### **Integration and Testing Documentation**

#### **Step 1: Document Data Export and Import**

**1. Exporting Data from MySQL**

* **Database Used**: mydatabase
* **Tables Exported**: Regions, Schools, Teachers, Students, Courses
* **SQL Queries for Export**:
  + **Regions**:

sql

Copy code

SELECT \* FROM Regions INTO OUTFILE '/var/lib/mysql-files/regions.csv'  
FIELDS TERMINATED BY ','   
ENCLOSED BY '"'  
LINES TERMINATED BY '\n';

* + **Schools**:

sql

Copy code

SELECT \* FROM Schools INTO OUTFILE '/var/lib/mysql-files/schools.csv'  
FIELDS TERMINATED BY ','   
ENCLOSED BY '"'  
LINES TERMINATED BY '\n';

* + **Teachers**:

sql

Copy code

SELECT \* FROM Teachers INTO OUTFILE '/var/lib/mysql-files/teachers.csv'  
FIELDS TERMINATED BY ','   
ENCLOSED BY '"'  
LINES TERMINATED BY '\n';

* + **Students**:

sql

Copy code

SELECT \* FROM Students INTO OUTFILE '/var/lib/mysql-files/students.csv'  
FIELDS TERMINATED BY ','   
ENCLOSED BY '"'  
LINES TERMINATED BY '\n';

* + **Courses**:

sql

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SELECT \* FROM Courses INTO OUTFILE '/var/lib/mysql-files/courses.csv'  
FIELDS TERMINATED BY ','   
ENCLOSED BY '"'  
LINES TERMINATED BY '\n';

* **Custom Queries Exported**:
  + **Teacher-Student Ratio**:

sql

Copy code

SELECT RegionName, COUNT(Teachers.TeacherID) AS NumberOfTeachers, SUM(NumberOfStudents) AS TotalStudents,  
 SUM(NumberOfStudents) / COUNT(Teachers.TeacherID) AS TeacherStudentRatio  
FROM Schools  
INNER JOIN Regions ON Schools.RegionID = Regions.RegionID  
INNER JOIN Teachers ON Schools.SchoolID = Teachers.SchoolID  
GROUP BY RegionName  
INTO OUTFILE '/var/lib/mysql-files/teacher\_student\_ratio.csv'  
FIELDS TERMINATED BY ','   
ENCLOSED BY '"'  
LINES TERMINATED BY '\n';

* + **Average Performance**:

sql

Copy code

SELECT RegionName, AVG(PerformanceScore) AS AveragePerformance  
FROM Students  
INNER JOIN Schools ON Students.SchoolID = Schools.SchoolID  
INNER JOIN Regions ON Schools.RegionID = Regions.RegionID  
GROUP BY RegionName  
INTO OUTFILE '/var/lib/mysql-files/average\_performance.csv'  
FIELDS TERMINATED BY ','   
ENCLOSED BY '"'  
LINES TERMINATED BY '\n';

* + **Rural Schools**:

sql

Copy code

SELECT SchoolName, InfrastructureQuality, NumberOfStudents  
FROM Schools  
INNER JOIN Regions ON Schools.RegionID = Regions.RegionID  
WHERE RegionName = 'Rural'  
INTO OUTFILE '/var/lib/mysql-files/rural\_schools.csv'  
FIELDS TERMINATED BY ','   
ENCLOSED BY '"'  
LINES TERMINATED BY '\n';

**2. Moving Exported Files**

* **File Paths**:
  + The files were initially exported to the /var/lib/mysql-files/ directory.
* **Commands Used to Move Files**:

bash

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sudo mv /var/lib/mysql-files/regions.csv /home/george/project\ queries/  
sudo mv /var/lib/mysql-files/schools.csv /home/george/project\ queries/  
sudo mv /var/lib/mysql-files/teachers.csv /home/george/project\ queries/  
sudo mv /var/lib/mysql-files/students.csv /home/george/project\ queries/  
sudo mv /var/lib/mysql-files/courses.csv /home/george/project\ queries/  
sudo mv /var/lib/mysql-files/teacher\_student\_ratio.csv /home/george/project\ queries/  
sudo mv /var/lib/mysql-files/average\_performance.csv /home/george/project\ queries/  
sudo mv /var/lib/mysql-files/rural\_schools.csv /home/george/project\ queries/

**3. Adjusting File Permissions**

* **Changing Ownership and Permissions**:
  + After moving the files, ownership and permissions were adjusted to ensure that the george user had full access:

bash

Copy code

sudo chown -R george:george /home/george/project\ queries/  
sudo chmod -R 755 /home/george/project\ queries/

**4. Importing Data into Excel**

* **Process**:
  1. **Open Excel**.
  2. **Import CSV Files**:
     + Navigate to Data -> Get Data -> From Text/CSV.
     + Import each file from /home/george/project queries/.
     + Place each file on a separate sheet within the workbook.
  3. **Name Sheets**:
     + Rename each sheet according to the data it contains (e.g., Regions, Schools, Teachers).

**5. Data Analysis in Excel**

* **Tools Used**:
  + **Pivot Tables**: Used to summarize and analyze data.
  + **Charts**: Created bar charts, pie charts, and other visualizations.
  + **Dashboard**: Combined pivot tables and charts into a single, interactive dashboard.

**6. Issues Encountered and Resolved**

* **File Permission Errors**:
  + Resolved by adjusting ownership and permissions.
* **Large File Handling**:
  + Though not directly applicable due to the small size of the files, the plan to split large files was prepared.
* **Excel Features Disabled**:
  + Ensured that Excel was not in read-only mode or protected view to enable all editing features.