Note: Name your project as "**Your_Last_name Final Project**." You will submit the project before the first day of final presentation.

1. Assume you have completed all the homework problem sets up to this point. You should already have most of the following classes:
    a. **Name** class:
        i. firstName: String
        ii. lastName: String

    b. **Person** abstract super class:
        i. name: Name
        ii. id: String, unique

    c. **Student** subclass:
        i. gpa: double
        ii. major: String

    d. Instructor subclass:
        i. rank: String (Instructor, Assistant Professor, Associate Professor, Professor)
        ii. salary: double

    e. **PersonBag** class:
        i. personArr: **Person[]**
        ii. nElems: int
        iii. public void insert(Person person)
        iv. public Person search(Predicate predicate)
        v. public Person delete(Predicate predicate)

    f. **Textbook** class:
        i. title: String
        ii. isbn: String
        iii. author: Name
        iv. price: double

    g. **TextbookBag** class:
        i. bookArr: **Textbook[]**
        ii. nElems: int
        iii. insert (Textbook textbook)
        iv. search(Predicate predicate)
        v. delete(Predicate predicate)

    h. **Utilities** class

i. emitName(String firstNameFileName, String lastNameFileName): read the two text files using the Scanner class and return a Name object consisting of a random first name and a random last name from the two files.
ii. emitTitleAndIsbn(String titleFileName, String isbnFileName): read the two text files using the Scanner class. Since each title in the title file matches the isbn at the same location in the isbn file, the method should return a two dimensional array that contains all the matching titles and isbn pairs.
iii. emitPrice(): to return a random price between 0.00 and 200.00.
iv. public static Textbook[] importBooks(String firstNameFileName, String lastNameFileName, String titleFileName, String isbnFileName): This method will read **all** the information from the four files and use the aforementioned methods in the same class to import all the textbooks into the TextbookBag.
v. public Student[] importStudents(String firstNameFileName, String lastNameFileName, String majorFileName): return an array of 1000 Student objects based on the three text files and random GPA between 0.0 and 4.0.
vi. public Instructor[] importInstructors(String firstNameFileName, String lastNameFileName, String rankFileName): return an array of 500 Instructor objects based on the three text files and random salary between 10,000.00 and 100,000.00.
vii. public void loadPerson(Student[] studentArr, Instructor[] instructorArr): loads the 1000 Student objects and 500 Instructor objects into a PersonBag.

2. Implement GUI to work with the classes listed above.

3. When the program starts the very first time, all the **Textbook** objects and **Person** objects, including both **Student** (1000) and **Instructor** (500) objects, should be loaded into the **TextbookBag** and **PersonBag**, respectively, by using the corresponding methods in the **Utilities** class.

4. Once these objects are in the bags, the bags must be saved onto the hard drive as "Textbooks.dat" and "Persons.dat" files in a separate **Data** folder under your project folder. From this point on, no such large-scale imports will be used again.

5. The GUI will also allow a user to insert, search, remove, and update textbooks, students, and instructors.

6. Data Persistence should be implemented. This means your project should be able to backup the two bags whenever there are changes to them and restore the two bags whenever the program restarts.