Documentation

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# Work Division

Reese: Main Code

Brian: Group Manager / UI Code / Documentation

Connor: Documentation / Design / GUI Code

Armando: Edits to Main Class

# Future Development

Future development would center around the need for the following:

* **Refinement of Component Responsibilities** - The UserInterface and Manager classes should have better division of behavior. The Manager should focus on data manipulation but have no display functions. This would not include any debug code that might be used for development to display values along the way – but this code should also be removed before release. This would leave the UserInferface class to display information based on a request sent to the manager.
* **Graphical User Interface Development** – Connor has started our next iteration of the user interface. The next iteration includes the development hopes to improve accessibility for a wider range of users. The initial design aims to replicate the functionality of the existing command-line interface. Subsequent releases will likely prioritize further enhancements and updates to the graphical user interface. It would also be beneficial to separate the GUI into several classes who interact with each other rather than one large class for ease of understanding and use.
* **Persistent Data Storage** – Implementing persistent data storage is a fundamental requirement for the application to effectively manage academic information. We are considering the following approaches:
  + - **JSON Database File** – One potential solution involves updating the application's shutdown process to export all current data into a JSON file. Upon startup, the application would then read and load this data. Or this could also be access by each mutator and accessor method to edit the file as it happens which would limit the amount of exporting at shutdown time.
    - **Database Integration** – An alternative approach involves integrating a database system (e.g., mySQL) to manage persistent data. This would require modifying existing functions, to interact directly with the database for data retrieval and modification. This service would also need to be run with or before our application has started.
* **Application Configuration** – As the application evolves, a dedicated configuration file will be essential for managing various settings related to data import/export and internal application behavior.
* **Software Testing** - A critical aspect of future development will be the implementation of comprehensive software testing procedures to ensure the reliability and stability of the application. This will encompass Unit, Integration, and System level testing.

# OOP Explanation

**Polymorphism**: Student and Instructor both have inherited methods of the same name, but are overridden and behave differently.

**Encapsulation**: Frequent use of setters and getters that interact with private variables and public methods to hide the variables from outside sources.

**Inheritance**: Student and Instructor classes both inherit the Person class and it’s members.

**Abstraction**: There is complexity abstraction from the user with the console user interface and the graphic user interface. The class Person is also abstract.

# TODO: Data Structures Justification

Justify use of data structures (ArrayList)

# Output Examples

## Console User Interface

Start Screen:

A screen shot of a computer

AI-generated content may be incorrect.

Student Path Example: A screenshot of a computer program

AI-generated content may be incorrect.

Instructor Path Example (inc. invalid input):  
A screenshot of a computer program

AI-generated content may be incorrect.

## Graphic User Interface (GUI)

Login Menu:

A screenshot of a computer screen

AI-generated content may be incorrect.

Student Login:

A screenshot of a computer screen

AI-generated content may be incorrect.

Student Menu:

A screenshot of a computer

AI-generated content may be incorrect.

Instructor Menu:

A screenshot of a computer

AI-generated content may be incorrect.

# TODO: Class Designs

## Person

Basic person class to be utilized by Instructor and Student.

|  |  |
| --- | --- |
| **Variable** | **Purpose** |
| private String name  private String email | Private variables |

|  |  |
| --- | --- |
| **Method or Constructor** | **Purpose** |
| public Person(String name, String email) | Constructor |
| public void setName(String name)  public void setEmail(String email) | Setters |
| public String getName()  public String getEmail() | Getters |
| public printDetails() | Print to Console |

## Instructor extends Person

Inherits basic Person class and handles/stores instructors.

|  |  |
| --- | --- |
| **Variable** | **Purpose** |
| private String courseName | Private variable |

|  |  |
| --- | --- |
| **Method or Constructor** | **Purpose** |
| public Instructor(String name, String email, String courseName) | Constructor |
| public String setCourseName(String courseName) | Setter |
| public String getCourseName() | Getter |
| public void printDetails() | Print to Console |

## Student extends Person

Inherits basic Person class and handles/stores students.

|  |  |
| --- | --- |
| **Variable** | **Purpose** |
| private String studentID | Private variable |
| private ArrayList assignments | Hold student’s assignments |

|  |  |
| --- | --- |
| **Method or Constructor** | **Purpose** |
| public Student(String name, String email, String studentID) | Constructor |
| public void setID(String studentID)  public void addAssignment(String assignmentName, int score, int maxScore) | Setter / Mutator |
| public String getID()  public ArrayList getAssignmnets()  public Assignment getAssignment(String assignmentName) | Getters |
| public void printDetails() | Print to Console |

## Grade

Calculates and stores students’ grades.

|  |  |
| --- | --- |
| **Variable** | **Purpose** |
| private int grade | Private variables |

|  |  |
| --- | --- |
| **Method or Constructor** | **Purpose** |
| public void setGrade(int grade) | Setters |
| public int getGrade()  public String getLetterGrade(Arraylist assignments)  public void getClassGrades() | Getters |

## Course

For handling and storing course information.

|  |  |
| --- | --- |
| **Variable** | **Purpose** |
| private String courseName  private String roomNumber  private String meetTime  private String instructor  priate String schedule  private ArrayList roster | Private variables |

|  |  |
| --- | --- |
| **Method or Constructor** | **Purpose** |
| public Course(String courseName, String roomNumber, String meetTime, String instructor, String schedule) | Constructor |
| public void setCourseName(String courseName)  public void setRoomNumber(String roomNumber)  public void setMeetTime(String meetTime) public void setInstructor(String instructor)  public void setSchedule(String schedule)  public void setRoster(ArrayList roster)  public void addStudent(Student student) | Setters |
| public String getCourseName()  public String getRoomNumber()  public String getMeetTime()  public String getInstructor()  public String getSchedule()  public ArrayList getRoster() | Getters |
| public void printStudentRoster()  public void printDetails() | Print to console |

## Assignment

For handling and storing assignment information.

|  |  |
| --- | --- |
| **Variable** | **Purpose** |
| private String assignmentName  private int score  private int maxScore | Private variables |

|  |  |
| --- | --- |
| **Method or Constructor** | **Purpose** |
| public Assignment(String assignmentName, int score, int maxScore) | Constructor |
| public void setAssignmentName(String assignmentName)  public void setScore(int score) | Setters |
| public String getAssignmentName()  public int getMaxScore()  public int getScore() | Getters |
| public void printDetails() | Print to console |

## Manager

For handling interaction between classes and storing objects.

|  |  |
| --- | --- |
| **Variable** | **Purpose** |
| private ArrayList students  private ArrayList instructors  private ArrayList courses  private Random random | Private variables |

|  |  |
| --- | --- |
| **Method or Constructor** | **Purpose** |
| public void addStudent(String email, String name, String studentID)  public void getStudentGrade(String studentID)  public ArrayList getStudentIDs()  public void enrollStudent(String studentID, String courseName)  public Student getStudent(String studentID) | Manage Students |
| public void addInstructor(String email, String name, String courseName)  public Instructor getInstructor(String name) | Manage Instructors |
| public void addCourse(String courseName, String roomNumber, String meetTime, String instructor, String schedule)  public Course getCourse(String name) | Manage Courses |
| public void addAssignment(String courseName, String assignmentName, int maxScore) | Manage Assignments |
| public String getExportFolder()  public String getExportFilename()  public String getInstructorExportFilePath()  public String getStuExportFilePath(Student student)  public void exportInstructorData(Instructor instructor)  public void exportStudentData(Student student) | Manage Exporting |
| public void printStudents()  public void printStudentIDs()  public void printInstructors()  public void printInstructorNames()  public void printCourses()  public void printCourseNames() | Print to Console |

## User Interface (Console)

Interact with the user via the console and the program via manager.

|  |  |
| --- | --- |
| **Variable** | **Purpose** |
| private Manager manager  private Scanner scanner | Private variables |

|  |  |
| --- | --- |
| **Method or Constructor** | **Purpose** |
| public UserInterface(Manager manager) | Constructor |
| public void startApp()  private void printWelcomeMessage()  private void printLoginScreen()  private void printGoodbyeMessage() | Startup / Exit |
| private void printInstructorMenu()  private void instructorMainMenuLoop()  private void manageInstructorsMenu()  private void manageInstructors() | Instructor |
| private void printStudentMenu()  private void studentMainMenuLoop(Student student)  private void manageStudentsMenu()  private void manageStudents()  private void gradeSummary(Student student)  private void changeStudentName(Student student)  private void changeStudentEmail(Student student) | Student |
| private void manageAssignmentsMenu()  private void manageAssignments() | Assignment |
| private void manageCoursesMenu()  private void manageCourses() | Courses |
| private void exportInstructorData()  private void exportStudentData(Student student) | Exporting |
| private int readIntInput(String prompt)  private String readStringInput(String prompt)  private void waitForEnter() | Utility |

## TODO: GUI (Graphic User Interface)

Interact with the user via a GUI and the program via manager.

|  |  |
| --- | --- |
| **Variable** | **Purpose** |
| private int grade | Private variables |

|  |  |
| --- | --- |
| **Method or Constructor** | **Purpose** |
|  | Setters |
|  | Getters |