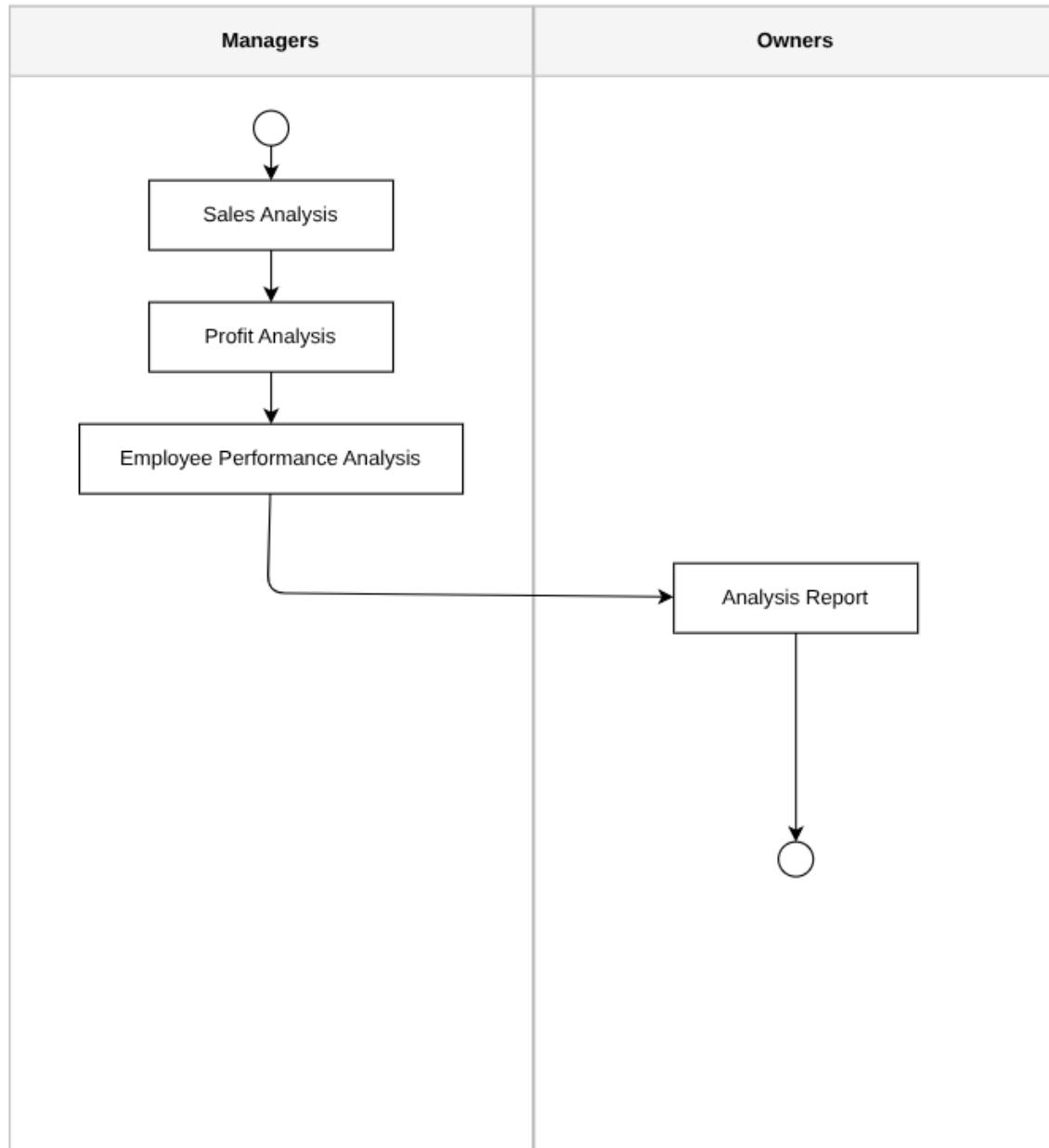


Level-1.11:

Name: Report Analysis Panel

Reference: Use case diagram level-1.11

Level 1.11 – Report Analysis Panel



Data based modeling

Data Object Identification

Number	Noun	Space	Attributes
1.	Account	S	
2.	Accountability	P	
3.	Address	P	
4.	Admin	P	
5.	Agreement	P	
6.	Alert	P	
7.	Analytics	S	41, 139, 66, 141
8.	Area	P	
9.	Arrival	P	
10.	Assessment	P	
11.	Attendance	P	
12.	Authentication	S	109, 103, 90, 38
13.	Authorization	S	148, 123, 121, 144
14.	Availability	P	
15.	Bank Transfer	P	

Number	Noun	Space	Attributes
16.	Batch info	S	132, 41, 72, 135
17.	Beam	P	
18.	Beam Connection	P	
19.	Beam Connectors	P	
20.	Bill	S	
21.	Birth Certificate no	P	
22.	Bkash	P	
23.	Block	P	
24.	Bobbins	P	
25.	Buyers	S	
26.	Calculation	S	132, 120, 104, 112
27.	Card Info	P	
28.	Cash	P	
29.	Categories	S	96, 123, 72
30.	CCTV	P	
31.	Charts	S	41, 139, 66, 141

Number	Noun	Space	Attributes
32.	Clock In	P	
33.	Clock Out	P	
34.	Commitments	P	
35.	Condition	P	
36.	Confirmation	S	123, 41, 100, 103
37.	Connection	S	123, 41, 72, 87
38.	Credentials	S	109, 96, 90, 103
39.	Daily	P	
40.	Dashboard	S	41, 100, 123, 150
41.	Date	P	
42.	Decision	P	
43.	Delay	P	
44.	Delivery Place	P	
45.	Demand	P	
46.	Device	P	
47.	Digital Receipts	S	144, 41, 123

Number	Noun	Space	Attributes
48.	Dispatch Report	S	41, 132, 123, 135
49.	Disposal	P	
50.	Drivers	P	
51.	Electricity Bill	P	
52.	Employee	P	
53.	Entries	S	41, 72, 123, 135
54.	Evaluation	S	41, 113, 141
55.	External Factory	P	
56.	Fabric	P	
57.	Fabric Cutting	P	
58.	Fabric weavers	P	
59.	Factory	P	
60.	Fine	P	
61.	Fire	P	
62.	Fuel	P	
63.	Gas Bills	P	

Number	Noun	Space	Attributes
64.	Goods	P	
65.	GPS	P	
66.	Graph	S	
67.	Growth	S	41, 139, 141, 132
68.	Hand	P	
69.	History	P	
70.	Holidays	P	
71.	Identity	P	
72.	IDs	P	
73.	Installation	P	
74.	Instruction	P	
75.	Inventory	P	
76.	Labour	P	
77.	Leave Application	P	
78.	Ledger	S	41, 144, 123
79.	Limit	S	132, 41, 123

Number	Noun	Space	Attributes
80.	Location	P	
81.	Login	S	41, 109, 103, 123
82.	Machines	P	
83.	Manager	S	
84.	Margins	P	
85.	Measurement	P	
86.	Meeting	P	
87.	Method	P	
88.	Mobile Application	S	41, 123, 100
89.	Mobile Banking	S	41, 144, 123
90.	Mobile No	P	
91.	Module	S	96, 123, 41
92.	Monitor	S	41, 123, 72, 141
93.	Monthly	P	
94.	Movement	P	
95.	Nagad	P	

Number	Noun	Space	Attributes
96.	Name	P	
97.	National ID	P	
98.	Negotiation	P	
99.	Notice	S	41, 123, 72
100.	Notification	S	41, 123, 72
101.	Online Banking System	S	41, 144, 123
102.	Optimization	S	41, 123, 132, 141
103.	OTP	S	41, 123, 90
104.	Output	S	41, 132, 123, 141
105.	Oversight	S	41, 123, 72
106.	Owner	S	96, 90, 123
107.	Panel	S	41, 123, 141, 150
108.	Paper	P	
109.	Password	S	41, 123, 72
110.	Pattern	S	41, 139, 141, 132
111.	Payment	S	

Number	Noun	Space	Attributes
112.	Payroll	S	41, 123, 72
113.	Performance	S	41, 123, 141
114.	Performance Indicator	S	41, 123, 141
115.	Periods	P	
116.	Place	P	
117.	Planning	S	41, 123, 132, 141
118.	Platform	S	41, 123, 100
119.	Policies	P	
120.	Price	P	
121.	Primary Role	S	96, 123, 72
122.	Process	S	41, 123, 72
123.	Procurement	P	
124.	Product	P	
125.	Production	S	
126.	Production Update	P	
127.	Profit	P	

Number	Noun	Space	Attributes
128.	Profit Analysis Module	S	41, 127, 141, 139
129.	Proposal	P	
130.	Purchase	P	
131.	Quality	P	
132.	Quantity	P	
133.	Raw Materials	P	
134.	Receipt	P	
135.	Records	S	41, 123, 72
136.	Recycling	P	
137.	References	P	
138.	Registration	P	
139.	Remainder	P	
140.	Remainder Deadline	P	
141.	Report	S	41, 123, 139, 132
142.	Respond	P	

Number	Noun	Space	Attributes
143.	Review	S	41, 123, 72
144.	Risk	P	
145.	Route	P	
146.	Safety Reminder	S	41, 123, 72
147.	Salary	S	
148.	Sales	P	
149.	Scarcity	P	
150.	Section	S	96, 123, 41
151.	Security	S	159, 181, 192
152.	Sell	P	
153.	Sellers	S	96, 159, 181
154.	Shipments	P	
155.	Sick Day	P	
156.	Size	P	
157.	SMS	P	
158.	Stage	P	

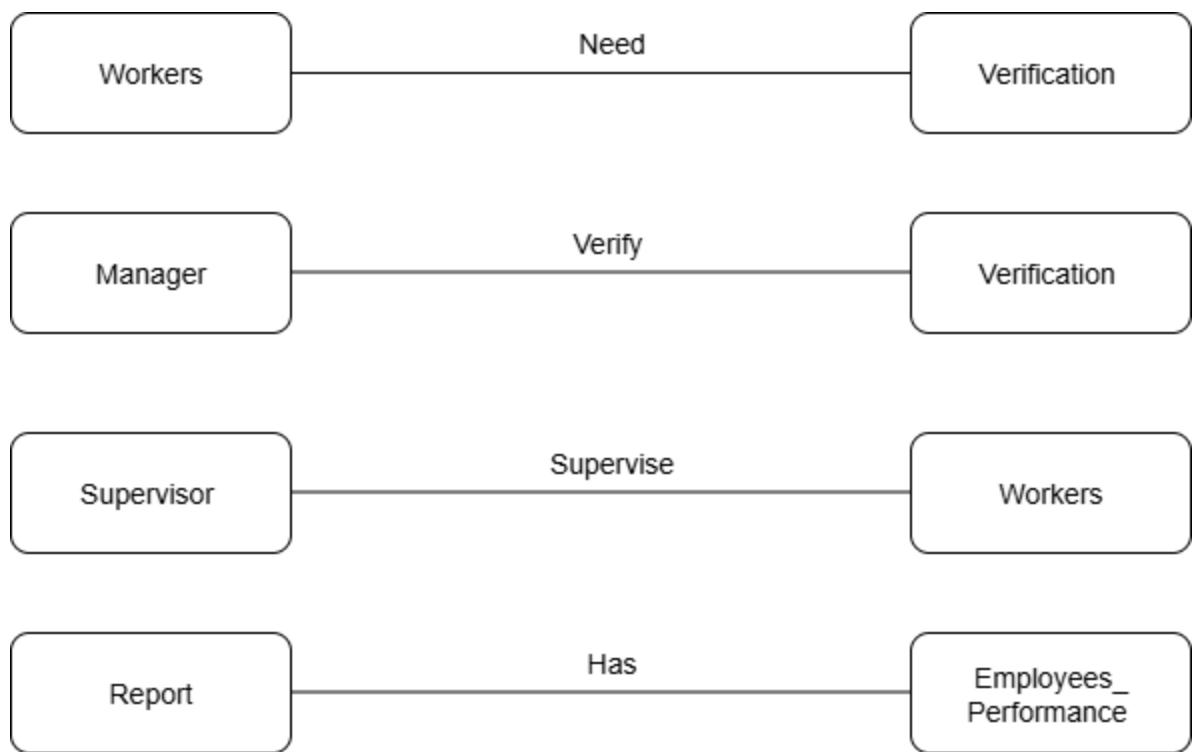
Number	Noun	Space	Attributes
159.	Status	P	
160.	Stock	S	199, 159, 181
161.	Storage Limit	P	
162.	Structure	S	96, 159, 181
163.	Sub-system	S	96, 159, 181
164.	Summaries	S	181, 159, 199
165.	Supervisor	S	96, 159, 181
166.	Supervisor Approval	S	181, 159, 192
167.	Supplier	P	
168.	Support	P	
169.	Suspicious Login	S	181, 159, 6
170.	System	S	159, 181
171.	System Application	S	159, 181
172.	System Database	S	159, 181, 156
173.	Task	S	181, 159
174.	Task-Based Payment	S	181, 159, 173

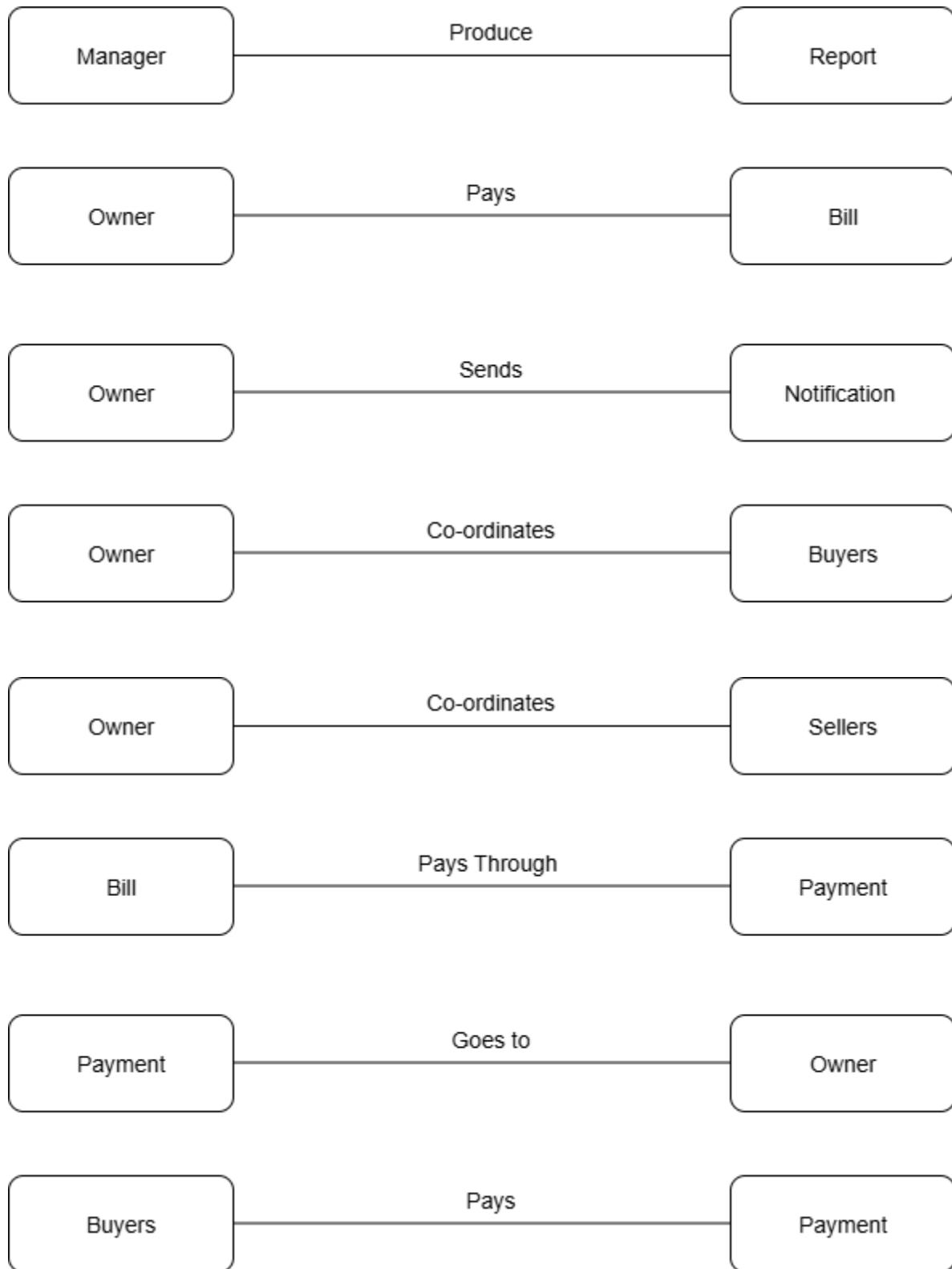
Number	Noun	Space	Attributes
175.	Tax	P	
176.	Terms	P	
177.	Textile Goods	P	
178.	Thick Thread	P	
179.	Thin Thread	P	
180.	Thread	P	
181.	Time Frames	P	
182.	Timer	S	181, 159, 173
183.	Traceability	S	181, 159, 164
184.	Tracker	S	181, 159, 173
185.	Transaction	S	181, 159
186.	Transparency	S	159, 181, 164
187.	Trends	S	181, 159, 199
188.	Trips	P	
189.	Tube	P	
190.	Tube Loading	S	181, 159, 199, 206

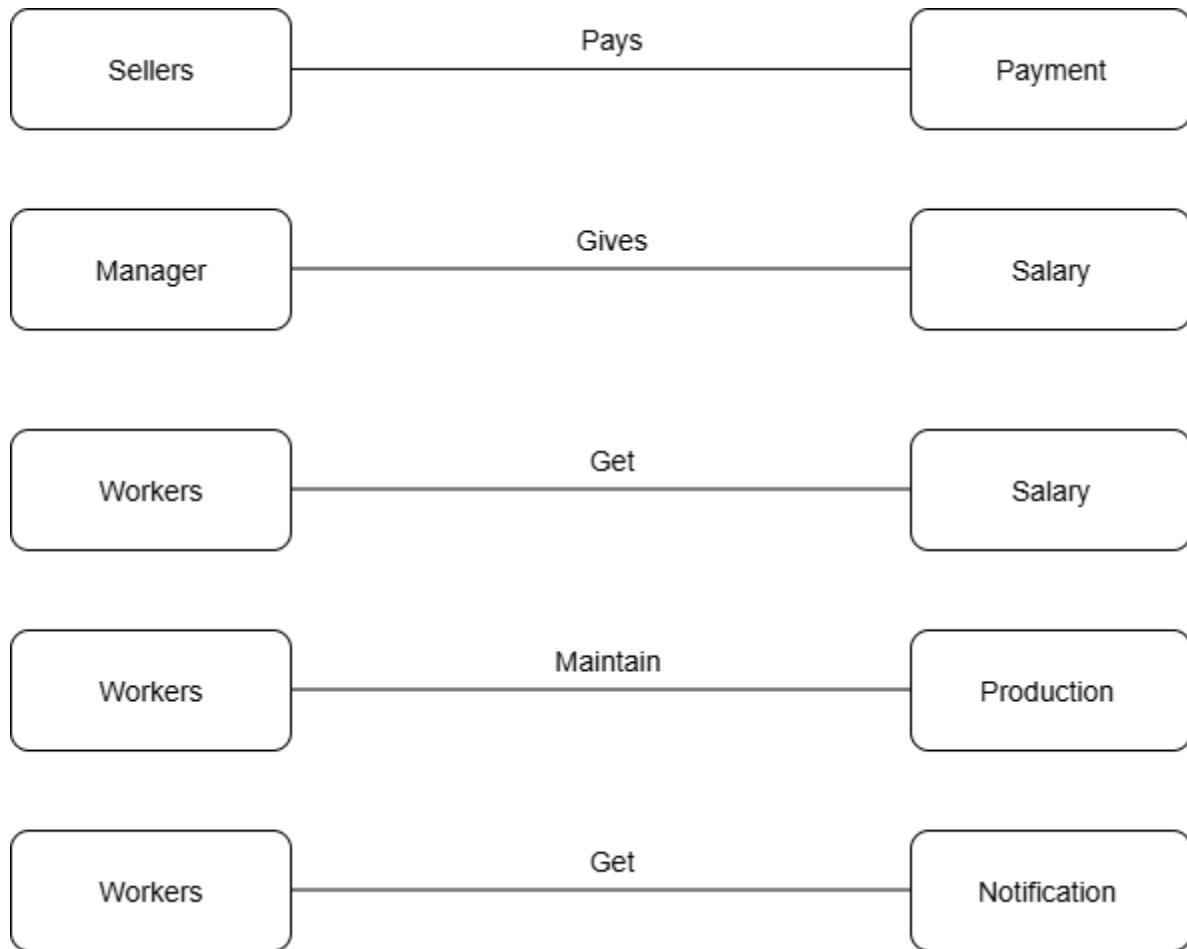
Number	Noun	Space	Attributes
191.	Underperformances	P	
192.	Updates	S	181, 159
193.	Usage	P	
194.	User Role Assignment	S	96, 159, 181
195.	Vendor	P	
196.	Verification	S	181, 159
197.	View	S	181, 159, 164
198.	Viewership	S	181, 159, 199
199.	Volume Of Fabric	P	
200.	Waste	P	
201.	Water Bill	P	
202.	Ways	P	
203.	Weekly	P	
204.	Work Log	P	
205.	Work Schedule	P	
206.	Workers	S	96, 159, 181

Number	Noun	Space	Attributes
207.	Workload	P	
208.	Yearly	P	

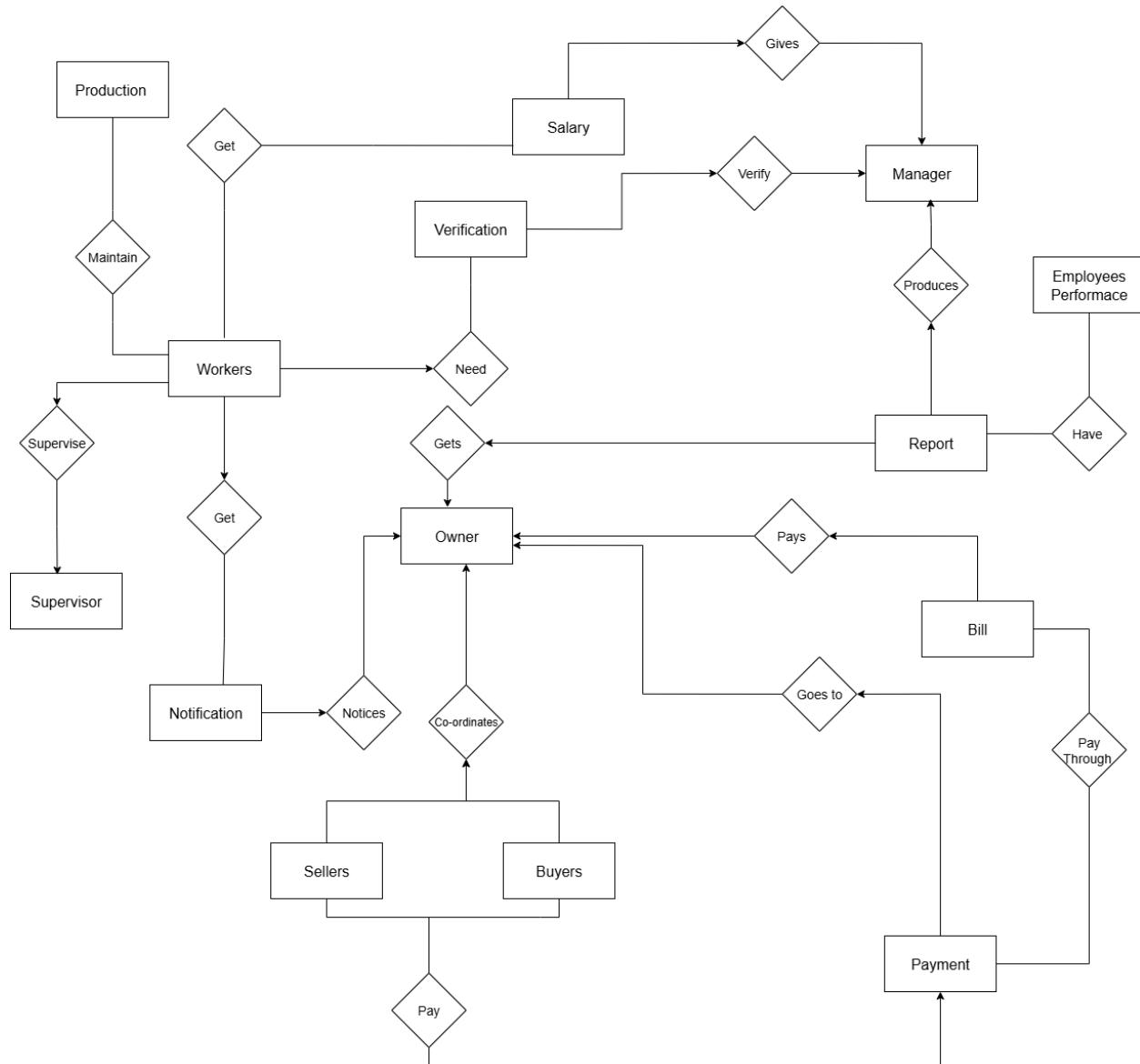
Relation







ER Diagram



Schema Diagram

Data Object	Variable
Workers	WID NUMBER Full_Name varchar(100) Birth_Certificate_No varchar(50) Mobile_No varchar(20) NID NUMBER E_mail varchar(100) Present_Address varchar(100) Bank_Account_No varchar(100) Password varchar(20)
Verification	OTP NUMBER Mobile_No [Foreign key from Workers] Password [Foreign key from Workers]
Report	MID [Foreign key from Manager] Growth varchar(100) Sales varchar(100) Graph varchar(100)
Supervisor	SID NUMBER Amount_Of_Work varchar(50) Overview varchar(100) Check_Attendance varchar(50)

Owner	O_ID NUMBER Name varchar(100) Email varchar(100) NID NUMBER
Sellers	SID NUMBER Sell_product varchar(50) Price varchar(50)
Buyers	BID NUMBER Buy_Product varchar(50) Price varchar(50)
Employee_Performance	Mark_Attendance varchar(20) Amount_Of_Worker [Foreign key from Supervisor] Leave varchar(100)
Manager	MID NUMBER Name varchar(100) E-mail varchar(100) NID NUMBER Update_Account varchar(100)
Production	SID [Foreign key from Supervisor] Beam_Amount varchar(100) Threads_Amount varchar(100) Bovvin_Amount varchar(100) Thread_type varchar(20)

Salary	Contract_No [Foreign key from Worker] Amount_Of_Work [Foreign key from Supervisor] Salary_Amount varchar(100) MID [Foreign key from Manager]
Bill	OID [Foreign key from owner] Tax varchar(50) Fuel varchar(50) Gas varchar(50) CCTV_Maintainance varchar(50) Electricity varchar(50)
Notification	OID [Foreign key from owner] Important_Note varchar(100) Safety_Reminder varchar(50) Work_Schedule varchar(100)
Payment	OID [Foreign key from owner] Payment_Type varchar(20) Bank_account_no [Foreign key from workers] Transection_Id varchar(100) Transection_Date varchar(100) BID [Foreign key from Buyer] SID [Foreign key from Seller]

Class Based Modeling

Class-based modeling defines the structure of the entire system by identifying the static structure of objects in that system. A class model defines attributes and operations for the objects of each class and also the relationship between the objects, and the collaborations that occur between the classes of the systems. The elements of a class-based model include classes and objects, attributes, operations, ClassResponsibility- Collaborator (CRC) models, collaboration diagrams, and packages.

General Characteristics

Candidate classes are categorized based on the seven general classification. The analysis classes manifest themselves in one of the following ways:

1. External entities
2. Things
3. Events
4. Roles
5. Organizational units
6. Places
7. Structures

A candidate class is selected for special classification if it fulfills three or more characteristics.

Noun	General Classification
Account	2, 7, 9
Analytics	2
Authorization	3, 5, 7
Authentication	4, 5
Batch Info	2
Bill	3, 5, 7
Buyer	1, 2, 4, 7
Calculation	2
Categories	2
Charts	2
Confirmation	3, 5, 7
Connection	2, 7
Credentials	2
Dashboard	2, 6, 7
Digital Receipts	1

Dispatch Report	2, 5
Entries	2
Evaluation	2
Graph	1, 2
Growth	2
Ledger	2
Limit	2
Login	2, 7
Manager	1, 2, 4, 7
Mobile Application	1, 7
Mobile Banking	1
Module	2
Monitor	2
Notice	2
Notification	2, 3, 7
Online Banking	1, 7

Optimization	2
OTP	1, 5, 7
Oversight	2
Owner	1, 2, 4, 7
Panel	2
Password	5, 7
Pattern	2
Payment	2, 5, 7
Payroll	4
Performance	2, 3, 7
Platform	4, 6, 8
Primary Role	4
Process	2, 5
Profit Analysis Module	2, 3
Production	2, 3, 5
Records	2

Report	2, 3, 7
Review	2, 3, 5
Safety Reminder	3, 5
Salary	2, 3, 7
Section	2
Security	5
Seller	1, 2, 4, 7
Stock	2, 5, 7
Structure	2
Sub-system	2
Summary	2
Supervisor	4, 7, 2, 4, 7
Task	3
Timer	2
Traceability	2
Tracker	3, 6, 7

Transaction	1, 5, 7
Transparency	2, 4
Trends	2
Tube Loading	2, 3, 7
Updates	3
User Role Assignment	2
Verification	2, 3, 7
View	3
Workers	2, 7, 9

List of Potential Classes after General Classification:

Potential Classes	
Account	Performance
Bill	Production
Buyers	Report
Confirmation	Salary
Dash board	Sellers

Manager	Stock
Notification	Supervisor
OBS	Tracker
OTP	Transaction
Owner	Tube Loading
Password	Verification
Payment	Workers

Selection Criteria

Candidate classes are categorized based on the seven general classification. The analysis classes manifest themselves in one of the following ways:

1. Retained Information
2. Needed Services
3. Multiple Attributes
4. Common Attributes
5. Common Operations
6. Essential Requirements

A final class list is made after reviewing the list and merging multiple candidate classes if needed.

Potential Classes	Selection Criteria
Account	1, 2, 3, 4, 5
Bill	1, 2, 3, 4, 5
Buyers	2, 3, 4, 5

Confirmation	2, 4, 5
Dashboard	1, 2, 3, 4, 5
Manager	1, 2, 3, 4, 5
Notification	2, 3, 4, 5
OBS	2, 4, 5
OTP	2, 4, 5
Owner	1, 2, 3, 4, 5
Payment	1, 2, 3, 4, 5
Performance	1, 2, 3, 4, 5
Production	1, 2, 3, 4
Report	1, 2, 3, 4
Salary	1, 2, 3, 4, 5
Sellers	2, 3, 4, 5
Stock	6
Supervisor	1, 2, 3, 4, 5
Tracker	6
Transaction	2, 4, 5

Tube Loading	1, 2
Verification	6
Workers	2, 1, 9, 5

Analysis

The system is designed to manage multiple types of users, namely Workers, Supervisors, Owners, Managers, Buyers, and Sellers, where each role carries distinct responsibilities. All users interact with the Account class, which provides the fundamental processes of registration and login, ensuring secure access control across the system. Employee productivity and efficiency are monitored through the Performance class, which maintains performance data and visual graphs, while the Manager class is responsible for analyzing and manipulating this data. Business insights are supported by the Report class, which delivers visual analyses of sales, purchases, and employee performance. Financial operations are handled through the Bill class, which stores billing data, and the Payment class, which manages payment information, both of which are further coordinated and controlled by the OBS class. Additionally, the Notification class ensures effective communication by storing and delivering important notices, work schedules, and task assignments to the relevant users.

Class Cards

1. Workers

Attribute	Method
- WID - Name - CellNo - NID - Address - Bank_Account_Info	+viewWorkerDetails() +GetWorkerInfo() +StoreBankInfo() +ApplyForLeave() +MarkAttendance()
Responsibility	Collaborator
Create worker profile	Account
Give bank account information	OBS
Storing and updating account info	Manager

2. Supervisor

Attribute	Method
-SID -Name -CellNo -NID -Address -Bank_Account_Info -Attendance -WorkAmount	+viewSupervisorInfo() +StoreBankInfo() +Check_Attendance_Info() +CalculateWorkAmountDetails()
Responsibility	Collaborator
Input work amount	Production
Create a supervisor profile	Account

3. DashBoard

Attribute	Method
-UserType -NoticeType -Performance	+Owner's_Dashboard_View() +Manager_Dashboard_View() +ReportAnalysisDetails() +WorkerDashboardView()
Responsibility	Collaborator
Show performance in the owner dashboard	Performance
Release important notice	Owner, notifier
Type of user-defined dashboard feature	Account

4. Performance

Attribute	Method
-Attendance -WID -WorkAmount -Number_Of_Leave	+CheckAttendanceGraph() +LeaveAnalysisReport() +Total_Work_Amount_Graph()
Responsibility	Collaborator
Show attendance graph of employee	Worker
Make graphics analysis of employee	Manager

5. Report

Attribute	Method
-Sales -Profit -Attendance	+Employess_Performance_Report() +SalesAnalysisReport() +ProfitAnalysisReport()
Responsibility	Collaborator
Give Sales data	Manager
Create Profit Analysis Graph	Manager
Show all report	Owner
Show Employee's Performance Graph	Performance

6. Account

Attribute	Method
-UserName -UserType -Registration_date -Cell_No -Email -Password	+Login() +Registration() +EncryptPassword() +Receipt OTP() +Validate_Password() +Confirmation()
Responsibility	Collaborator
Login & Registration successful	Owner,Worker,Manager,Supervisors,Buyers, Sellers,Drivers
Authentication	Owner
OTP verification sucessful	Verification

7. OBS

Attribute	Method
-Bkash -Nagad -OTP -Card -TID	+PayWithBkash() +PayWithNagad() +SendOTP() +PayWithBankAccount() +ShowTransactionReceipt()
Responsibility	Collaborator
Buy products	Buyers,Owner
Pay Bill	Bill
Sell products	Sellers,Owner
Pay Salary	Salary,Owner

8. Bill

Attribute	Method
-WaterBill -ElectricityBill -FuelBill -Tax	+viewBillDetail() +calculatePayableBill() +ConfirmPayBill()
Responsibility	Collaborator
Pay Bill	OBS,Owner

9. Tracker

Attribute	Method
-GPS -Location -DeliveryTimes	+viewLocationDetails() +TrackDeliveryLocation()
Responsibility	Collaborator
Sends Delivery Location	Driver,Owner
Track drivers Location	Owner,Manager

10. Notification

Attribute	Method
-SMS -Mail -Notice -PhoneNo	+AlertWorkerSchedhule() +viewImportantNotice() +SafetyRemainderAlert() +SetAlarm()
Responsibility	Collaborator
Delivery Notice	Owner
Sends Notification	Dashboard
Show Report On owner Dashboard	Owner,Dashboard

11. Owner

Attribute	Method
-OID -Name -CellNo -Mail	+viewEmployeePerformance() +PayDueBill() +viewBuyersOffer() +VerifyAccount() +viewSalesUpdate() +NegotiationChatBox()
Responsibility	Collaborator
Create Owner's Profile	Account
Pay Bill	Bills,OBS
Verify Account	Verification

12. Manager

Attribute	Method
-MID -Name -CellNo -Mail	+CreateEmployeePerformanceReport() +CreateSalesAnalysisReport() +CreateProfitAnalysisReport() +PayDueSalary()
Responsibility	Collaborator
Create Manager Profile	Account
Analysis of Sales & Buy	Stock,Production
Analysis of employee performance	Performance
Update Account	Account

13. Buyers

Attribute	Method
-Price -ProductList -Amount	+viewCurrentMarketPrice() +NegotiationWithOwner() +ReceiveConfirmationOfBuy() +AmountOfProductToBuy() +viewBuyingPayReceipt()
Responsibility	Collaborator
Buy Product	OBS
Negotiation for price	Owner
Create Buyer's Profile	Account

14. Sellers

Attribute	Method
-Price -ProductList -Amount	+SetOfferPrice() +NegotiationWithOwner() +RecieveConfirmationOfBuy() +AmountOfSellingProduct() +ViewSellReciept()
Responsibility	Collaborator
Create Seller's Profile	Account
Sell Product	OBS
Negotiation for price	Owner

15. Verification

Attribute	Method
-OTP -SMS -Phone_no -Mail	+VerifyOTP() +VerifyAccount()
Responsibility	Collaborator
Send OTP	Account,OBS
Receive OTP	Account
Verify Payment	Salary,Bill

16. Production

Attribute	Method
-FabricType -BobbingSize -ThreadAmount	+ConnectBeamStatus() +viewThreadType() +RecycleableThreadAmount() +viewBobbinSize()
Responsibility	Collaborator
Show Current Beam Status	Worker,Dashboard
Show Bobbins type in the stock	Stock

17. Salary

Attribute	Method
-ContractTime -AmountOfWork -AmountOfSalary	+CalculateAmountOfThread() +CalculateAmountOfFabric() +ReceiveSalaryInfo() +viewSalaryStructure()
Responsibility	Collaborator
Input work amount	Supervisor
Show contract time of fixed salary employees	Worker,Manager,Supervisor
Paysalary	OBS

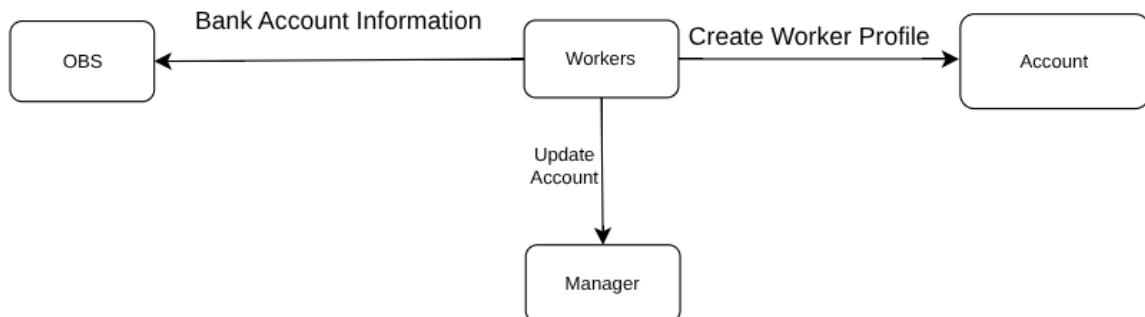
18. Stock

Attribute	Method
-AmountOfRawMaterial -TypeOfBobbinThread -BobbinSize -Alarm	+StockViewInfo() +AlertThroughSMS() +AlertThroughDashboard() +UpdateStock()
Responsibility	Collaborator
Amount of Raw Materials in stock	Production,Dashboard
Send Alert of Deficiency	Supervisor,Production

CRC-Diagram

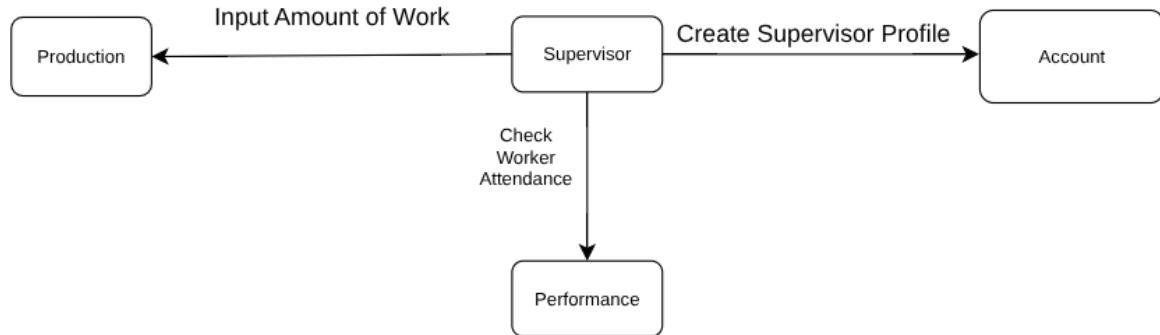
ID No: 1

Name: Worker



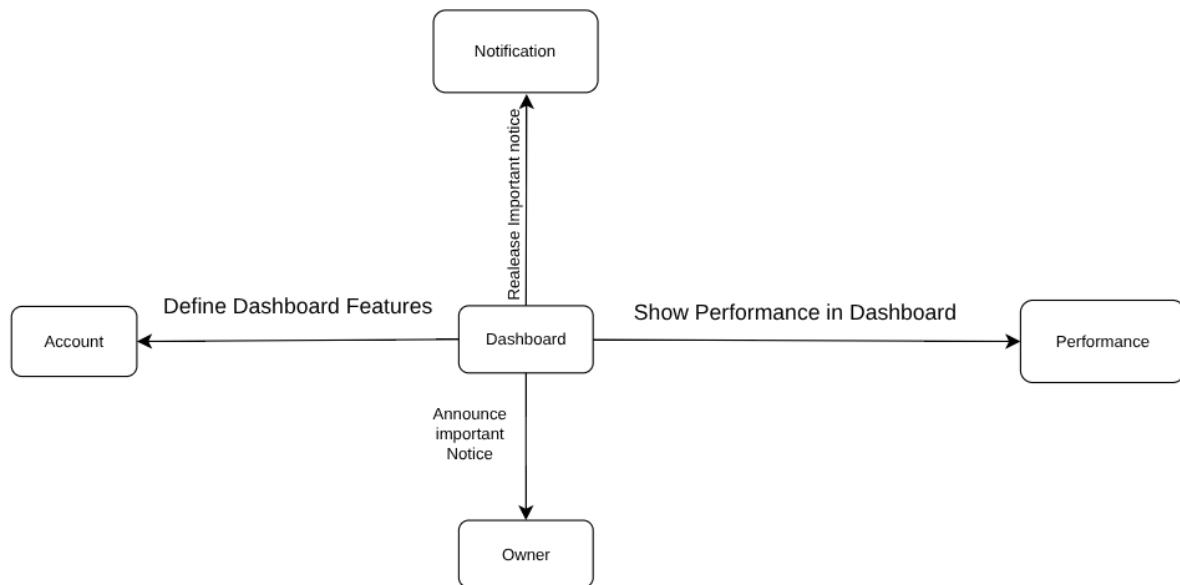
ID No: 2

Name: Supervisor



ID No: 3

Name: DashBoard



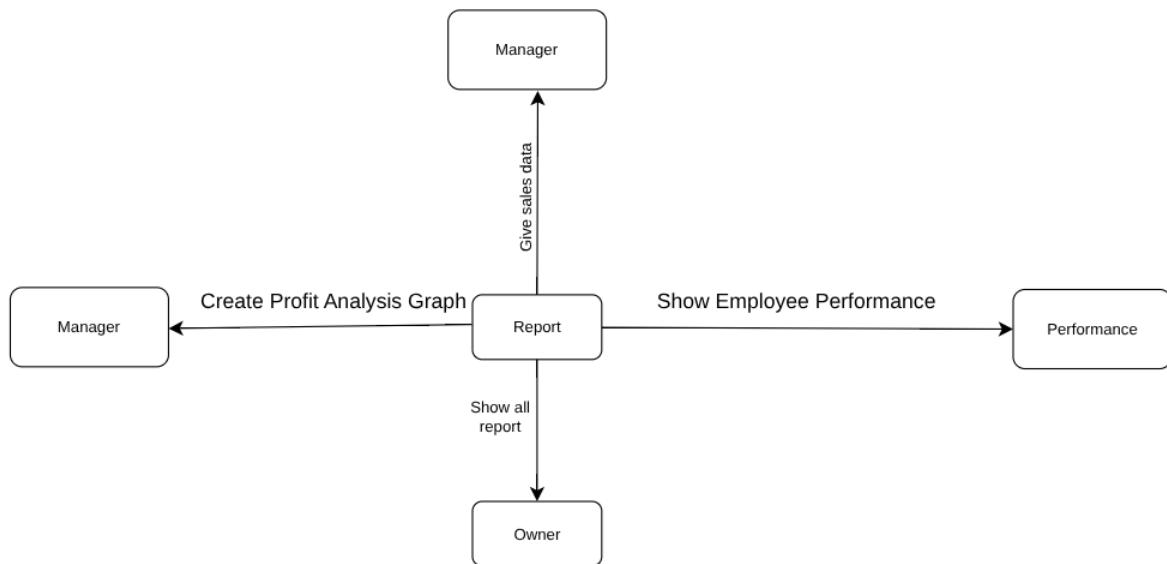
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Name: Performance



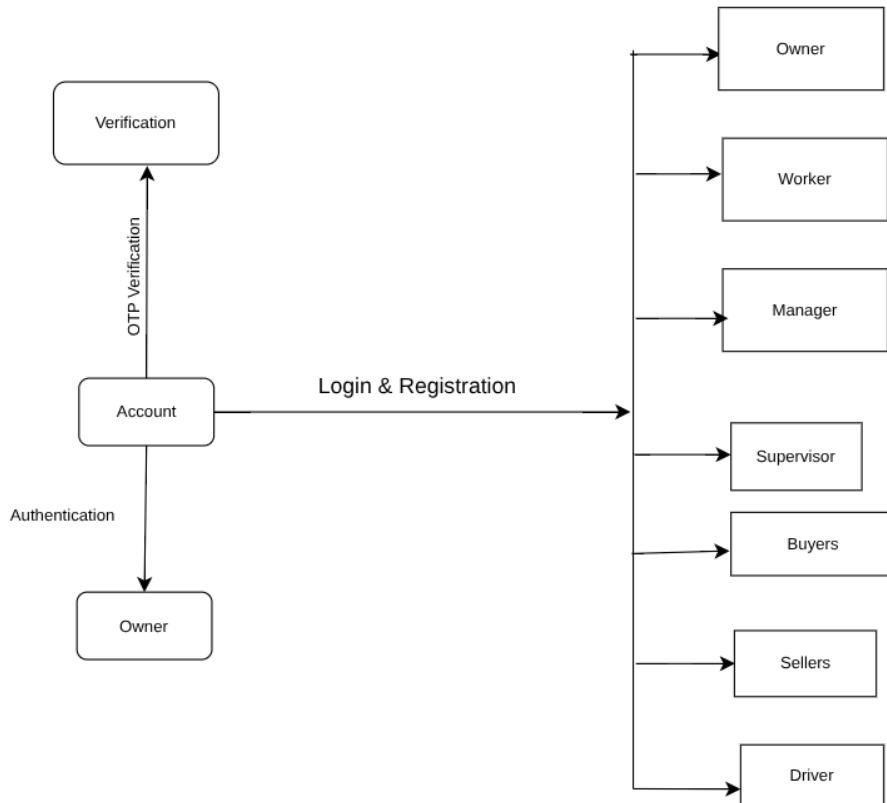
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Name: Report

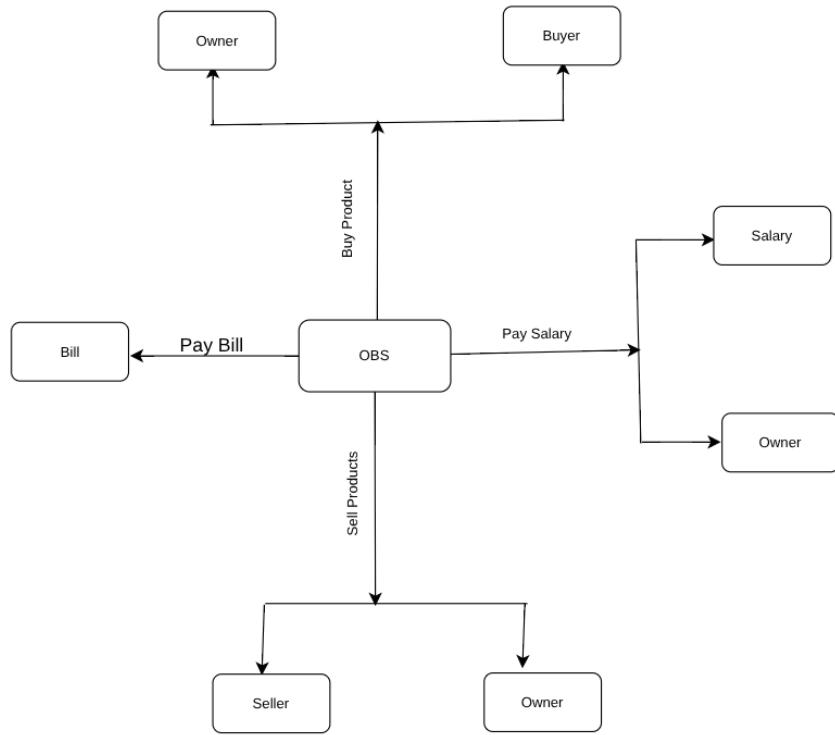


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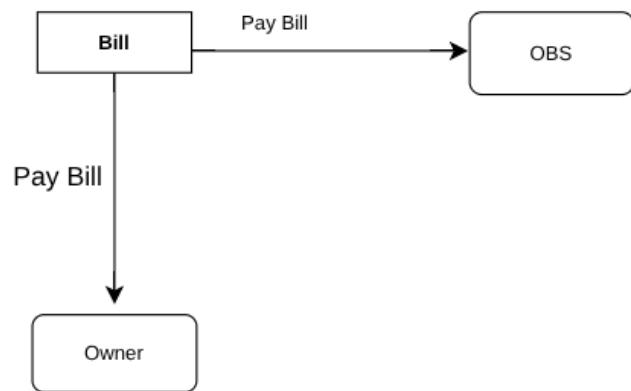
Name: Account



ID No: 7
Name: OBS

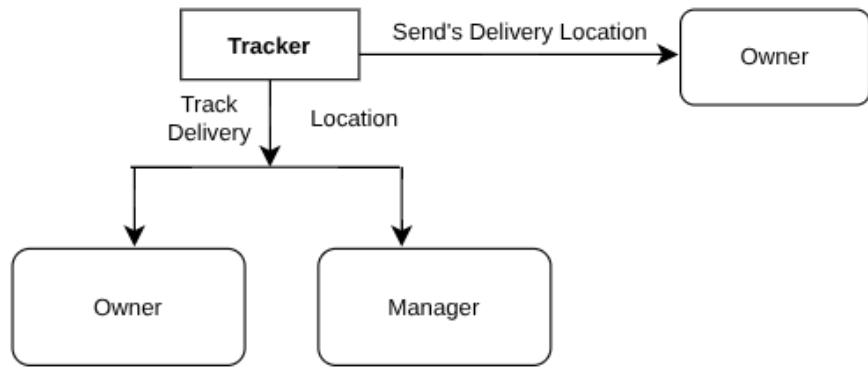


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Name: Bill



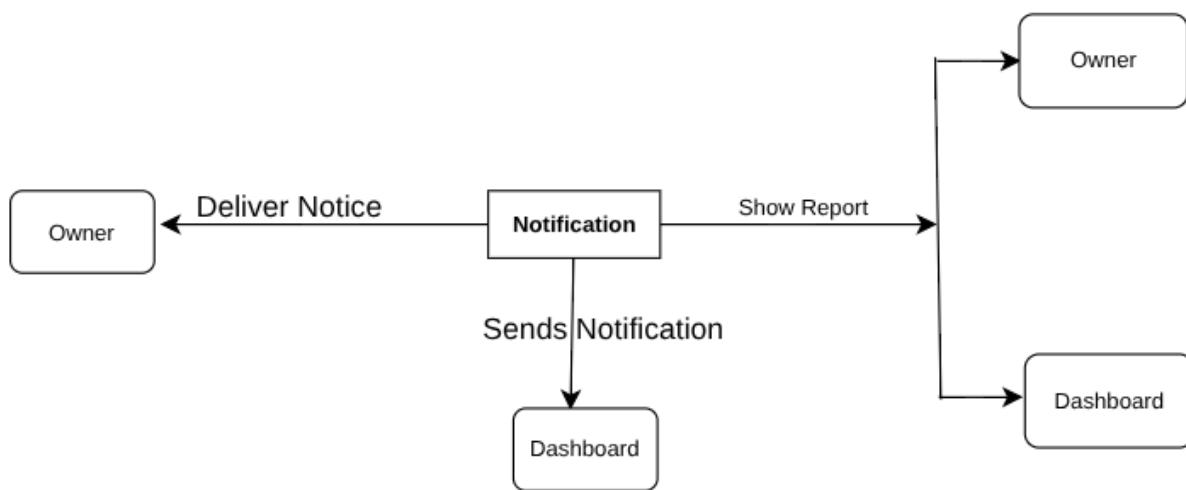
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Name: Tracker



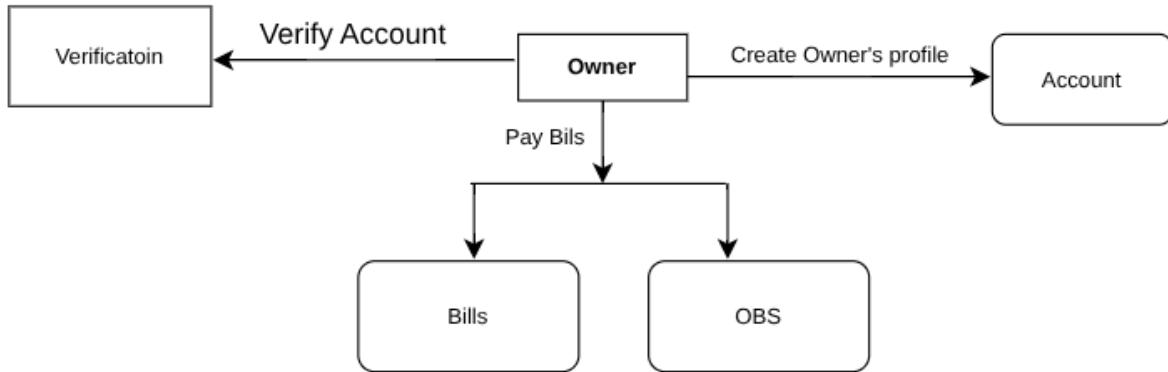
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Name: Notification



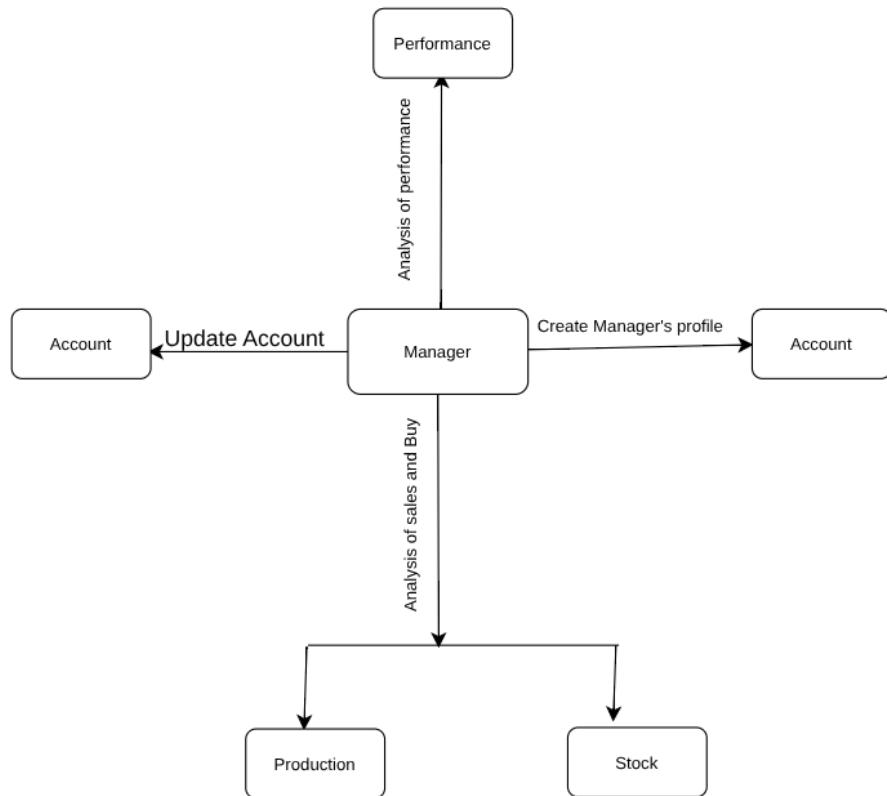
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Name: Owner



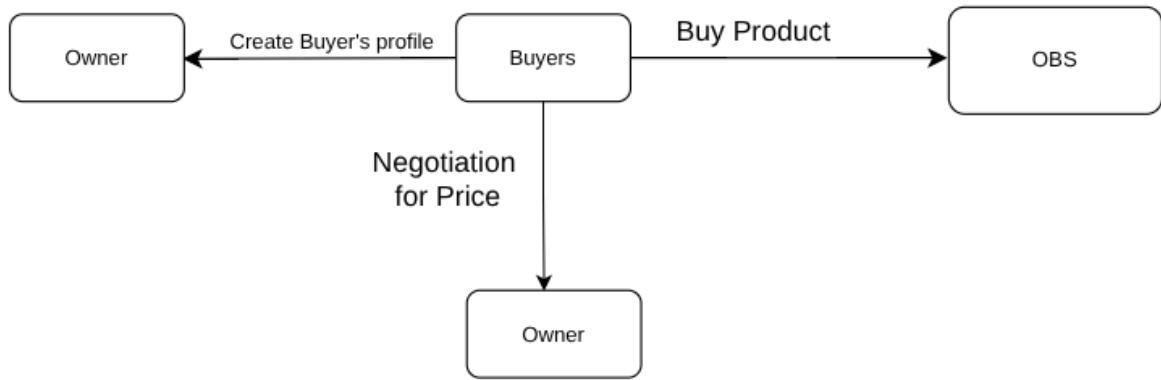
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Name: Manager



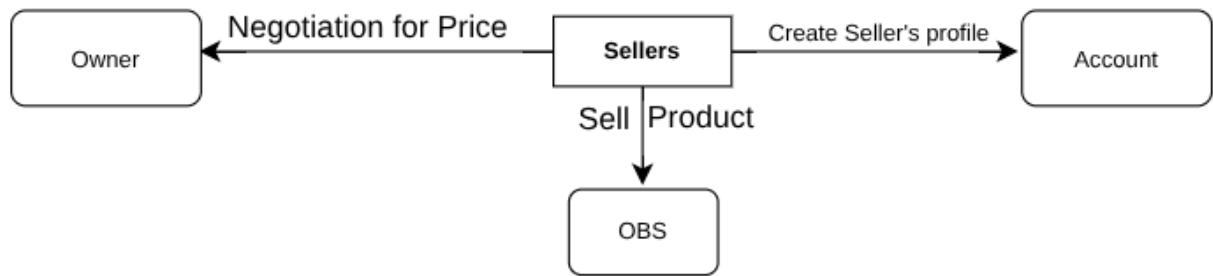
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Name: Buyers



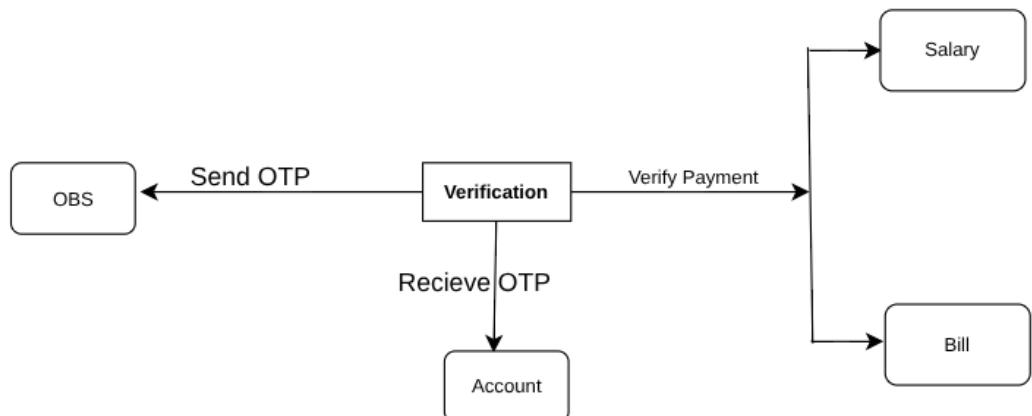
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Name: Sellers



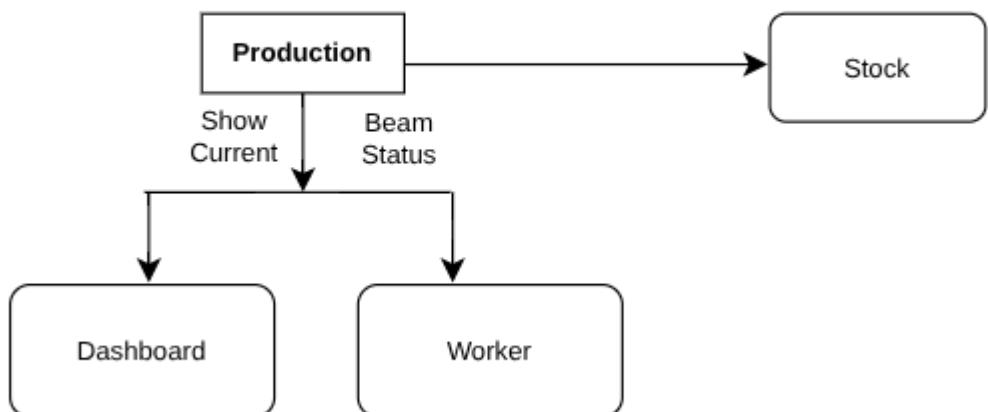
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Name: Verification

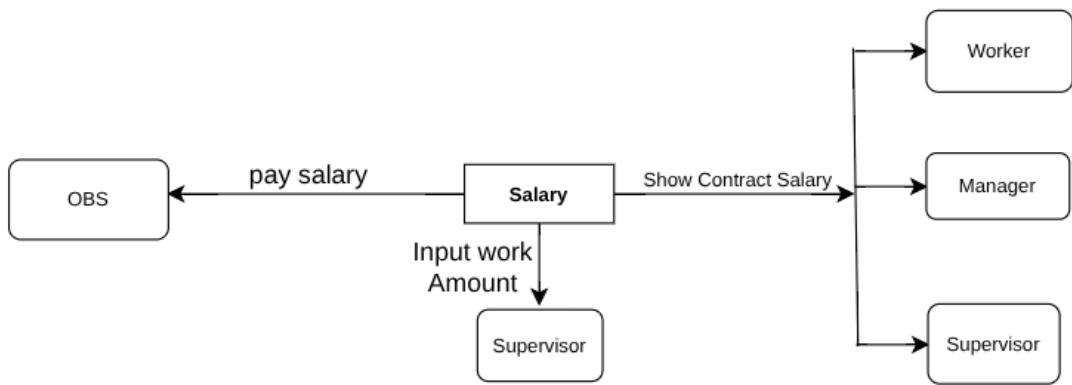


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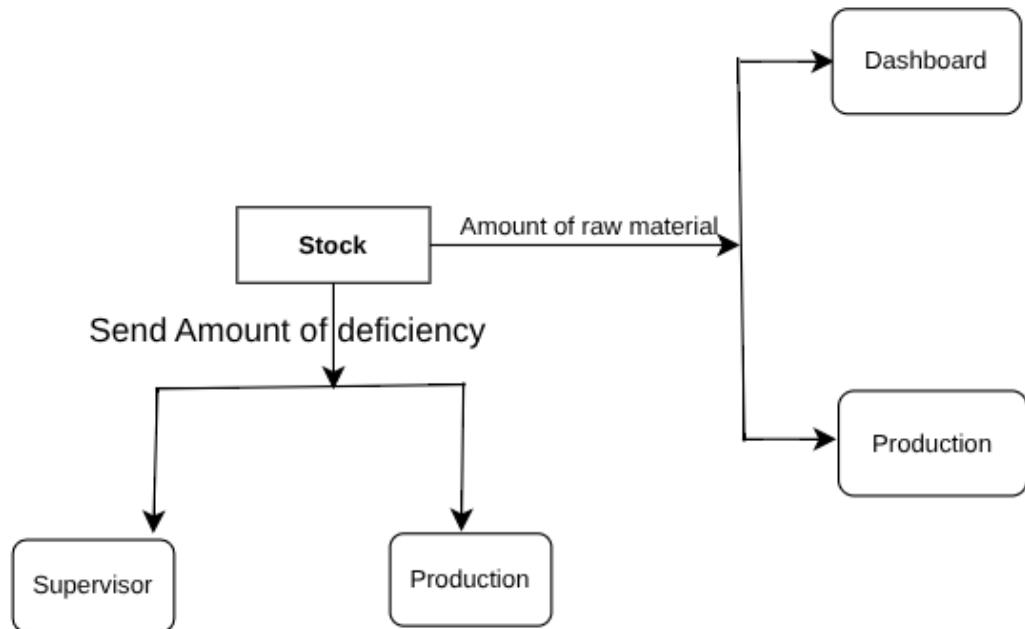
Name: Production



ID No: 17
Name: Salary



ID No: 18
Name: Stock



Behavioral Modeling

Event Table

SN	Events	Initiator	Collaborator
1	Initiate Worker Profile	Worker	Account
2	Update account	Worker	Manager
3	Store Bank Information	Worker	OBS
4	Check Worker Attendance	Supervisor	Performance
5	Calculate Work Amount Details	Supervisor	Performance
6	View Owner's Dashboard	Owner	Dashboard
7	View Manager's Dashboard	Manager	Dashboard
8	Report Analysis Details	Manager	Report,Owner
9	Mark attendance	Worker	Performance

10	Leave Analysis Report	Manager	Owner,Performance
11	Input Work Amount	Supervisor	Production
12	Employee Performance Report	Report	Performance
13	Sales Analysis Report	Report	Performance
14	Profit Analysis Report	Report	Performance
15	Create Employee Performance Report	Manager	Report
16	Create Sales Analysis Report	Manager	Report
17	Create Profit Analysis Report	Manager	Report
18	Pay Due Bills	Bills	OBS
19	View Location Details	Tracker	Dashboard
20	Track Delivery Location	Tracker	Dashboard
21	Alert Worker Schedule	Notification	Worker

22	View Important Notice	Notification	Worker
23	Release Important Notice	Owner	Dashboard
24	Verify Account	Owner	Account
25	View Sales Update	Owner	Report
26	Send OTP	OBS	Account
27	Validate OTP	Account	Verification
28	Assign User Role	Manager	Account
29	Approve Account	Owner	Account
30	Notify Account Approval	Owner	Notification
31	Authentication	Account	Owner
32	OTP Verification	Account	Verification
33	Buy Products	OBS	Buyers, Owner
34	Sell Products	OBS	Bill, Sellers, Owner
35	Pay Salary	OBS	Salary, Owner

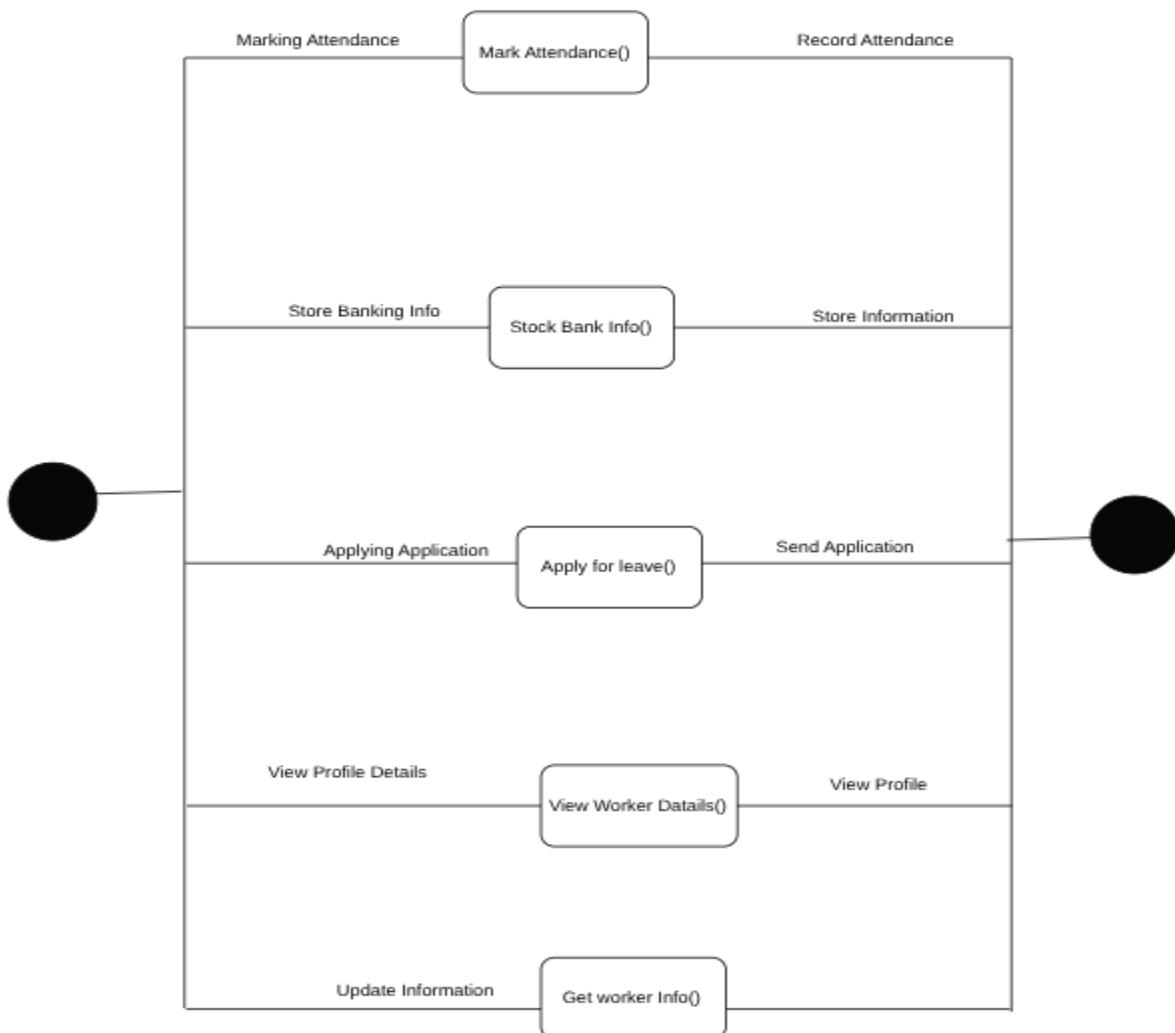
36	Pay Bill	Bill	Owner, OBS
37	Sends Delivery Location	Tracker	Owner
38	Track Drivers Location	Tracker	Owner, Manager
39	Deliver Notice	Notification	Owner
40	Sends Notification	Notification	DashBoard
41	Show Report in Owner in DashBoard	Notification	Owner, DashBoard
42	Show Current Beam Status	Production	Worker, DashBoard
43	Show Bobbins Type	Production	Stock
44	Input Work Amount	Salary	Supervisor
45	Show constant Time of Fixed Salary Employee	Salary	Worker, Manager, Supervisor
46	Amount of Raw Materials	Stock	Production, DashBoard
47	Send Alert of Deficiency	Stock	Supervisor, Production
48	Send OTP	Verification	OBS

49	Receive OTP	Verification	Account
50	Verify Payment	Verification	Salary, Bill
51	Create Sellers	Sellers	Account
52	Sale Products	Sellers	OBS
53	Negotiation for Price	Sellers	Owner
54	Buy Product	Buyers	OBS
55	Create Buyers Profile	Buyers	Account
56	Analysis of Sales and Buys	Manager	Stock, Production
57	Analysis of Employee Performance	Manager	Performance
58	Update Account	Manager	Account

State Transition Diagram

ID No: 1
Name: Worker

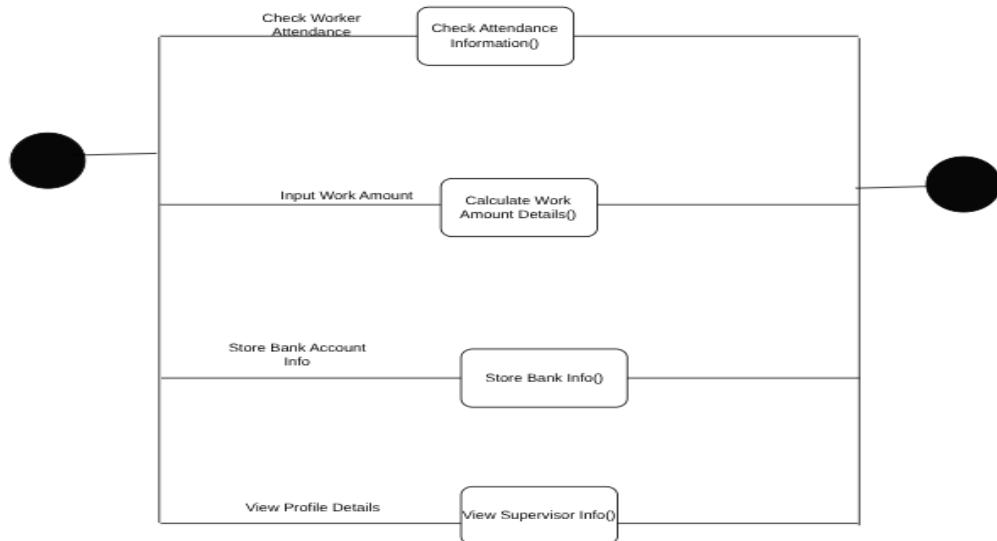
Workers



ID No: 2

Name: Supervisor

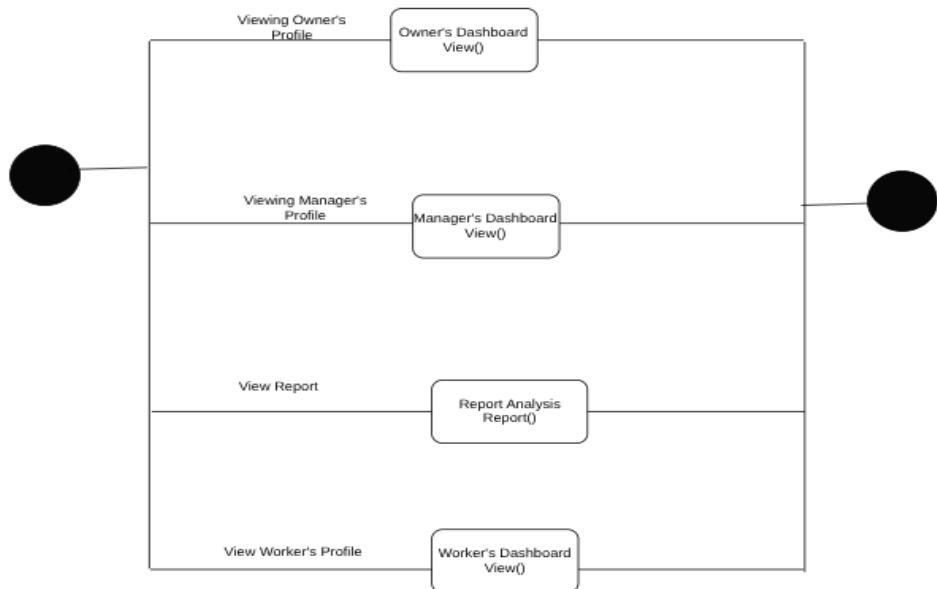
Supervisor



ID No: 3

Name: DashBoard

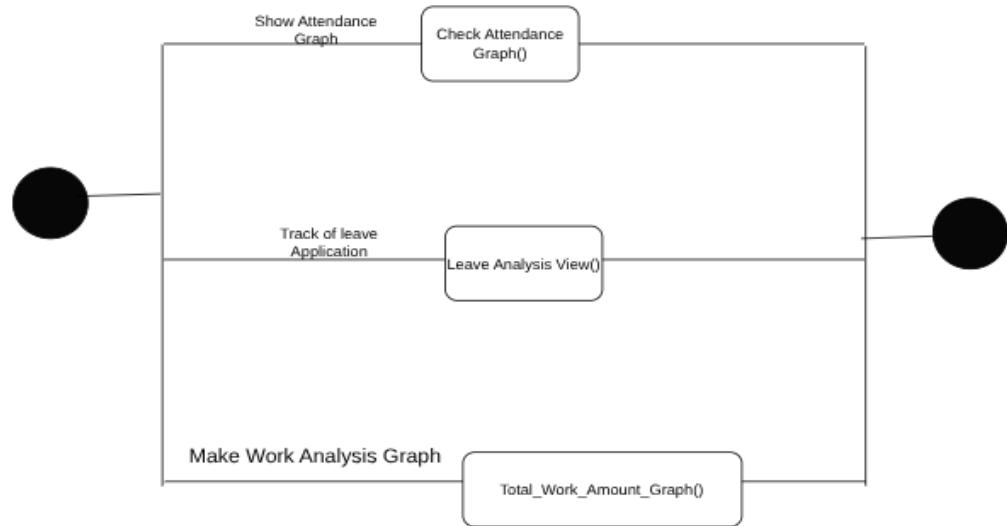
DashBoard



ID No: 4

Name: Performance

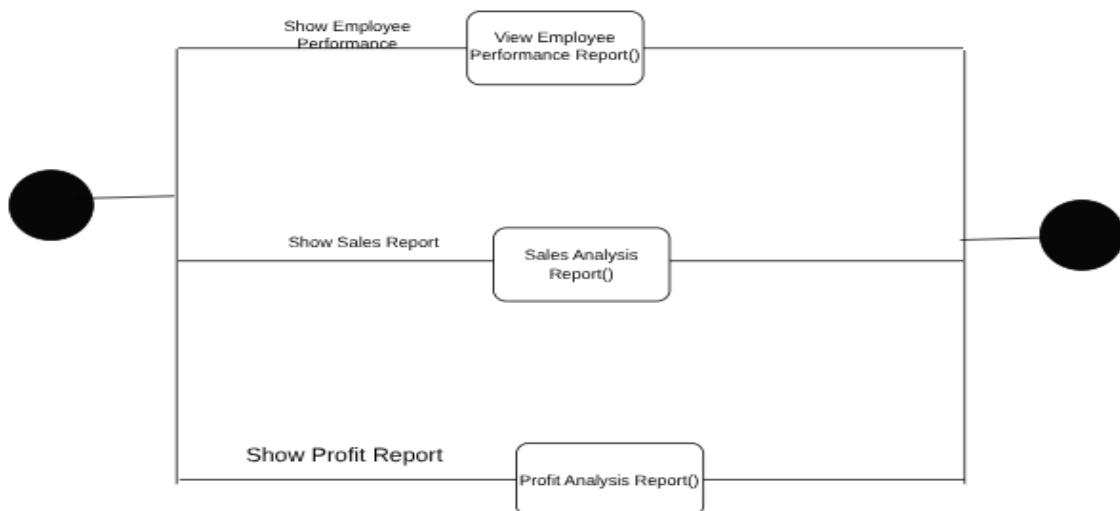
Performance



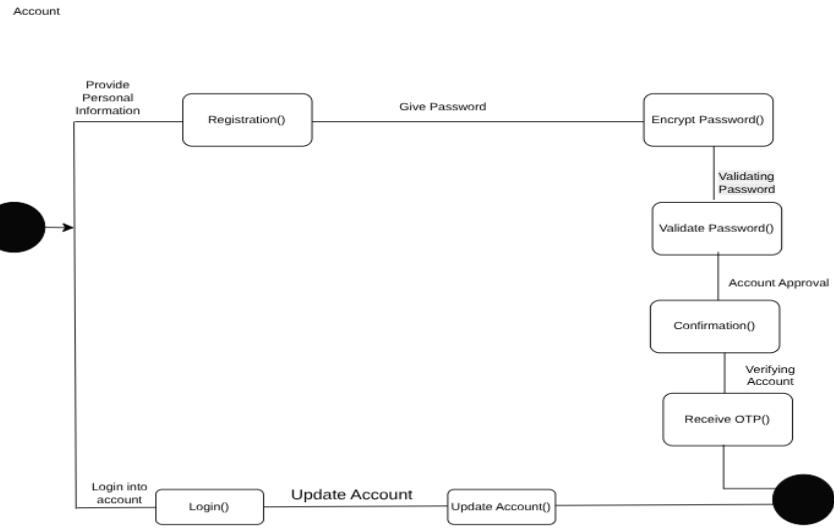
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Name: Report

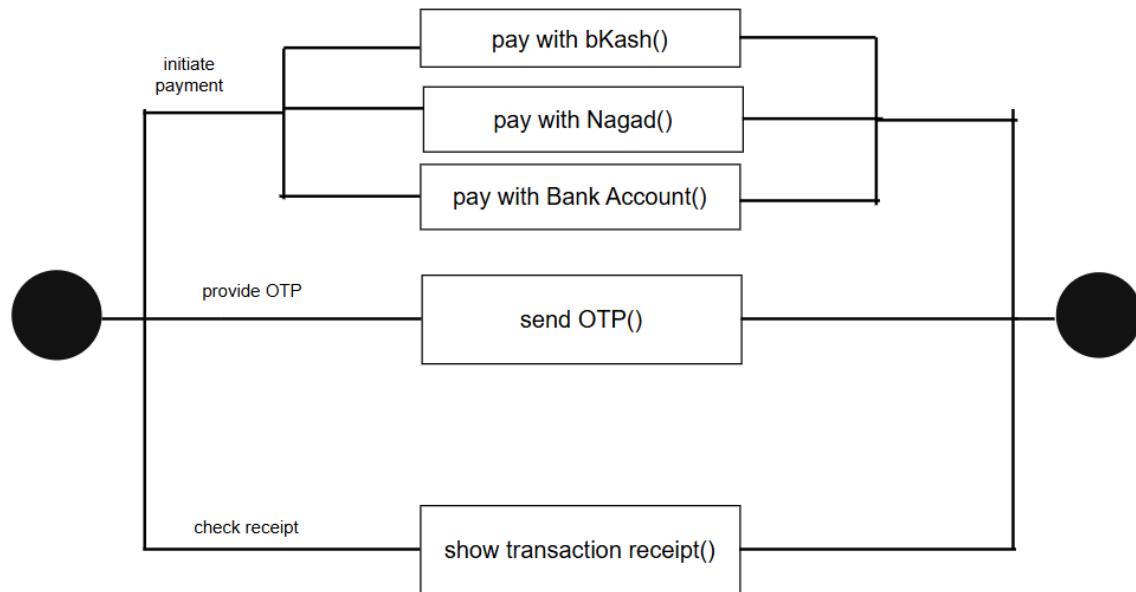
Report



ID No: 6
Name: Account



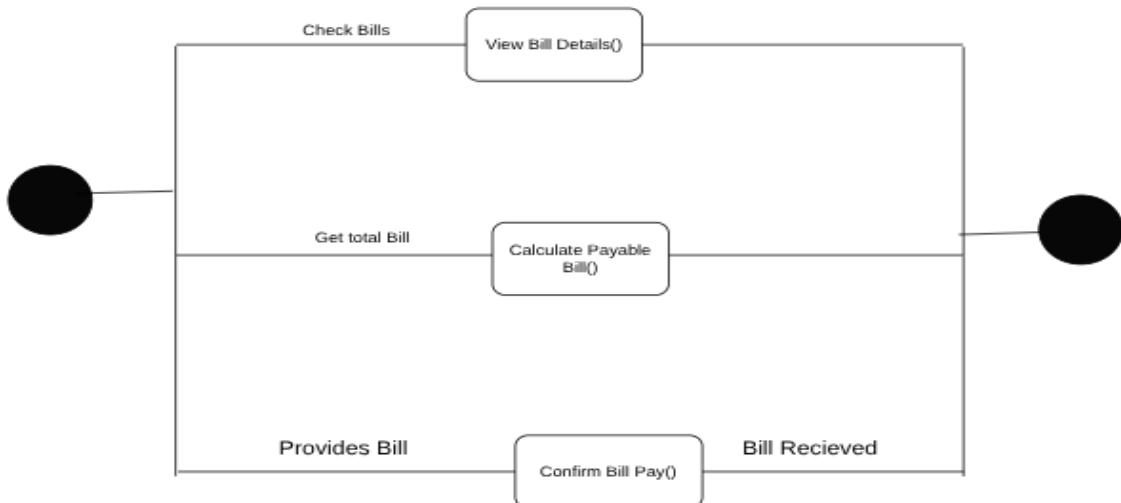
ID No: 7
Name: OBS



ID No: 8

Name: Bill

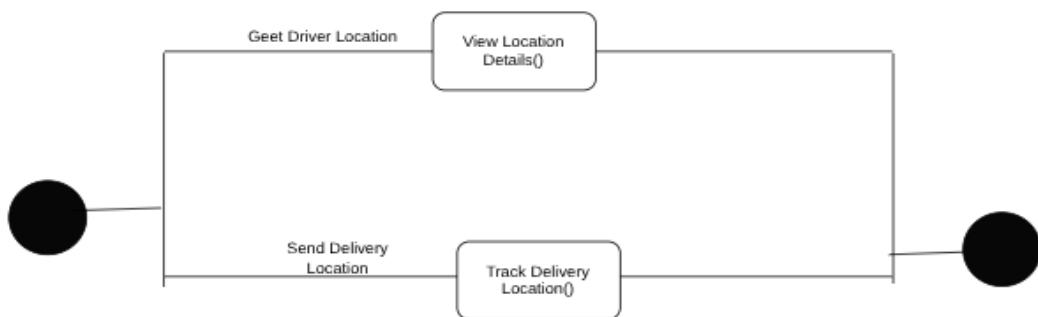
Bill



ID No: 9

Name: Tracker

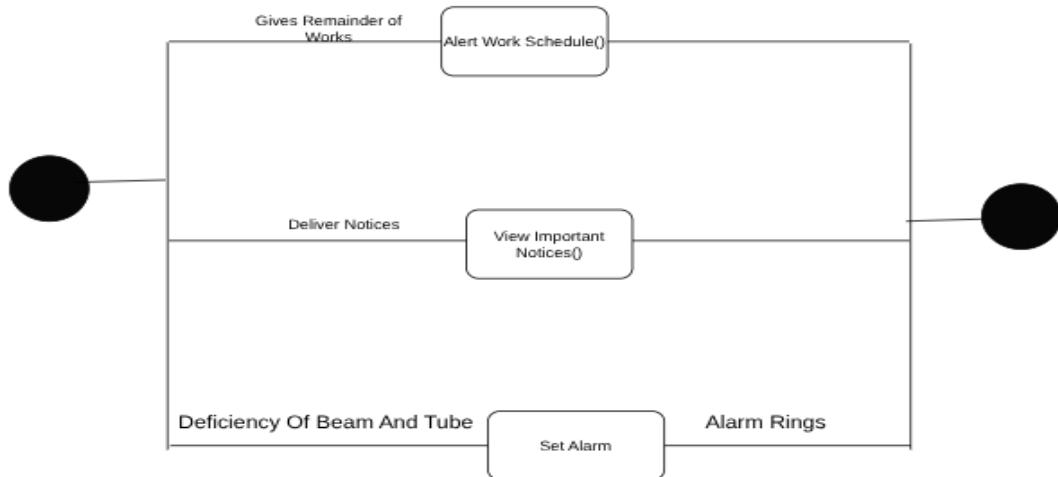
Tracker



ID No: 10

Name: Notification

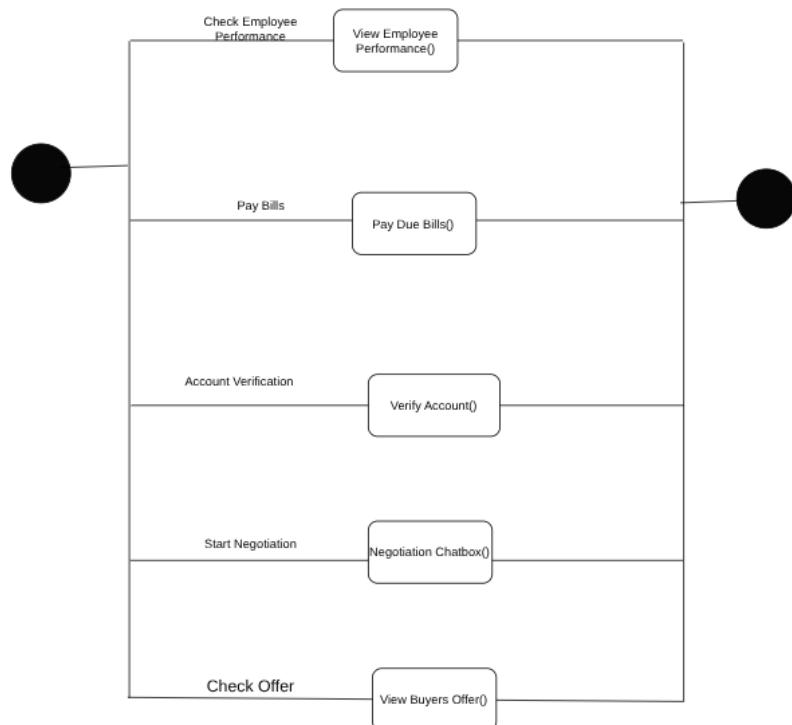
Notification



ID No: 11

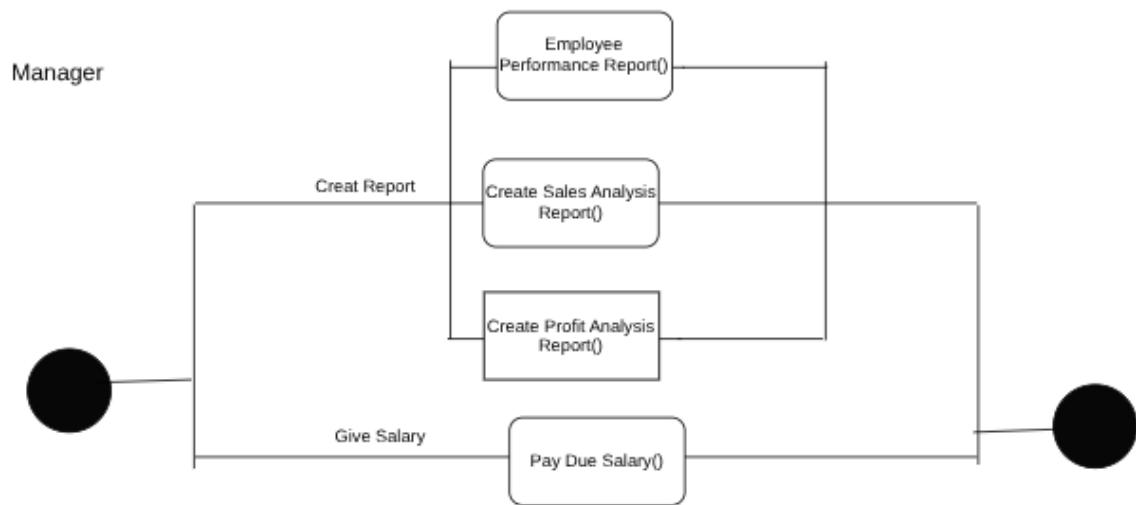
Name: Owner

Owners



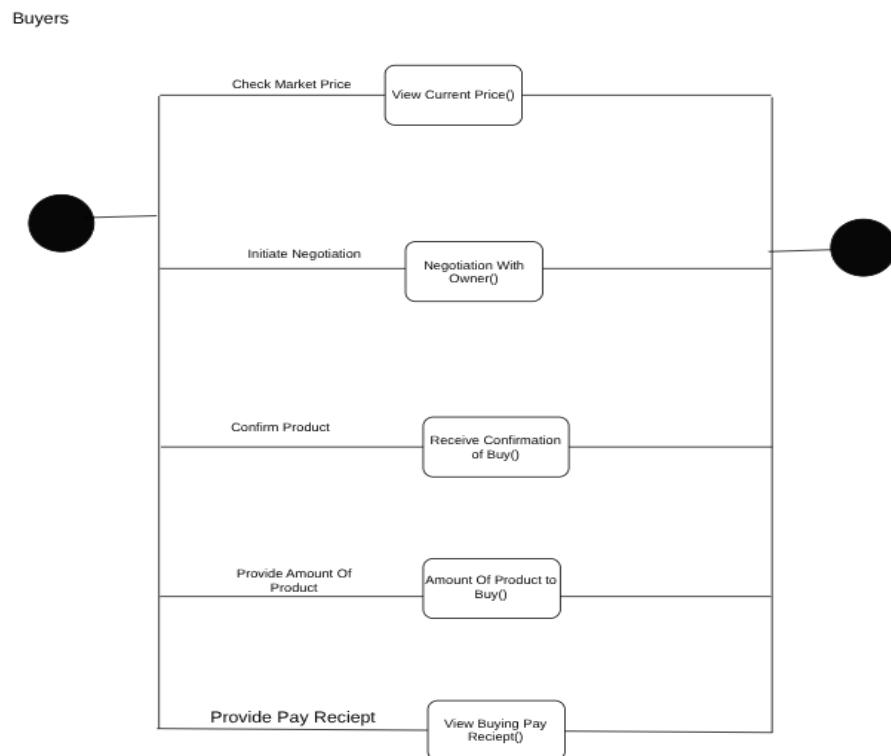
ID No: 12

Name: Manager



ID No: 13

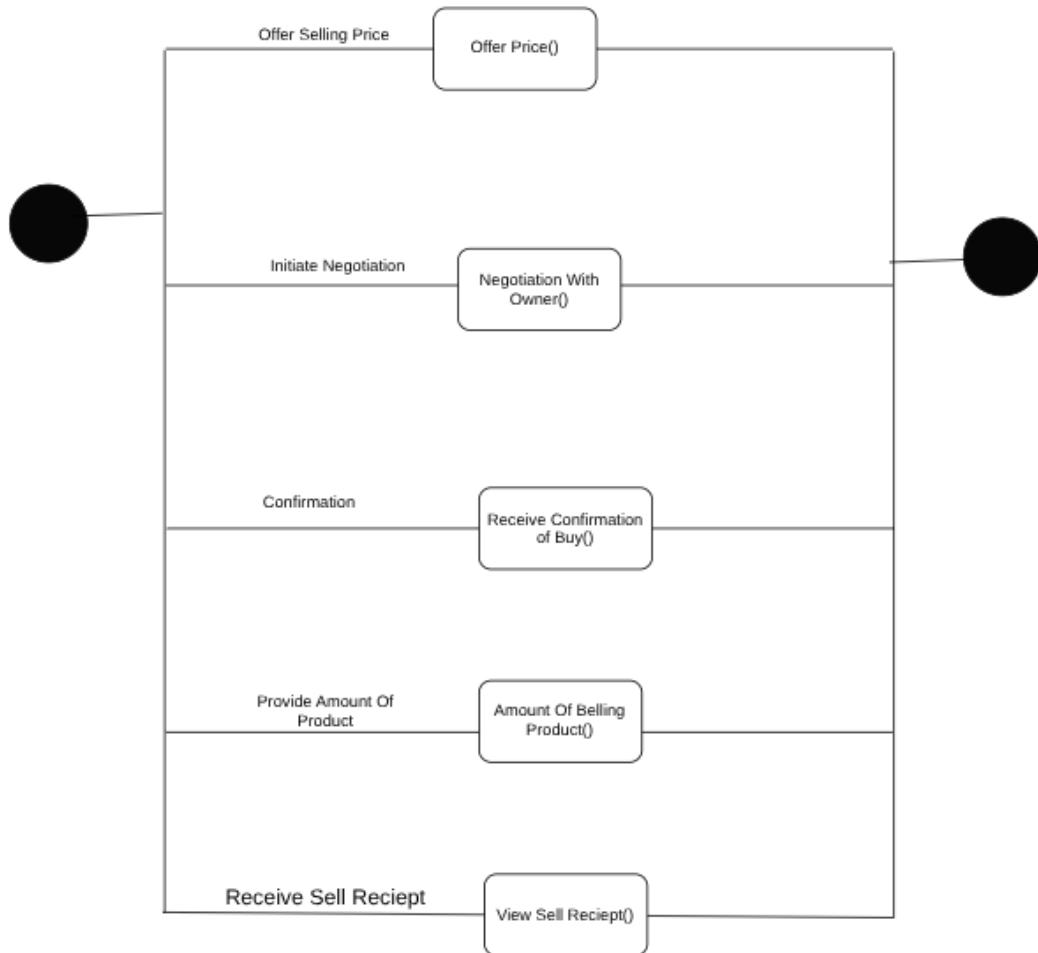
Name: Buyers



ID No: 14

Name: Sellers

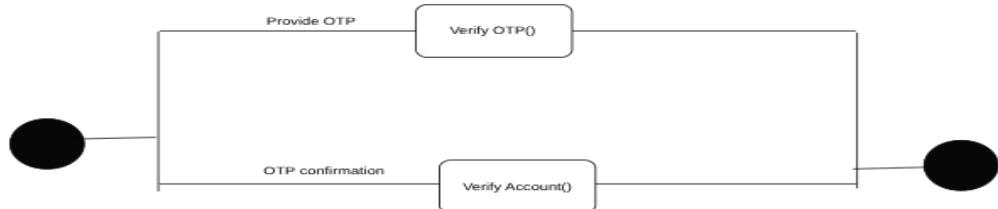
Seller



ID No: 15

Name: Verification

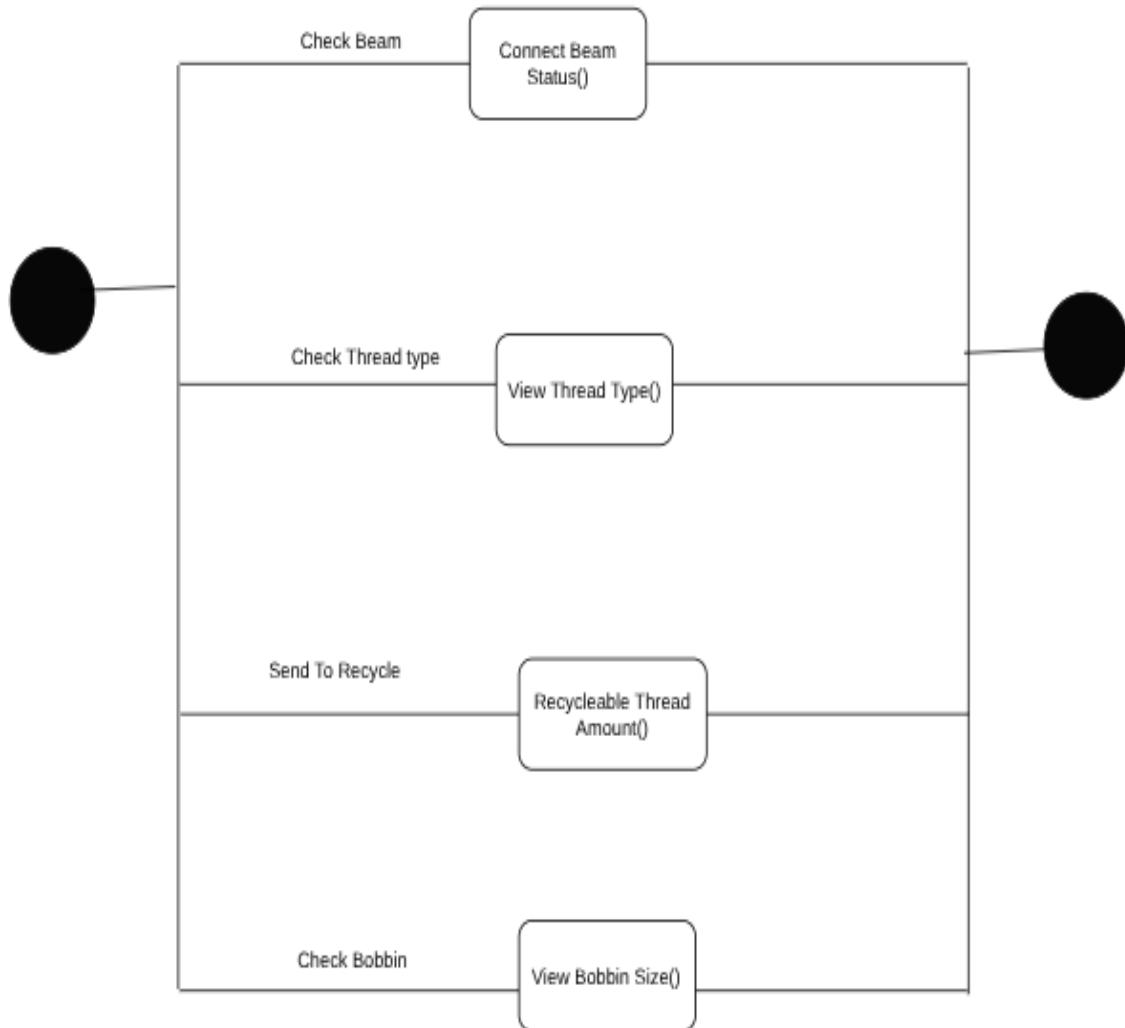
Verification



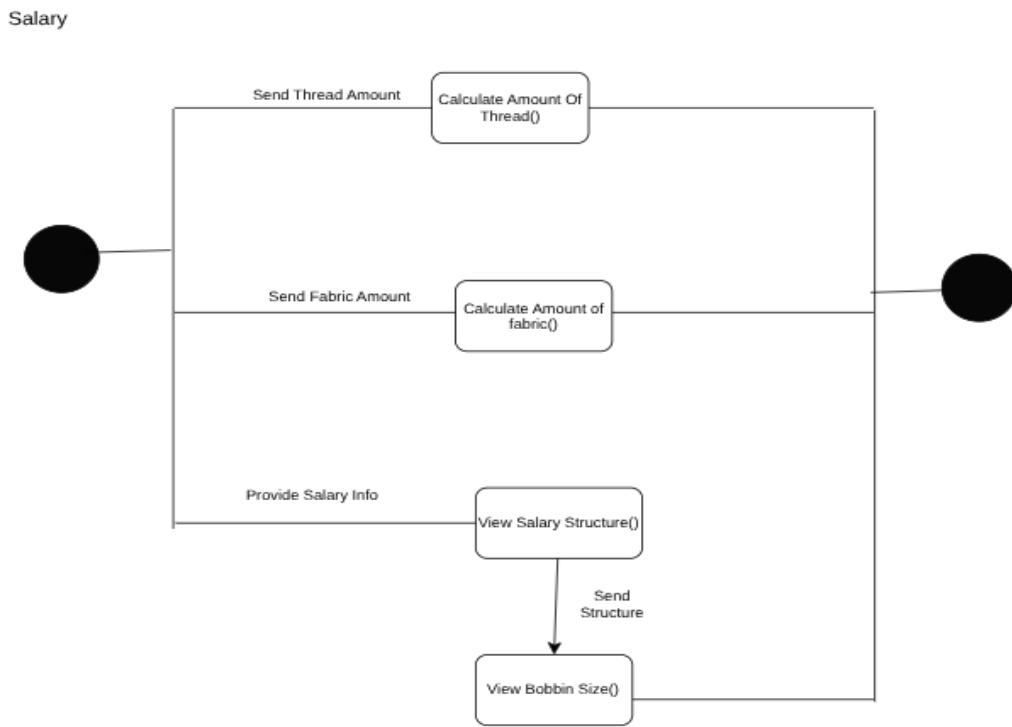
ID No: 16

Name: Production

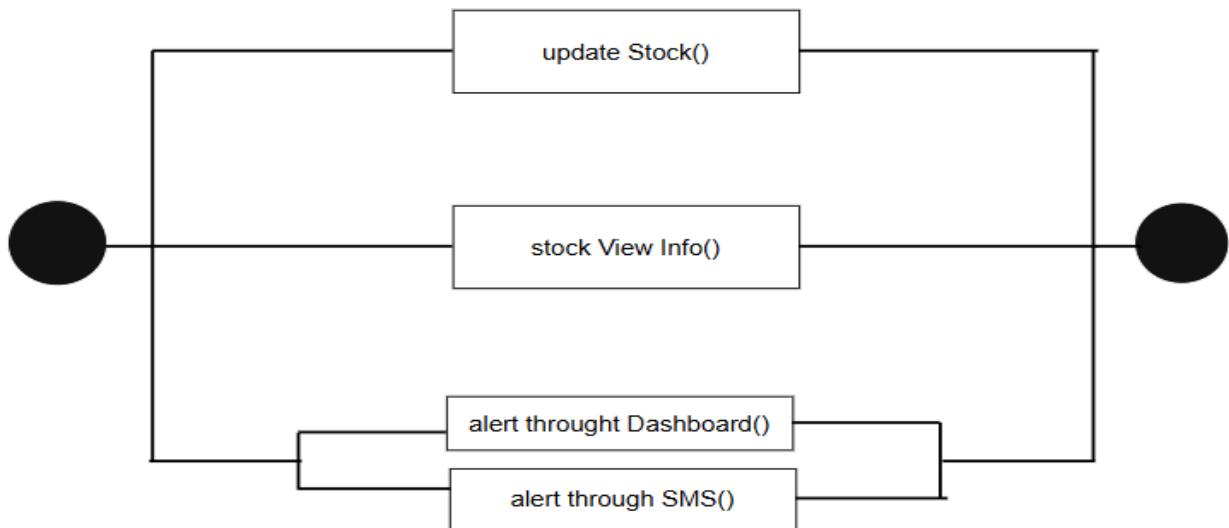
Production



ID No: 17
Name: Salary



ID No: 18
Name: Stock



Sequence Diagram

