**Capstone Project 3: Dashboard Development**

**Assignment Type: Individual**

**Submission Format: Report + Dashboard Files + SQL Queries**

**Due Date: 25th May 2025 23:59**

**Objective:**

The goal of this project is to develop **two** **interactive dashboard** using the **cleaned dataset and database** from **Capstone Project 2**. This dashboard should provide meaningful insights, visualizations, and an intuitive user experience. You will learn how to integrate front-end, back-end, and database elements to create a data-driven application.

**Project Guidelines:**

**Step 1: Define Dashboard Requirements**

* **Understand the end users** – Who will use the dashboard? What are their demographics?
* **Identify key metrics** – What data insights are most important?
* **Choose appropriate charts** – What types of visualizations best represent the data?
* **Story telling** – What is the story behind your dashboard?
* **Dashboard type** – What type of dashboard are you going to design to tell the story? Analytical, Operational, Strategic, Managerial (Tactical). Both dashboards need to be different types.

**Deliverable:**

* A brief **Dashboard Plan** outlining story, type of dashboard, key features, target users, and required visualizations.

**Step 2: Database Integration**

* Connect the **database from Capstone Project 2** to the dashboards.
* Optimize queries for **data retrieval**.
* Perform aggregations and filtering for dashboard performance.

**Deliverable:**

* **SQL Queries used for data retrieval and transformation.**
* **Database connection code (Python/Flask, SQLAlchemy, etc.).**

**Step 3: Dashboard Design**

* **Define the layout and UX:**
  + Widgets
  + Logical placement of charts, filters, and tables.
  + Interactive elements (dropdowns, search, date filters).
* **Tools:**
  + Python (Flask compulsory)
  + JavaScript (Chart.js, D3.js)
  + Tableau / Power BI (optional addition)

**Deliverable:**

* **N/A**

**Step 4: Develop the Dashboard**

* **Front-End:**
  + Use **HTML, CSS, JavaScript** for styling and responsiveness.
  + Implement interactive elements using **Flask, and JavaScript libraries**.
* **Back-End:**
  + Connect the database using Flask.
  + Fetch data dynamically and render it on the dashboard.

**Deliverable:**

* **2 Fully functional dashboard.**
* **Screenshots of the working dashboard.**
* **Source code files (HTML, CSS, JavaScript, Python, etc.) on GitHub link**

**Step 5: Data Visualization**

* Implement **charts, graphs, tables** to present data insights.
* Ensure **real-time data updates** if applicable.
* Optimize the dashboard for **performance and readability**.

**Deliverable:**

* **At least 4-5 meaningful visualizations per dashboard.**
* **At least 4 different quantitative visualization techniques need to be used**
* **At least 3 Qualitative Visualization Techniques Need to be Used**
* **Interactive elements such as filters and search.**

**Step 6: User Experience (UX) and Testing**

* **Test dashboard usability:**
  + Is it intuitive and user-friendly?
  + Are the charts easy to interpret?
  + Does it load efficiently?
* **Gather feedback** from users or peers.
* **Fix bugs** and improve dashboard responsiveness.

**Deliverable:**

* **List of UX considerations and improvements fully integrated into the dashboard screenshots from step 5**
* **Screenshots of dashboard functionality.**

**Submission Requirements**

Your final submission should include:

1. **Dashboard Plan (Step 1)**
2. **Database Connection & SQL Queries (Step 2)**
3. **N/A (Step 3)**
4. **Dashboard Code & Screenshots (Step 4-5)**
5. **Screenshots of Dashboard (Step 6)**

**Evaluation Criteria (Rubric)**

| **Category** | **Points** | **Description** |
| --- | --- | --- |
| Dashboard Planning | 15 | Clear identification of goals, audience, and key metrics for both dashboards. No story, no marks. Different dashboard types required. |
| Database Integration | 20 | Efficient database connection and optimized queries for two dashboards. |
| Dashboard Design & UX | 20 | Well-structured layout and intuitive user experience for both dashboards. |
| Functional Dashboard | 25 | Working dashboard with interactive elements and visualizations for both dashboards. |
| Data Visualization | 20 | Meaningful charts, graphs, and tables to represent insights for both dashboards. At least 4 quantitative. At least 3 qualitative |

**Total:** 100 points