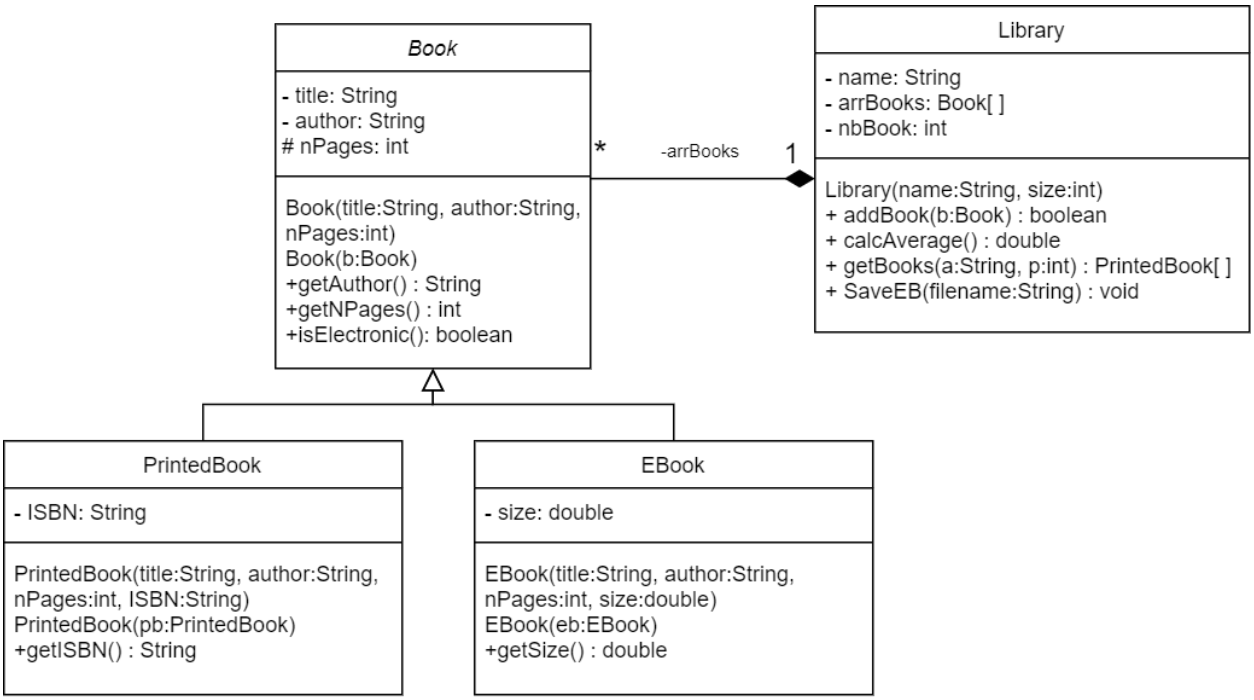
King Saud University
College of Computer and Information Sciences - Department of Computer Science
CSC113 – Computer Programming II – Lab Final Exam-v4 – Spring 2022



Q1: Write the classes "Book", "PrintedBook", and "EBook" in java. The classes descriptions are as follows **(5 marks)**:

- Class *Book:*
  - Attributes:
    - title: stores the title of the book as a String.
    - author: stores the author of the book as String.
    - nPages: stores the number of pages as int.
  - Methods:
    - Book(title:String, author:String, nPages:int) : constructor.
    - Book(b:Book) : copy constructor.
    - getAuthor() : returns the author of the book.
    - getNPages() : returns the number of pages.
    - isElectronic() : this is an **abstract method** that works as follow:
      - If it's a PrintedBook, it returns *false*.
      - If it's an EBook, it returns *true*.
- Class *PrintedBook*:
  - Attributes:
    - ISBN: stores the ISBN of the printed book as a String.
  - Methods:
    - PrintedBook(title:String, author:String, nPages:int, ISBN:String) : constructor
    - PrintedBook(pb:PrintedBook) : copy constructor.
    - getISBN() : returns the ISBN of the book.

- Class *EBook*:
  - Attributes:
    - size: stores the size of the EBook as a double value.
  - Methodes:
    - EBook(title:String, author:String, nPages:int, size:double) : constructor.
    - EBook(eb:EBook) : copy constructor.
    - getSize() : returns the size of the EBook.

Q2: Write the class "Library" in java. The class description is as follows (2 marks):

- Class *Library*:
  - Attributes:
    - name: stores the name of the library.
    - arrBooks: array of books.
    - nbBooks: number of books currently in the library.
  - Methods:
    - Library(name:String, size:int) : constructor.
    - addBook(b:Book) : adds a new book to the library. This method returns true if the book is added, and false if the library is full.
    - calcAverage() : returns the average page numbers of all the books.
      Note: This method throws **ArithmeticException** if nbBooks is zero.
    - getBooks(**a**:String, **p**:int) : returns an array of printed books from the author **a** that has nPages less than **p**.
    - SaveEB(filename:String) : save all book objects that are electronic in the file **filename**. This method throws IOException.
      Hint: you can either use the method 'isElectronic()' or check if the book is instance of EBook.

When you finish, export your project as a '.zip' file (File > export > general > archive file) and submit it to the blackboard website (https://lms.ksu.edu.sa/).