CS 411 STAGE 3: Database Design

AI-Powered Job Recommendation and Notification System (Job-Genie)

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Below is the Data Definition Language (DDL) commands:

```
CREATE TABLE User (
  UserID INT PRIMARY KEY AUTO_INCREMENT,
  Email VARCHAR(255) UNIQUE NOT NULL,
  Name VARCHAR(255) NOT NULL,
  Resume TEXT,
  Preferences TEXT
);
CREATE TABLE Job (
  JobID INT PRIMARY KEY AUTO_INCREMENT,
  Title VARCHAR(255) NOT NULL,
  Company VARCHAR(255),
  Location VARCHAR(255),
  Salary DECIMAL(10,2),
  Description TEXT,
  Source VARCHAR(255)
);
CREATE TABLE JobMatch (
  MatchID INT PRIMARY KEY AUTO_INCREMENT,
  UserID INT NOT NULL,
  JobID INT NOT NULL,
```

```
  MatchScore DECIMAL(5,2) NOT NULL,
  Timestamp DATETIME DEFAULT CURRENT_TIMESTAMP,
  FOREIGN KEY (UserID) REFERENCES User(UserID) ON DELETE CASCADE,
  FOREIGN KEY (JobID) REFERENCES Job(JobID) ON DELETE CASCADE
);
CREATE TABLE Application (
  ApplicationID INT PRIMARY KEY AUTO_INCREMENT,
  UserID INT NOT NULL,
  JobID INT NOT NULL,
  NotificationID INT NOT NULL,
  Status VARCHAR(50) NOT NULL CHECK (Status IN ('Pending', 'Accepted', 'Rejected')),
  AppliedAt DATETIME DEFAULT CURRENT_TIMESTAMP,
  FOREIGN KEY (UserID) REFERENCES User(UserID) ON DELETE CASCADE,
  FOREIGN KEY (JobID) REFERENCES Job(JobID) ON DELETE CASCADE,
  FOREIGN KEY (NotificationID) REFERENCES Notification(NotificationID) ON DELETE
CASCADE
);
CREATE TABLE Notification (
  NotificationID INT PRIMARY KEY AUTO_INCREMENT,
  UserID INT NOT NULL,
  JobID INT NOT NULL,
  ApplicationID INT NOT NULL,
  Status VARCHAR(255) NOT NULL,
  SentAt DATETIME DEFAULT CURRENT_TIMESTAMP,
  FOREIGN KEY (UserID) REFERENCES User(UserID) ON DELETE CASCADE,
```

```
  FOREIGN KEY (JobID) REFERENCES Job(JobID) ON DELETE CASCADE,
  FOREIGN KEY (ApplicationID) REFERENCES Application(ApplicationID) ON DELETE
CASCADE
);
CREATE TABLE UserJob (
  UserID INT,
  JobID INT,
  PRIMARY KEY (UserID, JobID),
  FOREIGN KEY (UserID) REFERENCES User(UserID) ON DELETE CASCADE,
  FOREIGN KEY (JobID) REFERENCES Job(JobID) ON DELETE CASCADE
);
```

Advanced Queries and and Screenshots:

Query 1: Recent Applications (Last 45 Days)

```
SELECT
    a.ApplicationID,
    u.Name,
    j.Title,
    a.AppliedAt
FROM
    Application a
JOIN
    User u ON a.UserID = u.UserID
JOIN
    Job j ON a.JobID = j.JobID
WHERE
    a.ApplicationID IN (
        SELECT a2.ApplicationID
        FROM Application a2
        WHERE a2.AppliedAt >= NOW() - INTERVAL 45 DAY
    )
ORDER BY
    a.AppliedAt DESC;
```

```
mysql> SELECT a.ApplicationID, u.Name, j.Title, a.AppliedAt FROM Application a JOIN User u ON a.UserID = u.UserID JOIN Job j ON a.JobID = j.JobID
WHERE a.ApplicationID IN (SELECT a2.ApplicationID FROM Application a2 WHERE a2.AppliedAt >= NOW()-INTERVAL 45 DAY) ORDER BY a.ApplicationID ASC;
+---------------+----------------------+-----------------------------------------------------------------+---------------------+
| ApplicationID | Name                 | Title                                                           | AppliedAt           |
+---------------+----------------------+-----------------------------------------------------------------+---------------------+
|             1 | Cora Daly            | Business Development Associate                                  | 2025-04-10 15:56:00 |
|             2 | Tessa Calhoon        | IELTS/PTE/Spoken English Trainer                                | 2025-04-10 15:56:00 |
|             3 | Lauren Rolland       | Fashion Designer                                                | 2025-04-10 15:56:00 |
|             4 | Samuel Greene        | Corporate Sales Executive                                       | 2025-04-10 15:56:00 |
|             5 | Kenneth Jenkins      | Junior Python Developer                                         | 2025-04-10 15:56:00 |
|             6 | Paula Jones          | Social Media Manager                                            | 2025-04-10 15:56:00 |
|             7 | Theodore Easter      | Video Editor & Graphic Designer                                 | 2025-04-10 15:56:00 |
|             8 | Edward Perkins       | Business Development Executive                                  | 2025-04-10 15:56:00 |
|             9 | Gary Riley           | Sales Associate                                                 | 2025-04-10 15:56:00 |
|            10 | Devora Johnson       | Domain Specialist Company Secretary                             | 2025-04-10 15:56:00 |
|            11 | Rosalind Simmons     | Senior Tax Expert- Semi CA                                      | 2025-04-10 15:56:00 |
|            12 | John Lamboy          | Customer Success Manager                                        | 2025-04-10 15:56:00 |
|            13 | Joel Guadalupe       | Inside Sales Manager                                            | 2025-04-10 15:56:00 |
|            14 | Desiree Formella     | Data Analyst                                                    | 2025-04-10 15:56:00 |
|            15 | Trisha Walden        | Copywriter/Creative Strategist                                  | 2025-04-10 15:56:00 |
```

Query 2: Most Recent Application per User

```
SELECT
    u.UserID,
    u.Name,
    j.JobID,
    j.Title,
    a.AppliedAt
FROM
    User u
JOIN
    Application a ON u.UserID = a.UserID
JOIN
    Job j ON a.JobID = j.JobID
WHERE
    a.AppliedAt = (
        SELECT MAX(a2.AppliedAt)
        FROM Application a2
        WHERE a2.UserID = u.UserID
    );
```

```
mysql> SELECT u.UserID, u.Name, j.JobID, j.Title, a.AppliedAt FROM User u JOIN Application a ON u.UserID = a.UserID JOIN Job j ON a.JobID = j.JobI
D WHERE a.AppliedAt = (SELECT MAX(a2.AppliedAt) FROM Application a2 WHERE a2.UserID = u.UserID);
+--------+----------------------+-------+-----------------------------------------------------------------+---------------------+
| UserID | Name                 | JobID | Title                                                           | AppliedAt           |
+--------+----------------------+-------+-----------------------------------------------------------------+---------------------+
|      1 | Cora Daly            |     1 | Business Development Associate                                  | 2025-04-10 15:56:00 |
|      2 | Tessa Calhoon        |     2 | IELTS/PTE/Spoken English Trainer                                | 2025-04-10 15:56:00 |
|      3 | Lauren Rolland       |     3 | Fashion Designer                                                | 2025-04-10 15:56:00 |
|      4 | Samuel Greene        |     4 | Corporate Sales Executive                                       | 2025-04-10 15:56:00 |
|      5 | Kenneth Jenkins      |     5 | Junior Python Developer                                         | 2025-04-10 15:56:00 |
|      6 | Paula Jones          |     6 | Social Media Manager                                            | 2025-04-10 15:56:00 |
|      7 | Theodore Easter      |     7 | Video Editor & Graphic Designer                                 | 2025-04-10 15:56:00 |
|      8 | Edward Perkins       |     8 | Business Development Executive                                  | 2025-04-10 15:56:00 |
|      9 | Gary Riley           |     9 | Sales Associate                                                 | 2025-04-10 15:56:00 |
|     10 | Devora Johnson       |    10 | Domain Specialist Company Secretary                             | 2025-04-10 15:56:00 |
|     11 | Rosalind Simmons     |    11 | Senior Tax Expert- Semi CA                                      | 2025-04-10 15:56:00 |
|     12 | John Lamboy          |    12 | Customer Success Manager                                        | 2025-04-10 15:56:00 |
|     13 | Joel Guadalupe       |    13 | Inside Sales Manager                                            | 2025-04-10 15:56:00 |
|     14 | Desiree Formella     |    14 | Data Analyst                                                    | 2025-04-10 15:56:00 |
|     15 | Trisha Walden        |    15 | Copywriter/Creative Strategist                                  | 2025-04-10 15:56:00 |
```

Query 3: Users Who Applied to More Than One Job per Company

```
SELECT
    u.UserID,
    u.Name,
    j.Company,
    COUNT(DISTINCT j.JobID) AS NumJobsAtCompany
FROM
    User u
JOIN
    Application a ON u.UserID = a.UserID
JOIN
    Job j ON a.JobID = j.JobID
GROUP BY
    u.UserID, u.Name, j.Company
```

```
mysql> SELECT u.UserID, u.Name, j.Company, COUNT(DISTINCT a.JobID) AS NumJobsAtCompany FROM User u JOIN Application a ON a.UserID = u.UserID JOIN
Job j ON j.JobID = a.JobID GROUP BY u.UserID, u.Name, j.Company;
+--------+---------------------+-----------------------------------------------------------+-------------------+
| UserID | Name                | Company                                                   | NumJobsAtCompany |
+--------+---------------------+-----------------------------------------------------------+-------------------+
|      1 | Cora Daly           | Break The Code                                            |                 1 |
|      2 | Tessa Calhoon       | DePioneer Education Overseas                              |                 1 |
|      3 | Lauren Rolland      | Valkyre Clothing                                          |                 1 |
|      4 | Samuel Greene       | Kompass India Information Private Limited                  |                 1 |
|      5 | Kenneth Jenkins     | Extension Technologies Private Limited                    |                 1 |
|      6 | Paula Jones         | Brilliance Academy                                        |                 1 |
|      7 | Theodore Easter     | Brilliance Academy                                        |                 1 |
|      8 | Edward Perkins      | Physics Wallah                                            |                 1 |
|      9 | Gary Riley          | PolicyBazaar.com                                          |                 1 |
|     10 | Devora Johnson      | ClearTax                                                  |                 1 |
|     11 | Rosalind Simmons    | ClearTax                                                  |                 1 |
|     12 | John Lamboy         | ClearTax                                                  |                 1 |
|     13 | Joel Guadalupe      | ClearTax                                                  |                 1 |
|     14 | Desiree Formella    | Media.net                                                 |                 1 |
|     15 | Trisha Walden       | Hansa Cequity                                             |                 1 |
```

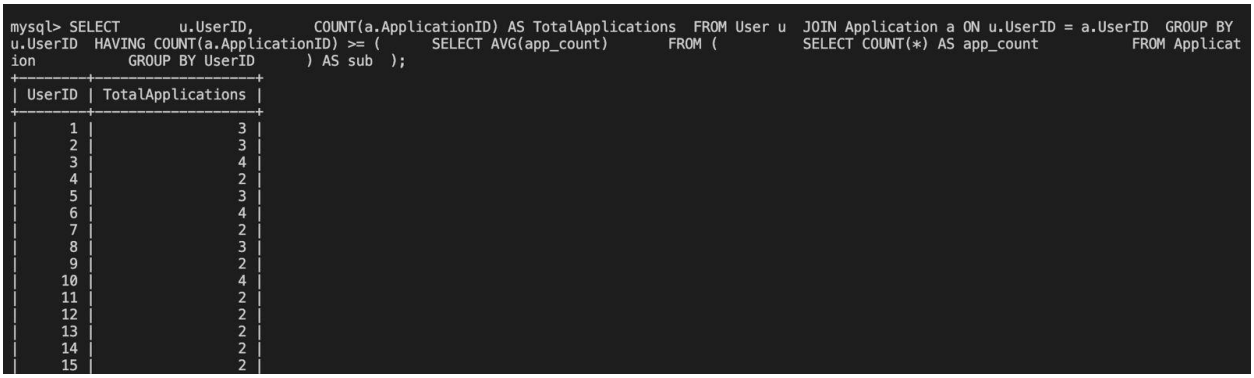
Query 4: Users Who Didn’t Apply to the Highest Salary Job

```
SELECT
    DISTINCT u.UserID,
    u.Name,
    u.Email
FROM
    User u
JOIN
    Application a ON u.UserID = a.UserID
WHERE
    u.UserID NOT IN (
        SELECT a.UserID
        FROM Application a
        JOIN Job j ON a.JobID = j.JobID
        WHERE j.Salary = (SELECT MAX(Salary) FROM Job)
    );
```

```
mysql> SELECT
    ->     DISTINCT u.UserID,
    ->     u.Name,
    ->     u.Email
    -> FROM
    ->     User u
    -> JOIN
    ->
    ->     Application a ON u.UserID = a.UserID
    -> WHERE
    ->     u.UserID NOT IN (
    ->         SELECT a.UserID
    ->         FROM Application a
    ->         JOIN Job j ON a.JobID = j.JobID
    ->         WHERE j.Salary = (SELECT MAX(Salary) FROM Job)
    ->     );
+--------+---------------------+-----------------------------------+
| UserID | Name                | Email                             |
+--------+---------------------+-----------------------------------+
|      1 | Cora Daly           | cora.daly935@gmail.com            |
|      2 | Tessa Calhoon       | tessa.calhoon850@gmail.com        |
|      3 | Lauren Rolland      | lauren.rolland628@gmail.com       |
|      4 | Samuel Greene       | samuel.greene546@gmail.com        |
|      5 | Kenneth Jenkins     | kenneth.jenkins527@gmail.com      |
|      6 | Paula Jones         | paula.jones600@gmail.com          |
|      7 | Theodore Easter     | theodore.easter311@gmail.com      |
|      8 | Edward Perkins      | edward.perkins808@gmail.com       |
|      9 | Gary Riley          | gary.riley881@gmail.com           |
|     10 | Devora Johnson      | devora.johnson698@gmail.com       |
|     11 | Rosalind Simmons    | rosalind.simmons291@gmail.com     |
|     12 | John Lamboy         | john.lamboy570@gmail.com          |
|     13 | Joel Guadalupe      | joel.guadalupe648@gmail.com       |
|     14 | Desiree Formella    | desiree.formella450@gmail.com     |
|     15 | Trisha Walden       | trisha.walden504@gmail.com        |
```

Query 5: Users with More Applications than the Average

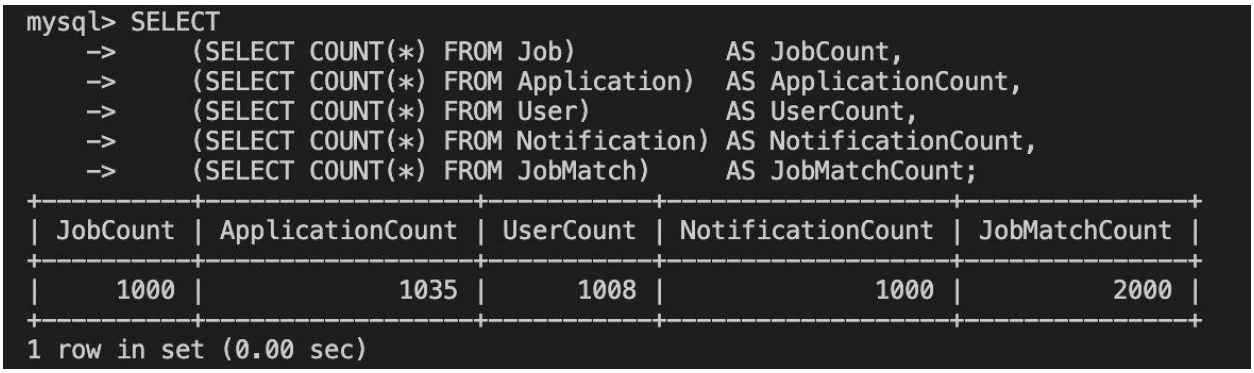
```
SELECT
    u.UserID,
    COUNT(a.ApplicationID) AS TotalApplications
FROM User u
JOIN Application a ON u.UserID = a.UserID
GROUP BY u.UserID
HAVING COUNT(a.ApplicationID) >= (
    SELECT AVG(app_count)
    FROM (
        SELECT COUNT(*) AS app_count
        FROM Application
        GROUP BY UserID
    ) AS sub
);
```



```
mysql> SELECT       u.UserID,       COUNT(a.ApplicationID) AS TotalApplications  FROM User u  JOIN Application a ON u.UserID = a.UserID  GROUP BY
u.UserID  HAVING COUNT(a.ApplicationID) >= (      SELECT AVG(app_count)       FROM (          SELECT COUNT(*) AS app_count           FROM Applicat
ion           GROUP BY UserID      ) AS sub  );
+--------+--------------------+
| UserID | TotalApplications |
+--------+--------------------+
|      1 |                  3 |
|      2 |                  3 |
|      3 |                  4 |
|      4 |                  2 |
|      5 |                  3 |
|      6 |                  4 |
|      7 |                  2 |
|      8 |                  3 |
|      9 |                  2 |
|     10 |                  4 |
|     11 |                  2 |
|     12 |                  2 |
|     13 |                  2 |
|     14 |                  2 |
|     15 |                  2 |
```

Count Query to show 1000 in 3 tables:

```
SELECT
   (SELECT COUNT(*) FROM Job)          AS JobCount,
   (SELECT COUNT(*) FROM Application)  AS ApplicationCount,
   (SELECT COUNT(*) FROM User)         AS UserCount,
   (SELECT COUNT(*) FROM Notification) AS NotificationCount,
   (SELECT COUNT(*) FROM JobMatch)     AS JobMatchCount;
```



```
mysql> SELECT
    ->     (SELECT COUNT(*) FROM Job)          AS JobCount,
    ->     (SELECT COUNT(*) FROM Application)  AS ApplicationCount,
    ->     (SELECT COUNT(*) FROM User)         AS UserCount,
    ->     (SELECT COUNT(*) FROM Notification) AS NotificationCount,
    ->     (SELECT COUNT(*) FROM JobMatch)     AS JobMatchCount;
+----------+------------------+-----------+--------------------+----------------+
| JobCount | ApplicationCount | UserCount | NotificationCount | JobMatchCount |
+----------+------------------+-----------+--------------------+----------------+
|     1000 |             1035 |      1008 |               1000 |          2000 |
+----------+------------------+-----------+--------------------+----------------+
1 row in set (0.00 sec)
```