

CSE 112 1. Midterm

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I. QUESTION (26 POINTS)

Design a class named `LibraryCard` to represent a library card owned by a student. All fields will be private. All methods will be public. The class contains:

- (2 points) A string data field named **owner** that specify the owner of the card.
- (2 points) An integer data field named **borrowCount** that specify the number of books the student has borrowed.
- (2 points) A no-arg constructor that sets the `borrowCount` to 0.
- (4 points) One argument constructor **`LibraryCard(String newOwner)`**.
- (2 points) A method named **`void borrowBooks(int numOfBooks)`** where exactly `numOfBooks` books are borrowed.
- (4 points) A method named **`void borrowRandomBooks(int maxBooks)`** where a random amount of books between 1 and `maxBooks` are borrowed.
- (4 points) A method named **`void returnBooks(int numOfBooks)`** where exactly `numOfBooks` books are returned. Write also safety check code.
- (2 points) A method named **`void printBooks()`** which prints the number of books the student has borrowed.
- (4 points) Two accessor methods for the two fields **owner** and **borrowCount**.

II. QUESTION (18 POINTS)

Declare a test class `TestLibraryCard` to do the following:

- (6 points) Declare three `LibraryCards` one owned by no one, the other owned by Deniz, and the last one owned by Olcay.
- (6 points) The following events occurred. Olcay borrowed 5 books, Deniz borrowed 2 books, Olcay returned 2 books.
- (2 points) Print the number of books borrowed by Olcay.
- (2 points) Print the number of books borrowed by Deniz.
- (2 points) Deniz randomly borrows up to 10 books.

III. QUESTION (8 POINTS)

Modify the class `LibraryCard` such that we can find the total number of books borrowed from the library easily.

IV. QUESTION (6 POINTS)

Write a function **`void exchangeBooks(LibraryCard student2)`** which swaps the books borrowed by the current student with student **student2**. The students exchange the books borrowed by them.

V. QUESTION (24 POINTS)

Design a class named `Student` to represent a student. All fields will be private. All methods will be public. The class contains:

- (2 points) A string data field **name** for the student's name.
- (2 points) An integer data field **id** for the student's id number.
- (2 points) A string field **gender** for the student's gender.
- (2 points) A `LibraryCard` data field **libraryCard** to store the library card of the student.
- (2 points) A method named **`void borrowBooks(int numOfBooks)`** where exactly `numOfBooks` books student has borrowed.
- (6 points) A constructor that creates a student with specified name, id, gender.
- (4 points) The accessor methods for name and gender.
- (4 points) The mutator methods for id and name.

VI. QUESTION (8 POINTS)

Modify the class `Student` such that we can find the female students in the university easily.

VII. QUESTION (10 POINTS)

Declare a test class `TestStudent` to do the following:

- (4 points) Declare two `Students` girl Deniz with id 5 and boy Olcay with id 8.
- (2 points) Change id of Deniz to 18.
- (2 points) Change name of Olcay to Taner.
- (2 points) Deniz borrowed 5 books.