**Project Title:** Game Analytics: Unlocking Tennis Data with SportRadar API

**Domain:** Sports / Data Analytics

**Skills Applied:**

* Python scripting
* API Integration (SportRadar)
* SQL Database Design & Management
* Data Analysis
* Streamlit Web Application Development

**1. Objective**

The goal of this project is to build an end-to-end data analytics application that fetches, processes, stores, and visualizes tennis event data from the SportRadar API. This helps users explore tournament structures, track player performances, and derive insights from event statistics.

**2. Business Use Cases**

* **Event Exploration:** Visualize hierarchical structure of tennis competitions (e.g., ATP Vienna).
* **Trend Analysis:** Analyze events by gender, type, and competition level.
* **Performance Insights:** Track player participation and performance in singles/doubles.
* **Decision Support:** Provide data-driven insights for organizers on scheduling and resource allocation.

**3. Project Approach**

**A. Data Extraction**

* Used the SportRadar API endpoints to fetch data on competitions, complexes, venues, and rankings.
* Transformed nested JSON into structured tabular formats using Python.

**B. Database Design**

* Created relational schemas using MySQL.
* Designed normalized tables with primary and foreign key constraints.

**C. Tables Designed**

1. **Categories Table**
2. **Competitions Table**
3. **Complexes Table**
4. **Venues Table**
5. **Competitors Table**
6. **Competitor\_Rankings Table**

**D. Data Collection**

* Parsed JSON responses into rows.
* Inserted transformed data into SQL tables using pymysql and sqlalchemy.

**4. Application Development (Streamlit)**

**A. Homepage Dashboard**

* Showed key statistics: total competitors, top points, countries represented.

**B. Search and Filter**

* Allowed users to search competitors by name or filter by rank/country.

**C. Competitor Detail Viewer**

* Displayed movement, country, rank, and points per selected competitor.

**D. Country-Wise Analysis**

* Aggregated points, number of players, and average ranking by country.

**E. Leaderboards**

* Displayed highest-ranked and top-scoring players in real time.

**5. Key Features**

* **Real-time Data Sync** using API
* **Modular Python Scripts** for each stage
* **Optimized SQL Queries** with joins and groupings
* **Interactive Streamlit UI** with filters and summaries

**6. Technologies Used**

* **Programming Language:** Python
* **API Source:** SportRadar
* **Database:** MySQL
* **Framework:** Streamlit
* **Version Control:** Git & GitHub

**7. Challenges & Solutions**

* **Unavailable API Endpoint (Rankings):** Reworked project scope to focus on working API endpoints.
* **Complex Nested JSON:** Used recursive JSON parsing and custom normalization logic.
* **Streamlit Rendering Speed:** Used pagination and caching to optimize performance.

**8. Future Enhancements**

* Integrate additional endpoints for live match data.
* Enable chart-based visualization using Plotly.
* Expand to support other sports with similar architecture.

**9. Project Outcome**

* Successfully implemented a working end-to-end project with data pipelines, database storage, and a web application.
* Deployed insights for organizers and fans through a clean UI.