Part 1: Database Design & Data Cleaning

1. Import & Normalize Data

- **Import** the Excel file into a SQL Server database.

- **Normalize** the structure into multiple tables such as:

    o Employees (EmployeeID, Name, Status)

    o Roles (RoleID, RoleName)

    o Locations (LocationID, LocationName)

    o Experience (EmployeeID, YearsExperience)

    o Compensation (EmployeeID, BaseSalary)

- **Foreign keys** should be used to link relationships.

- Avoid redundancy and ensure data integrity.

2. Data Quality Checks

Before proceeding with analysis:

- **Check for missing values** (e.g., NULL in Compensation, Experience).

- **Detect outliers** in Compensation or Experience.

- **Standardize values** (e.g., inconsistent Location/Role spellings).

- **Status Field**: Check if "Active"/"Inactive" statuses are consistent.

 Part 2: Section A

Q1: Data Quality Issues & Cleaning Steps

Potential issues you might find:

- Missing compensation or experience values.

- Role or Location field may have inconsistent naming (e.g., "NYC" vs "New York").

- Duplicate employee records.

- Unclear status fields ("Active", "active", "Act" etc.)

Cleaning Steps:

- Replace NULL compensation with median for that role (if acceptable).

- Normalize Role/Location with a mapping table.

- Remove duplicates based on Name + Role + Location.

- Enforce standardized values for status (Active, Inactive).

Q2: Highest Turnover by Role and Location

Use these steps:

- Identify terminated or inactive employees using Status.

- Count total employees vs. inactive by Role and Location.

- Calculate turnover rate = #Inactive / #Total for each role/location.

Insights you might add:

- "Sales" roles in "New York" may show higher turnover.

- Junior-level roles may have higher attrition due to career growth or dissatisfaction.

Q3: Compensation Competitiveness

Method:

- Group employees by Role and Experience range (e.g., 0–1, 1–3, 3–5, etc.)

- Calculate **average compensation per group**.

- Compare those figures to industry benchmarks (you may assume or use dummy benchmarks for PoC).

Insight example:

- "Software Engineers with 3–5 years of experience are earning 15% below industry average."

Q4: Reasons for Headcount Decline

Potential reasons may include:

- **Uncompetitive pay** compared to market rates.

- **Lack of career progression** (e.g., flat compensation over years).

- **High workload** in certain roles/locations.

- **Geographical mismatch** (long commutes, relocation resistance).

- **Low engagement in remote/inactive teams.**

Q5: Retention Recommendations

Based on your data and analysis, recommend:

- **Compensation adjustments** for underpaid roles.

- Implement **role/location-specific retention bonuses**.

- Conduct **stay interviews** to understand issues before exits.

- Introduce **career development programs** to boost retention.

- Improve **onboarding or mentoring** in high-turnover roles.

Step 1: SQL Script Templates

Objective:

Import and normalize employee data from Excel into a relational database.

Table Creation

```sql
-- Employee table
CREATE TABLE Employees (
    EmployeeID INT PRIMARY KEY,
    Name VARCHAR(100),
    RoleID INT,
    LocationID INT,
    ExperienceYears DECIMAL(3,1),
    Compensation DECIMAL(10,2),
    Status VARCHAR(20) -- Active, Inactive, etc.
);


-- Roles table
CREATE TABLE Roles (
    RoleID INT PRIMARY KEY,
    RoleName VARCHAR(100)
);


-- Locations table
CREATE TABLE Locations (
    LocationID INT PRIMARY KEY,
    LocationName VARCHAR(100)
);
```

Sample Stored Procedure: FilterEmployees

```sql
CREATE PROCEDURE FilterEmployees
    @RoleID INT = NULL,
    @LocationID INT = NULL,
    @IncludeInactive BIT = 0
AS
BEGIN
    SELECT e.Name, r.RoleName, l.LocationName, e.Compensation, e.Status
    FROM Employees e
```

```
    JOIN Roles r ON e.RoleID = r.RoleID

    JOIN Locations l ON e.LocationID = l.LocationID

    WHERE (@RoleID IS NULL OR e.RoleID = @RoleID)

      AND (@LocationID IS NULL OR e.LocationID = @LocationID)

      AND (@IncludeInactive = 1 OR e.Status = 'Active');

END;
```

◆ **Step 2: Sample Analysis Report – Section A**

1. Data Quality Issues (Hypothetical)

- Missing values in Compensation, Status, or ExperienceYears
- Inconsistent location/role naming (e.g., "NYC" vs "New York")
- Duplicate employee entries

Cleaning Steps:

- Use defaults or medians to fill missing compensation
- Normalize strings (e.g., trimming, casing)
- Remove duplicates based on unique EmployeeID

2. Turnover Rate Analysis

- Add a TerminationDate or filter Status = 'Inactive'
- Calculate turnover % per role/location:

```
SELECT

    l.LocationName,

    r.RoleName,

    COUNT(CASE WHEN e.Status = 'Inactive' THEN 1 END) * 100.0 / COUNT(*) AS TurnoverRate

FROM Employees e

JOIN Roles r ON e.RoleID = r.RoleID

JOIN Locations l ON e.LocationID = l.LocationID

GROUP BY l.LocationName, r.RoleName

ORDER BY TurnoverRate DESC;
```

3. Compensation Competitiveness

Group by role + experience buckets (0–1, 1–2, etc.)

```
SELECT

    r.RoleName,
```

```sql
CASE

    WHEN e.ExperienceYears BETWEEN 0 AND 1 THEN '0–1'

    WHEN e.ExperienceYears BETWEEN 1 AND 2 THEN '1–2'

    WHEN e.ExperienceYears BETWEEN 2 AND 5 THEN '2–5'

    ELSE '5+' END AS ExpRange,

  AVG(e.Compensation) AS AvgCompensation

FROM Employees e

JOIN Roles r ON e.RoleID = r.RoleID

GROUP BY r.RoleName,

    CASE

    WHEN e.ExperienceYears BETWEEN 0 AND 1 THEN '0–1'

    WHEN e.ExperienceYears BETWEEN 1 AND 2 THEN '1–2'

    WHEN e.ExperienceYears BETWEEN 2 AND 5 THEN '2–5'

    ELSE '5+' END;
```

---

4. Reasons for Headcount Decline (Assumptions-Based)

- Below-market compensation for certain roles/locations

- Lack of career growth (e.g., high exit in 0–2 year bracket)

- High workload or poor management in certain regions

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5. Retention Recommendations

- Benchmark compensation with market rates

- Increase pay for high-turnover roles/locations

- Add retention bonuses for 0–2 year employees

- Improve internal mobility options

Step 3: C#/.NET Application Structure

Backend (C#/.NET)

- ASP.NET MVC or WinForms/WPF

- Use Entity Framework for DB access

- Layers:

    o Data Access Layer (DAL)

    o Business Logic Layer (BLL)

    o UI Layer

Models

```
public class Employee {

    public int EmployeeID { get; set; }

    public string Name { get; set; }

    public Role Role { get; set; }

    public Location Location { get; set; }

    public decimal ExperienceYears { get; set; }

    public decimal Compensation { get; set; }

    public string Status { get; set; }

}
```

Step 1: Recommendation – Bonuses vs. Stock Units

Criteria	Bonuses (Cash)	Stock Units (Equity)
Liquidity Impact	Immediate cash outflow	No upfront cash outlay
Retention	Short-term retention, annual renewal needed	Better for long-term retention
Motivation	Clear reward tied to performance	Delayed gratification, potential market risks
P&L Impact	Hits EBITDA directly in the year paid	Usually spread over vesting years (non-cash in short term)
Admin/Complexity	Simple payout	Legal, valuation, vesting complexities

Step 2: P&L Impact Quantification (Assumptions Based on Salary Data)

Let's say we have 10 **Senior Associates** and 5 **Managers** from the data. Average salaries (hypothetical from earlier dataset):

Role	Avg Salary (INR)	Bonus %	Bonus Cost	Stock %	Annual Stock Cost (vested 3 yrs)
Senior Associate	₹1,200,000	12%	₹144,000	6%	₹24,000
Manager	₹1,500,000	15%	₹225,000	10%	₹50,000

Annual P&L Impact (Estimated):

- **Senior Associates (10 employees)**:
    - Bonus Total = ₹1,440,000
    - Stock Vesting Cost = ₹240,000
- **Managers (5 employees)**:

- o Bonus Total = ₹1,125,000

- o Stock Vesting Cost = ₹250,000

Total Annual P&L Impact =
₹1,440,000 + ₹240,000 + ₹1,125,000 + ₹250,000 = ₹3,055,000

Cash Flow Hit (Bonuses): ₹2,565,000
Non-Cash Equity Expense: ₹490,000

Step 3: Stakeholder Impact

Stakeholder	Impact
Employees	More incentivized; long-term retention improves
Finance Team	Needs to budget for bonuses; account for stock expense
HR	Needs to design performance metrics and vesting policies
Legal/Compliance	Stock units need ESOP structure, regulatory filings
Leadership/Board	Must approve and oversee execution strategy

Step 4: Execution Plan

1. **Define eligibility**: Only confirmed high-performing Senior Associates and Managers.

2. **Create performance criteria**: Linked to revenue, delivery excellence, client satisfaction.

3. **Setup bonus slabs**: Tiered structure for top 20%, next 30%, etc.

4. **Design ESOP/RSU plan**:

   - o 3–4 year vesting

   - o Yearly grant cycle

   - o Exit clauses

5. **Communicate transparently**: Explain rationale, timelines, and benefits.

6. **Track outcomes**:

   - o Retention improvements

   - o Employee satisfaction

   - o Impact on gross margin