Boeing Open EdX Project A

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Introduction

Problem Statement

Problems we seeked to solve through this project:

- Canvas is great, but what if we could use an open source course management systems instead?
- How can we help instructors to better understand student performance in their courses?

We solved these problems by:

- Creating a course in Open EdX to demonstrate the usability of this open source platform compared to Canvas
- Developed a data analytics application integrated into the Open EdX Studio that allows instructors to view student performance from an analytical perspective

System Design

Open EdX Course

- Open-source platform that can be customized and modified to fit the unique needs of each institution or organization.
- Used Docker Compose and Tutor to construct the course.
- Created 4 weeks content of a Canvas course includings lectures, assignments, quizzes and other materials.
- The core layer of the system is edX-platform, which holds the LMS, and the course authoring application studio.

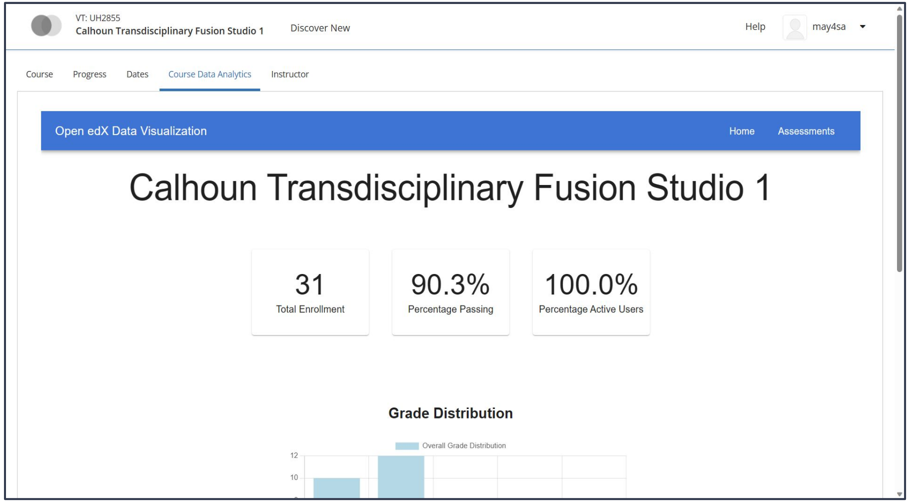
Data Pipeline

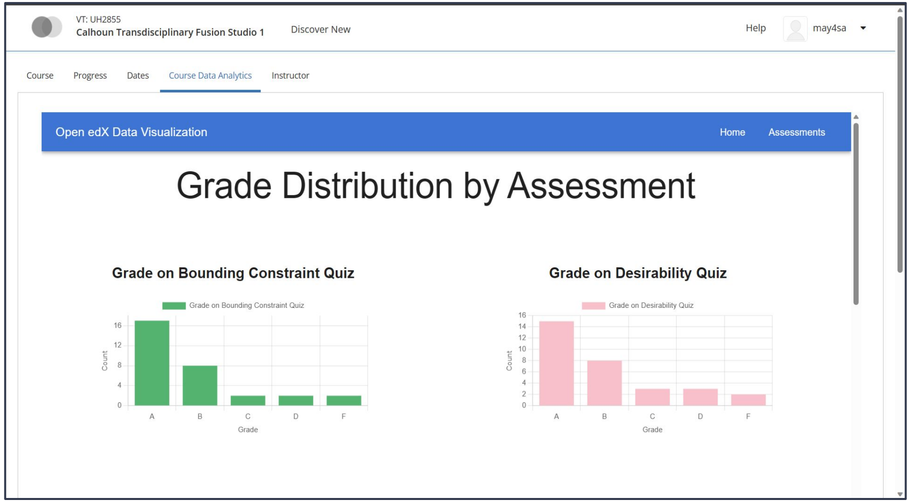
- Written in Python
- Pipeline uses the Tutor plugin framework
- Runs in a sibling container within the Tutor Docker Compose application
- Queries the MySQL database for usernames, email addresses, and grades
- Queries the MongoDB database to match grades with quizzes
- Data is exported as JSON file
- Available via a Python HTTP server

Data Analytics UI

- Processes the data output from the pipeline in the form of a dashboard
  - Shares this data throughout the application
  - Organized into components
- Provides useful information to instructor
  - Visualizations
  - Statistics
  - Analytics
- Used to employ data-driven decisions

Data Analytics UI Course Integration





Technologies Used

Tutor and Docker

- Tutor - the official Open edX distribution
    - Free and open-sourced
    - Customizable and extensible
    - Can be used for local development and production
    - Easy to deploy and scale
    - Dockerized installation process
- Docker - open source containerization
    - Provides consistency across various development environments
    - Offers many deployment options
    - Easily replicated and scalable
    - Offers an extra layer of security on top of underlying host systems

Front-End Technologies

- React Framework
  - Flexible and more efficient for an interactive UI
- Chart.js Library for visualizations
  - Provides pre-built chart objects
  - Many customization options
  - Easy integration with react (pre-built components)
- Redux for managing state
  - Data from pipeline maintained and updated across the application
  - Multiple components can share it
- Material-UI Library for cohesive styling

Demo

Thank you!