Bangladesh Thana & Jail Management System

ERD Explanation and Project Overview

1. Project Overview

This project is a Bangladesh-based Thana and Jail Management System. It helps the government and police stations keep criminal records, arrests, jail placement, and online GD (General Diary) submissions in one place.

2. MVP Features

• Admin registers Thanas and assigns a head officer.
• Thanas manage officers, criminals, arrests, cases, and jail placement.
• Citizens register and submit Online GD reports.
• Thana officers approve or reject GD reports.
• Criminals can be viewed by location.

3. Users and Scope

Admin (Government): Registers Thanas, assigns head officers, controls all system setup.
Thana Head (Officer-in-Charge): Oversees officers, approves GD decisions, and monitors cases.
Police Officers: Manage criminals, arrests, case files, jail placement, and bail tracking.
Citizens (General Users): Register, submit Online GD, and view criminal locations.

4. Real-Life Use Case Flow

1) Admin creates a Thana and assigns its head officer.
2) Thana adds officers and registers criminals.
3) If a criminal is arrested, an arrest record is created and linked to a case.
4) If the criminal is jailed, incarceration and cell records are assigned.
5) If bail is granted, a bail record is stored.
6) Citizens submit Online GD; Thana reviews and approves or rejects it.
7) Citizens can see criminal locations based on recorded sightings.

5. ER Diagram Summary

The ERD is built with strong entities for core records (Thana, Officer, Criminal, Jail, User). The only relationship tables are membership and relation tables, which keep links simple and clear.

5.1 Strong vs Weak Entities

Strong entities: admin, thanas, ranks, officers, locations, users, gd_reports, criminals, organizations, case_files, jails, cell_blocks, cells, arrest_records, incarcerations, bail_records, criminal_locations.
Weak entities: none. Every table has its own primary key, so no weak entity is required.

6. Tables and Attributes

Table: admin

Purpose: Government admins who create Thanas and control system setup.

Connected to: thanas (created_by_admin_id)

Attribute	Purpose
admin_id	Unique admin ID
full_name	Admin name
email	Admin email

Table: thanas

Purpose: Police stations in Bangladesh.

Connected to: admin, officers, gd_reports, criminals, case_files, arrest_records

Attribute	Purpose
thana_id	Unique thana ID
name	Thana name
district	District name
address	Thana address
created_by_admin_id	Admin who created the thana
head_officer_id	Officer in charge

Table: ranks

Purpose: Police rank list.

Connected to: officers

Attribute	Purpose
rank_code	Rank identifier
rank_name	Rank name
level	Rank order level

Table: officers

Purpose: Police officers working in a Thana.

Connected to: thanas, ranks, gd_reports (approval)

Attribute	Purpose
officer_id	Unique officer ID
thana_id	Officer's thana
rank_code	Officer's rank
full_name	Officer name

badge_no	Officer badge number

Table: locations

Purpose: District and thana area locations.

Connected to: criminal_locations

Attribute	Purpose
location_id	Unique location ID
district	District name
thana_area	Local thana area
address	Address text

Table: users

Purpose: Citizens who register and use Online GD.

Connected to: gd_reports

Attribute	Purpose
user_id	Unique user ID
full_name	User name
nid_number	National ID number
phone	User phone
address	User address
email	User email
password_hash	Password hash for login

Table: gd_reports

Purpose: Online GD submissions by citizens.

Connected to: users, thanas, officers (approval)

Attribute	Purpose
gd_id	Unique GD ID
user_id	User who submitted
thana_id	Assigned thana
submitted_at	Submission time
description	GD description
status	GD status
approved_by_officer_id	Officer who approved

Table: criminals

Purpose: Criminal profiles managed by Thanas.

Connected to: thanas, case_files, arrest_records, criminal_organizations, criminal_relations, criminal_locations

Attribute	Purpose
criminal_id	Unique criminal ID
full_name	Criminal name
nid_or_alias	NID or alias
status	Custody status
risk_level	Risk level 1–10
registered_thana_id	Thana that registered

Table: organizations

Purpose: Criminal organizations or gangs.

Connected to: criminal_organizations

Attribute	Purpose
org_id	Unique organization ID
name	Organization name
ideology	Organization ideology
threat_level	Threat level 1–10
created_at	Record creation time

Table: criminal_organizations

Purpose: Membership table that connects criminals to organizations.

Connected to: criminals, organizations

Attribute	Purpose
criminal_id	Linked criminal
org_id	Linked organization
role	Role in organization

Table: criminal_relations

Purpose: Criminal-to-criminal relationship table.

Connected to: criminals (self-relation)

Attribute	Purpose
relation_id	Unique relation ID
criminal_id_1	First criminal
criminal_id_2	Second criminal
relation_type	Relation type

Table: case_files

Purpose: Case records for criminals under a Thana.

Connected to: criminals, thanas

Attribute	Purpose
case_id	Unique case ID
case_number	Case number
criminal_id	Linked criminal
thana_id	Linked thana
case_type	Case type
status	Case status
filed_at	Case filed time

Table: jails

Purpose: Jail facilities.

Connected to: cell_blocks, incarcerations

Attribute	Purpose
jail_id	Unique jail ID
name	Jail name
district	Jail district
address	Jail address
capacity	Total capacity

Table: cell_blocks

Purpose: Blocks inside a jail.

Connected to: jails, cells

Attribute	Purpose
block_id	Unique block ID
jail_id	Parent jail
block_name	Block name
capacity	Block capacity

Table: cells

Purpose: Cells inside a block.

Connected to: cell_blocks, incarcerations

Attribute	Purpose
cell_id	Unique cell ID
block_id	Parent block

cell_number	Cell number
capacity	Cell capacity
status	Cell status

Table: arrest_records

Purpose: Arrest history for criminals.

Connected to: criminals, thanas, bail_records, incarcerations

Attribute	Purpose
arrest_id	Unique arrest ID
criminal_id	Arrested criminal
thana_id	Arresting thana
arrest_date	Arrest date
bail_due_date	Bail due date
custody_status	Custody status
case_reference	Case reference

Table: incarcerations

Purpose: Jail placement for an arrest. (Junction table linking Arrests to Jails/Cells)

Connected to: arrest_records, jails, cells

Attribute	Purpose
incarceration_id	Unique incarceration ID
arrest_id	Linked arrest
jail_id	Jail where kept
cell_id	Cell assigned
admitted_at	Admit time
released_at	Release time

Detailed Explanation:

Scenario: A criminal is arrested by Thana A and sent to Dhaka Central Jail. The arrest table records the 'event' of the arrest. However, the physical placement in a jail and specific cell is a separate timeline. This 'incarcerations' table manages that placement.

Why it is absolutely needed: Arrest and jail placement are not 1:1 in the real world. A person can be arrested but not sent to jail (bailed immediately). Or, one arrest can lead to multiple jail transfers (Jail A -> Jail B). Separate tables prevent data duplication and confusion.

Table: bail_records

Purpose: Bail details for an arrest.

Connected to: arrest_records

Attribute	Purpose
bail_id	Unique bail ID
arrest_id	Linked arrest
court_name	Court name
bail_amount	Bail amount
granted_at	Bail date
surety_name	Surety name
status	Bail status

Table: criminal_locations

Purpose: Criminals linked to locations for public viewing.

Connected to: criminals, locations

Attribute	Purpose
criminal_location_id	Unique record ID
criminal_id	Linked criminal
location_id	Linked location
noted_at	Recorded time

7. Relationships (Cardinality)

• Admin 1 → N Thanas (Admin creates Thanas)

• Thana 1 → N Officers (Officers belong to one Thana)

• Rank 1 → N Officers (Each officer has one rank)

• Thana 0..1 → 1 Head Officer (Optional head officer)

• User 1 → N GD Reports (User submits GD)

• Thana 1 → N GD Reports (Thana receives GD)

• Officer 0..1 → N GD Reports (Officer approves GD)

• Thana 1 → N Criminals (Thana registers criminals)

• Criminal 1 → N Case Files (Cases for a criminal)

• Criminal 1 → N Arrest Records (Arrest history)

• Thana 1 → N Arrest Records (Arrests recorded by thana)

• Arrest 1 → N Bail Records (Bail info for an arrest)

• Arrest 1 → N Incarcerations (Jail placements)

• Cell 0..1 → N Incarcerations (A cell can be used many times over time; an incarceration may or may not have a cell yet)

• Jail 1 → N Cell Blocks (Jail structure)

• Block 1 → N Cells (Cells inside a block)

• Criminal N ↔ N Organizations (Memberships via criminal_organizations)

• Criminal N ↔ N Criminal (Relations via criminal_relations)

• Criminal 1 → N Locations (Seen in different locations)

7.1 Participation (Total vs Partial)

• Thana in Officers is total (every officer must belong to one thana).

• Rank in Officers is total (every officer has one rank).

• User in GD Reports is total (every GD must have a user).

• Thana in GD Reports is total (every GD goes to one thana).

• Criminal in Arrest Records is total (every arrest must have a criminal).

• Criminal in Case Files is total (every case must have a criminal).

• Thana Head is partial (a thana may or may not have a head).

• Criminal in Organizations and Criminal Relations is partial (a criminal may have none).

7.2 Chen Cardinality (Left/Right of Diamond)

For each relation below, the four numbers show minimum and maximum on both sides of the diamond. Format: LeftEntity (min,max) — Relation — RightEntity (min,max).

Relation	Cardinality (Left — Right)	Why this makes sense

Cell assigned to Incarceration	Cell (0,*) — assigned_to — Incarceration (0,1)	A cell can host many incarcerations over time; an incarceration may be pending without a cell.
Admin registers Thana	Admin (1,*) — registers — Thana (1,1)	A thana must be created by exactly one admin; one admin can create many thanas.
Thana employs Officer	Thana (1,*) — employs — Officer (1,1)	Every officer works for one thana; a thana has many officers.
Rank assigned to Officer	Rank (1,*) — assigned_to — Officer (1,1)	Each officer has exactly one rank; a rank is shared by many officers.
Thana headed by Officer	Thana (0,1) — headed_by — Officer (0,1)	A thana may or may not have a head; an officer may or may not be a head.
User submits GD	User (1,*) — submits — GD_Report (1,1)	Every GD is submitted by exactly one user; a user can submit many GDs.
Thana receives GD	Thana (1,*) — receives — GD_Report (1,1)	Each GD goes to one thana; a thana receives many GDs.
Officer approves GD	Officer (0,*) — approves — GD_Report (0,1)	A GD may be pending or approved by one officer; an officer can approve many GDs.
Thana registers Criminal	Thana (1,*) — registers — Criminal (1,1)	Each criminal is registered by one thana; a thana registers many criminals.
Criminal has Case	Criminal (1,*) — has — Case_File (1,1)	A case file is for one criminal; a criminal can have multiple cases.
Criminal has Arrest	Criminal (1,*) — has — Arrest_Record (1,1)	Each arrest record is for one criminal; a criminal can be arrested multiple times.
Thana records Arrest	Thana (1,*) — records — Arrest_Record (1,1)	An arrest is recorded by one thana; a thana records many arrests.
Arrest has Bail	Arrest_Record (0,*) — has — Bail_Record (1,1)	A bail record must belong to one arrest; an arrest can have none or many bail updates.
Arrest has Incarceration	Arrest_Record (0,*) — has — Incarceration (1,1)	An incarceration must belong to one arrest; an arrest may have none or many transfers.
Jail has Blocks	Jail (1,*) — has — Cell_Block (1,1)	Each block belongs to one jail; a jail has many blocks.
Block has Cells	Cell_Block (1,*) — has — Cell (1,1)	Each cell belongs to one block; a block has many cells.
Criminal member of Organization	Criminal (0,*) — member_of — Organization (0,*)	A criminal may have no organization; organizations can have many criminals.
Criminal related to Criminal	Criminal (0,*) — related_to — Criminal (0,*)	A criminal may have no relations; relations can link many criminals.
Criminal seen at Location	Criminal (1,*) — seen_at — Location (1,*)	Each record links one criminal and one location; many records can exist over time.

8. Project Scope

This scope focuses on core policing and jail management. It covers Thana operations, criminal records, arrests, jail placement, bail, and citizen GD. It does not cover advanced surveillance, court workflows, or analytics.