CS272 Lab Assignment #1: Class definition and usage (OOP)

Learning objectives: Objective 1 (class), Objective 5, Objective 6, Objective 7

Requirements:
Specify and design a class called **Book**, and implement it in a file **Book.java**.

- (5pts) This class contains the following instance variables:
  (1) the book title (data type: String),
  (2) the number of authors (data type: int)
  (3) the authors of a book (data type: array of String), where the maximum length of the array is 3,
  (4) ISBN (data type: String)
- You are required to implement the following methods:
  1. (5pts) One no-argument constructor.
     This constructor sets null to book title and to the ISBN, sets 0 to the number of authors, and creates a String array with length 3 to the book authors.

     ```
     public Book()
     ```

  2. (10pts) One constructor to set the book title.
     This constructor assigns the `_title` to book title, sets null to the ISBN, sets 0 to the number of authors, and creates a String array with length 3 to the book authors.

     ```
     public Book (String _title)
     ```

  3. (10pts) One copy constructor that uses the given paramter *obj* to set the current object's instance variables.
     Please be very careful with String copy and array copy.
     The precondition is that *obj* should not be null and should be an instance of Book.

     ```
     public Book (Object obj)
     ```

  4. (5pts) *getTitle()* method to return the title of a book object.

     ```
     public String getTitle()
     ```

  5. (5pts) *getAuthorNumber()* method to return the number of authors of the current book.
     Please fix the declaration of this method and implement this method.

     ```
     public _____ getAuthorNumber()
     ```

  6. (5pts) *getISBN()* method to return the ISBN of the book. Please fix the declaration of this method and implement this method.

     ```
     public _____ getISBN()
     ```

  7. (5pts) *setTitle* method to set the title of a book object to the value of the given parameter.

     ```
     public void setTitle (String _title)
     ```

  8. (5pts) *setISBN* method to set the ISBN of a book object to the values of the given parameter.
     Please fix the declaration of this method and implement this method.

     ```
     public void setISBN (_____ _isbn)
     ```

9. (10pts) *addAuthor* method to add an author (the value of the given parameter) to the author list of the book.
   If there is sufficient space in the author array, then this author should be added, the number of authors should be increased by 1, and return true.
   If there is insufficient space in the author array, then there is no need to add the given author to the author array, and return false.
   Please implement this method.

   ```
   public boolean addAuthor (String _author)
   ```

10. (10pts) *equals* method
    This method returns true if the given object's ISBN is the same as the ISBN of the book instance which activates this method.
    Otherwise, this method returns false.
    The precondition is that *obj* should not be null and should be an instance of the Book class.

    ```
    public boolean equals(Object obj)
    ```

11. (10pts) A static method *getAllAuthors* to get all the distinct authors of two books which are the input parameters.
    The preconditions are that neither *b1* nor *b2* should be null.

    ```
    public static String[] getAllAuthors(Book b1, Book b2)
    ```

12. (10pts) *toString()* method to generate a string representation of a book.

    ```
    public String toString()
    ```

    This method should print the information in the order of

    ```
    title, ISBN, number of authors, list of authors
    ```

13. (10pts) *main()* method to thoroughly **test** your code.
    Design test cases, put them in your main method, run your program through the test cases.

    ```
    public static void main(String[] args)
    ```

- Write **specifications** with proper comments for parameters, preconditions, and return values for your class and all the methods.
  You are required to include comments in your code.
  Also, please use inline comments, meaningful variable names, indentation, formatting, and whitespace throughout your program to improve its readability.

Submission: a zip file *your-bannerid-lab1.zip* containing Book.java.

Grading criteria:

- The score allocation is already put in the questions.
  Please make sure that you test your code thoroughly.
  Your TAs may test your code using more test cases.