**Attendance Tracker App**

The Attendance Tracker App will be designed to monitor and record the attendance of employees working at the port. This app will provide administrators with the ability to track attendance records and generate various reports. There are two main types of employees: Operators and Engineers. Operators can only sign in and out within specified geofenced areas at the port, while Engineers can sign in and out from anywhere. The app also records the location of employees during sign-in and sign-out. There are multiple shifts, each lasting 8 hours. Employees can only sign out after completing a regular 8-hour shift, but they can sign out at any time during overtime.

**User Roles**

**Administrator**:

Administrators manage the application configuration and track employee records. Their responsibilities include:

* Creating and modifying terminals and adding geofencing (virtual boundaries) around each terminal.
* Updating employee profiles and credentials.
* Viewing attendance tracking reports.

**Operator**

Operators have the following capabilities:

* Signing in and out within the geofenced areas.
* Working multiple shifts in a day.

**Engineer**

Engineers have the following capabilities:

* Signing in and out from any location.
* Tracking movements.
* Recording preventive maintenance activities, including capturing photos of devices before and after maintenance.

**Port**

The port entity contains general information about the port and a list of terminals.

**Terminal**

The port can have multiple terminals, each with its own defined geofencing. Employees can mark their attendance within these geofenced areas. Employees are allowed to move between terminals and can sign in and out from different terminals.

**Shift**

There are multiple shifts defined for each day, with each shift lasting 8 hours. Employees are allowed to sign in for a shift within a specific time range at the start of the shift. If an employee does not sign out after 8 hours of a particular shift, they will be automatically signed out.

**Automated Tasks**

The Attendance Tracker App includes several automated tasks to ensure the smooth operation and security of the application. These tasks include:

1. **Automated Image Deletion:**

* The application will automatically delete images of employees that are stored during sign-in and sign-out processes after one month. This helps in managing storage efficiently and ensures privacy by removing outdated data.

1. **Date/Time Tampering Prevention:**

* If a user attempts to change the date or time settings on their mobile device, the application will block access. This measure prevents potential manipulation of attendance records and ensures the integrity of time-based data.

1. **Camera Access Control:**

* To enhance security and ensure proper verification, the application will block the use of the back camera and only allow access to the front camera for capturing photos during sign-in and sign-out. This ensures that employees' faces are clearly visible and identifiable.

Here's a database schema for the Attendance Tracker App based on the above information:

Tables:

1. Users

- `user\_id`: INT (Primary Key)

- `name`: VARCHAR

- `email`: VARCHAR

- `password`: VARCHAR

- `role`: ENUM ('Administrator', 'Operator', 'Engineer')

- `profile\_image`: VARCHAR

- `created\_at`: DATETIME

- `updated\_at`: DATETIME

2. Ports

- `port\_id`: INT (Primary Key)

- `name`: VARCHAR

- `location`: VARCHAR

- `description`: TEXT

- `created\_at`: DATETIME

- `updated\_at`: DATETIME

3. Terminals

- `terminal\_id`: INT (Primary Key)

- `port\_id`: INT (Foreign Key references Ports)

- `name`: VARCHAR

- `geofence\_coordinates`: TEXT

- `created\_at`: DATETIME

- `updated\_at`: DATETIME

4. Shifts

- `shift\_id`: INT (Primary Key)

- `name`: VARCHAR

- `start\_time`: TIME

- `end\_time`: TIME

- `duration\_hours`: INT

- `created\_at`: DATETIME

- `updated\_at`: DATETIME

5. Attendances

- `attendance\_id`: INT (Primary Key)

- `user\_id`: INT (Foreign Key references Users)

- `terminal\_id`: INT (Foreign Key references Terminals, NULL for Engineers)

- `shift\_id`: INT (Foreign Key references Shifts)

- `sign\_in\_time`: DATETIME

- `sign\_out\_time`: DATETIME

- `location\_coordinates`: TEXT

- `sign\_in\_photo`: VARCHAR

- `sign\_out\_photo`: VARCHAR

- `created\_at`: DATETIME

- `updated\_at`: DATETIME

6. Preventive\_Maintenance

- `maintenance\_id`: INT (Primary Key)

- `user\_id`: INT (Foreign Key references Users)

- `device\_id`: INT

- `before\_photo`: VARCHAR

- `after\_photo`: VARCHAR

- `maintenance\_date`: DATETIME

- `description`: TEXT

- `created\_at`: DATETIME

- `updated\_at`: DATETIME

Indexes and Constraints:

- Primary keys for all tables.

- Foreign keys to maintain referential integrity.

- Unique constraints on `email` in the `Users` table.

- Indexes on `user\_id`, `terminal\_id`, `shift\_id`, and `attendance\_id` to optimize query performance.