**Formula 1 Performance Dashboard**

**Project Report**

**📘 Project Overview**

This project involved designing and developing a comprehensive Formula 1 Performance Dashboard using Power BI. The goal was to consolidate multiple historical datasets into an interactive platform to explore trends, measure performance, and uncover insights about F1 drivers, constructors, circuits, and races.

**📂 Data Sources**

Data was imported from **14 Excel files**, covering:

* **Drivers**
* **Constructors**
* **Races**
* **Lap Times**
* **Pit Stops**
* **Qualifying**
* **Sprint Results**
* **Results**
* **Driver Standings**
* **Constructor Standings**
* **Constructor Results**
* **Circuits**
* **Seasons**
* **Status Codes**

All datasets were cleaned, transformed, and connected to create a unified data model.

**🧹 Data Preparation & Modeling**

**Steps:**

* Replaced invalid placeholders (e.g., \N) with blanks or zeros.
* Converted text columns to numeric types (Position, Points, etc.).
* Standardized date and time formats.
* Defined **star schema relationships**:
  + Fact tables: Results, Lap Times, Pit Stops.
  + Dimension tables: Drivers, Constructors, Circuits, Status.
* Cross-filtering set to maintain consistent aggregation.
* Created **DAX measures** for core metrics.

**🖥️ Dashboard Design**

The report was structured into **5 thematic pages:**

**🟩 1️⃣ Season Overview**

**Visuals:**

* KPI Cards (Total Races, Constructors, Circuits, Drivers)
* Donut Chart (Race Outcomes by Status)
* Column Chart (Races by Year)
* Year Slicer

**Findings:**

* ~67% of races ended with drivers classified as “Finished.”
* The number of races per season has grown steadily over time.

**🟦 2️⃣ Driver Performance**

**Visuals:**

* Bar Charts (Total Points & Wins by Driver)
* Table (Driver Standings)
* Fastest Lap KPI
* Driver Slicer

**Findings:**

* Top drivers consistently scored the highest points and wins.
* Qualifying position often correlated with race success.

**🟥 3️⃣ Constructor Insights**

**Visuals:**

* Column Chart (Constructor Points Over Time)
* Table (Constructor Standings)
* Table (Constructor Race Results)
* Constructor Slicer

**Findings:**

* Constructors like McLaren and Ferrari led in cumulative points.
* Smaller teams frequently scored no points across seasons.

**🟨 4️⃣ Race Outcomes & Status**

**Visuals:**

* Stacked Column Chart (Status by Year)
* Table (Race Results with Status)
* Year and Status Slicers

**Findings:**

* Mechanical failures (engine, gearbox) were frequent causes of DNFs.
* Certain circuits had higher rates of accidents and retirements.

**🟧 5️⃣ Pit Stops & Lap Times**

**Visuals:**

* Bar Chart (Average Pit Stop Duration per Driver)
* Line Chart (Lap Times over Laps)
* Table (Pit Stop Details)

**Findings:**

* Consistent pit stop timing (~23–27 seconds) was key to competitiveness.
* Fastest laps were usually recorded mid-race.

**🎨 Design & Usability**

* Branded theme inspired by F1 colors (yellow/black).
* Consistent font and spacing.
* Snap-to-grid alignment for clean export.
* Dropdown slicers to reduce clutter.
* Custom tooltips and drill through pages for detailed views.

**💡 Key Findings**

* **Performance Concentration:** A small number of drivers and constructors dominated points and wins.
* **Technical Failures:** Engine and gearbox issues were major contributors to retirements.
* **Qualifying Impact:** Strong qualifying often predicted race success.
* **Growing Calendar:** The F1 calendar has steadily expanded.

**🛠️ Advanced Features Applied**

* **Star Schema Modeling**
* **Custom DAX Measures** (CALCULATE, ALLEXCEPT, RANKX, DIVIDE)
* **Time Intelligence**
* **Sync Slicers**
* **Drill through Pages**
* **Bookmarks for Navigation**
* **Conditional Formatting**
* **Custom Tooltips**
* **Custom Visuals (Chiclet Slicer, Map)**
* **Performance Optimization (query folding, summarization)**
* **Export Layout Optimization**