Lab 4: Enhanced Bookstore System Simulation (with Real Data)

# Objective:

Students will create an enhanced bookstore system with a class hierarchy that utilizes principles of object-oriented programming (OOP) such as inheritance, interfaces, and encapsulation. Students will implement custom validation for constructor arguments and make appropriate use of `.equals()`, `.compareTo()`, and interfaces like `Printable` and `Reversible`. Use the best practices that we learn in class. Work with a partner.

# Class (C) and Interface (I) Descriptions

## Date (C)

Data Members:  
- Follows the implementation from Lab 1.  
Implements:  
- Printable

## Name (C)

Data Members:  
- first: String, not null, not blank, less than 50 characters.  
- last: String, not null, not blank, less than 50 characters.  
Methods:  
- Printable: Implements the `display()` method to print the full name.

## Person (C)

Data Members:  
- dateOfBirth: Date, not null.  
- dateOfDeath: Date, nullable (optional for living persons).  
- name: Name, not null.  
Implements:  
- Comparable: Older people are "larger."  
- Printable: Prints all attributes.  
- Reversible: Prints the full name backward.

## Author (C)

Extends Person.

Data Members:

- Genre (e.g. "Horror"): not null, not blank, less than 30 characters   
  
Methods:  
- Inherits methods from `Person`.  
Implements:  
- Printable: Prints the author's information.

## Book (C)

Data Members:  
- title: String, not null, not blank, less than 100 characters.  
- yearPublished: int, must be between year 1 and the current year.  
- author: Author, not null.  
Implements:  
- Comparable: Older books are "larger."  
- Printable: Prints the title, year, and author.  
- Reversible: Prints the title backward.

## Biography (C)

Extends Book.  
Data Members:  
- subject: Person, not null.  
Overrides:  
- `.equals()`: Two biographies are equal if they are about the same subject.  
Implements:  
- Printable: Prints all attributes including the subject.

## Autobiography (C)

Extends Biography.  
Behavior:  
- The `subject` is automatically set to the `author`.  
Implements:  
- Printable: Prints the book and author's information.

## Printable (I)

Methods:  
- `display()`: Prints every instance variable (including those in parent classes) in a sentence.

## Reversible (I)

Methods:  
- backward(): Prints the name/title backward.

# Main Method Instructions (Use the actual data shown below)

1. \*\*Create Five Books\*\*:  
- Ensure each book has a unique title, author, and publication year.  
- Authors must be instances of `Author` class.  
  
2. \*\*Create Five Biographies\*\*:  
- Each biography should be about a unique person.  
- The subject should be a `Person` object.  
  
3. \*\*Create Five Autobiographies\*\*:  
- Automatically set the `subject` to the `author` for each autobiography.  
  
4. \*\*Comparisons & Printing\*\*:  
- Perform comparisons using `.equals()` and `.compareTo()`. Examples:  
 - Compare books by publication year.  
 - Compare authors by birthdate.  
 - Compare biographies by subjects.  
- Use the `Printable` interface to print details for each object.  
- Use the `Reversible` interface to print the book titles and author names backward.  
- Print the results of all comparisons and outputs from interfaces.

# Real-World Examples for Main Method

## Five of the Greatest Books:

Title: 1984  
Year Published: 1949  
Author: George Orwell

Title: To Kill a Mockingbird  
Year Published: 1960  
Author: Harper Lee

Title: Pride and Prejudice  
Year Published: 1813  
Author: Jane Austen

Title: The Great Gatsby  
Year Published: 1925  
Author: F. Scott Fitzgerald

Title: Moby-Dick  
Year Published: 1851  
Author: Herman Melville

## Five of the Greatest Biographies:

Title: The Power Broker  
Year Published: 1974  
Author: Robert Caro  
Subject: Robert Moses

Title: Steve Jobs  
Year Published: 2011  
Author: Walter Isaacson  
Subject: Steve Jobs

Title: Churchill: A Life  
Year Published: 1991  
Author: Martin Gilbert  
Subject: Winston Churchill

Title: Alexander Hamilton  
Year Published: 2004  
Author: Ron Chernow  
Subject: Alexander Hamilton

Title: Einstein: His Life and Universe  
Year Published: 2007  
Author: Walter Isaacson  
Subject: Albert Einstein

## Five of the Greatest Autobiographies:

Title: The Diary of a Young Girl  
Year Published: 1947  
Author: Anne Frank  
Subject: Anne Frank

Title: Long Walk to Freedom  
Year Published: 1994  
Author: Nelson Mandela  
Subject: Nelson Mandela

Title: The Story of My Experiments with Truth  
Year Published: 1927  
Author: Mahatma Gandhi  
Subject: Mahatma Gandhi

Title: I Know Why the Caged Bird Sings  
Year Published: 1969  
Author: Maya Angelou  
Subject: Maya Angelou

Title: Autobiography of Malcolm X  
Year Published: 1965  
Author: Malcolm X   
Subject: Malcolm X