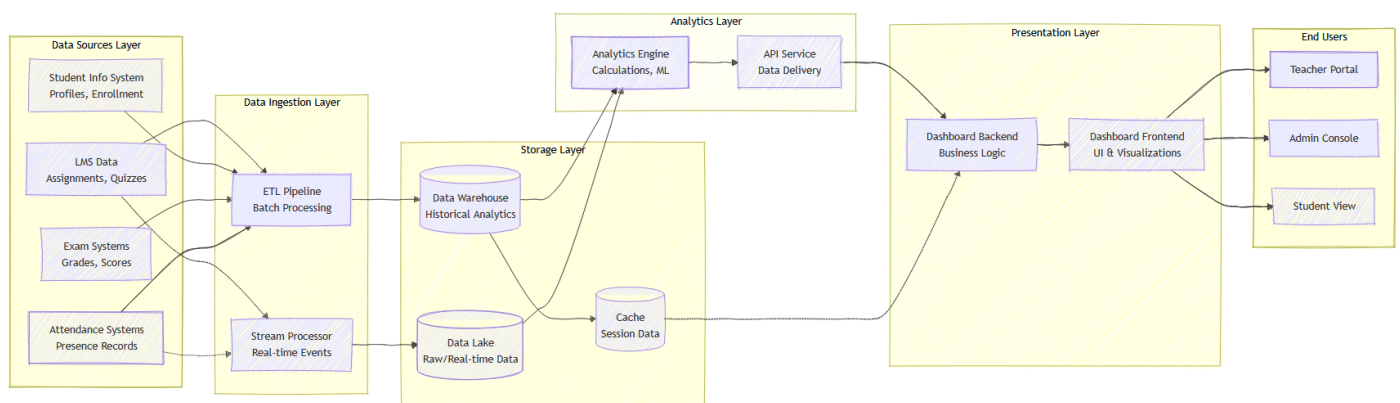# Assignment 1

1. Identify the components of a dashboard system used in PSU or any organization.

   - A dashboard system consists of various components, and in an organization, in this example, Pangasinan State University, consists of the following possible components:

     ‣ **Data Sources**, from databases or spreadsheets

     ‣ **ETL Process** (Extract, Transform, Load), these are the tools and workflows to gather, clean, and prepare data.

     ‣ **Data Warehouse** or **Data Lake**, this is a centralized storage for structured or unstructured data.

     ‣ **Analytics software/programs**, processing layer for calculations, aggregations, and data modeling.

     ‣ **Visualization Layer**, these are the Charts, graphs, tables, and KPIs displayed to the user.

     ‣ **Dashboard Interface**, interactive UI where users can view and interact with data.

     ‣ **User Management & Security**, Authentication, authorization, and role-based access control.

2. Sketch a simple dashboard system architecture for student performance analytics.

3. What challenges might arise when implementing a real-time dashboard system?

   - When implementing a real-time dashboard, the main challenges that we need to address are:

     1. **Data Quality & Performance**: Ensuring data consistency while managing latency to avoid overload or gaps, and designing for scalability under high query loads.

     2. **Integration & Security**: Connecting separate systems reliably and protecting sensitive data within cost-effective infrastructure.