**WideWorldImporters**

**Data Analysis Project**

**Prepared by:**

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**Tools Used:** SQL Server, Power BI, Python, Excel

**1️⃣ Project Planning & Management**

**Project Proposal**

Our team will conduct a comprehensive analysis using the **WideWorldImporters** database. This project will focus on **Sales, HR, Supply Chain, and Marketing** using **SQL Server, Power BI, Python, and Excel** to generate valuable business insights.

**Project Plan**

**📅 Timeline Breakdown (2 Months Plan)**

| **Week** | **Tasks** |
| --- | --- |
| **Week 1** | Database understanding, task assignments, planning. |
| **Week 2** | SQL queries for data extraction, initial cleaning. |
| **Week 3** | Exploratory Data Analysis (EDA) – Finding trends. |
| **Week 4** | Power BI dashboard creation. |
| **Week 5** | Refining insights, testing dashboard usability. |
| **Week 6** | Documentation drafting. |
| **Week 7** | Final reporting, business recommendations. |
| **Week 8** | Presentation preparation, submission. |

**Task Assignments & Roles**

| **Team Member** | **Responsibility** |
| --- | --- |
| **AbdelRahman AbdelMoez Anwar** | Data Visualization (Power BI) & Business Insights |
| **Fatma Ali Khaled** | Data Cleaning & Processing (Python, Excel) |
| **Youssef Mohamed Farag** | SQL Queries for Data Extraction |
| **Noha Soliman Mohamed** | Documentation & Presentation |

**Risk Assessment & Mitigation**

* **Data Integrity Issues** → Use **Python (Pandas) & SQL** for cleaning.
* **Time Constraints** → Plan tasks efficiently to meet deadlines.
* **Visualization Complexity** → Ensure dashboards focus on **KPIs & trends** for clarity.

**KPIs for Success**

* **Sales:** Revenue growth, best-selling products, customer retention rate.
* **HR:** Employee turnover, performance analysis.
* **Supply Chain:** Inventory turnover, supplier efficiency.
* **Marketing:** Campaign effectiveness, customer acquisition cost.

**2️⃣ Literature Review**

**Feedback & Evaluation**

* Lecturer’s assessment of the project, identifying strengths and areas for improvement.

**Suggested Improvements**

* Enhancements in data analysis techniques, additional insights, and optimization.

**Final Grading Criteria**

* **Documentation:** Clear and structured reporting.
* **Implementation:** Effective use of SQL, Python, and Power BI.
* **Testing:** Data accuracy and visualization effectiveness.
* **Presentation:** Delivery of findings and storytelling clarity.

**3️⃣ Requirements Gathering**

**Stakeholder Analysis**

We focus on **sales managers, HR specialists, supply chain teams, and marketing executives**, ensuring that our analysis aligns with their needs.

**User Stories & Use Cases**

* *“As a Sales Manager, I want to see revenue trends by region to optimize product distribution.”*
* *“As an HR Manager, I need to track employee turnover trends to reduce hiring costs.”*

**Functional & Non-Functional Requirements**

* **Functional:**
  + SQL-based data extraction
  + Power BI dashboarding
  + Python-powered data cleaning
* **Non-Functional:**
  + Fast report generation
  + Secure data access

**4️⃣ System Analysis & Design**

**Problem Statement & Objectives**

We aim to answer critical business questions:

* **Sales:** What products generate the most revenue?
* **HR:** What factors contribute to high employee turnover?
* **Supply Chain:** Which suppliers are most reliable?
* **Marketing:** What campaigns drive the highest ROI?

**Database Structure & Schema Overview**

The **WideWorldImporters** database includes key schemas:

* **Sales:** Orders, customers, transactions.
* **Application:** System-wide settings and user information.
* **Purchasing:** Suppliers, purchase orders.
* **Warehouse:** Inventory, stock movements.

**Data Flow & Process**

1. Extract raw data using **SQL Server**.
2. Clean and preprocess data with **Python (Pandas)**.
3. Visualize insights using **Power BI** and **Excel Reports**.

**Entity-Relationship Diagram (ERD)**

* **Sales:** Customers ↔ Orders ↔ Products
* **HR:** Employees ↔ Departments ↔ Salaries
* **Supply Chain:** Suppliers ↔ Inventory ↔ Warehouse

**5️⃣ Data Cleaning & Preprocessing**

**Handling Data Issues**

* **Missing Data:** Use **Pandas & SQL** to fill gaps with averages or interpolations.
* **Duplicate Entries:** Remove using **SQL DISTINCT** and **Pandas drop\_duplicates()**.
* **Data Formatting:** Standardize dates, currency conversions.

**6️⃣ Data Analysis & Insights**

**Sales Analysis**

* **Top 5 Best-Selling Products**
* **Sales Revenue Trends (Monthly, Yearly)**
* **Customer Retention Rate by Region**

**HR Analysis**

* **Employee Turnover Rate**
* **Department-wise Salary Distribution**
* **Performance vs. Retention Trends**

**Supply Chain Analysis**

* **Supplier Reliability Score**
* **Inventory Turnover by Product Category**
* **Delivery Time Analysis**

**Marketing Analysis**

* **Campaign Performance (CTR, ROI, Conversions)**
* **Customer Segmentation Based on Purchases**

**7️⃣ Data Visualization & Reporting**

* **Power BI Dashboards:** Interactive charts with filters (date, category, region).
* **Excel Reports:** Pivot tables for detailed analysis.

**8️⃣ System Deployment & Integration**

**Technology Stack**

* **SQL Server:** Backend database.
* **Python (Pandas, Matplotlib, Seaborn):** Data cleaning, statistical analysis.
* **Power BI:** Dashboarding.
* **Excel:** Pivot tables, automated reporting.

**Deployment Plan**

* Schedule **automated SQL queries** to refresh data.
* Publish **Power BI dashboards** for end-user access.

**9️⃣ Additional Deliverables**

* **Testing:** Query performance, dashboard usability checks.
* **Final Report:** Executive summary, key findings, recommendations.
* **Presentation:** Stakeholder-friendly storytelling with visual insights.