



Low Level Design Document

Introduction

This Low Level Design (LLD) document outlines the implementation details for **EduDash - Student Performance KPI Dashboard**. The project aims to deliver a Power BI dashboard visualizing key student performance indicators such as average grades, attendance rates, and subject-wise trends, with interactive filters and conditional formatting for actionable insights.

1. System Components

Component	Description	Key Responsibilities
Data Source	Student performance data (CSV/DB/Excel)	Store and provide raw data
Data Ingestion	Power BI Dataflow/Query	Import, clean, and transform data
Data Model	Power BI Data Model (Tables, Relationships)	Structure data for analysis
Visualization Layer	Power BI Reports/Dashboards	Display KPIs, trends, and filters
User Interaction	Power BI Filters/Slicers	Enable user-driven data exploration

2. Class/Interface Overview

Class/Interface	Description	Key Methods/Attributes
DataSource	Abstracts data input	<code>connect()</code> , <code>fetchData()</code>
DataTransformer	Cleans/transforms raw data	<code>cleanData()</code> , <code>calculateKPIs()</code>
KPIVisual	Renders KPI visuals	<code>render()</code> , <code>applyConditionalFormat()</code>
FilterControl	Manages user filters	<code>applyFilter()</code> , <code>resetFilter()</code>

Relationships:

- `DataSource` → `DataTransformer` → `KPIVisual`
- `FilterControl` interacts with `KPIVisual`

3. Data Structure Overview

Table/Model	Fields	Description
Students	StudentID, Name, Class, ...	Student master data
Subjects	SubjectID, Name	Subject master data
Grades	StudentID, SubjectID, Grade, Date	Student grades per subject
Attendance	StudentID, Date, Status (Present/Absent)	Daily attendance records



4. Algorithms/Logic

KPI Calculation Pseudocode:

```
For each student:
    avg_grade = AVG(Grades.Grade WHERE StudentID = student)
    attendance_rate = COUNT(Attendance.Status == 'Present') / TOTAL_DAYS
For each subject:
    subject_avg = AVG(Grades.Grade WHERE SubjectID = subject)
```

Conditional Formatting:

- If `avg_grade < threshold` , highlight in red
- If `attendance_rate < threshold` , highlight in orange

Filter Logic:

- On filter change, update visuals to reflect selected class/subject/date range
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5. Error Handling

Scenario	Handling Approach
Data source unavailable	Show error message, retry option
Data format mismatch	Log error, skip invalid records
No data for selected filter	Display “No data available” message
Calculation errors (e.g., div/0)	Default to zero or show warning

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