Project in OOP Library Management System

Question: Library Management System

You have been assigned to develop a Library Management System for a small library. The system should allow librarians to manage books, patrons, and transactions. Implement the following features:

1. Create classes for **Book**, **Patron**, and **Transaction**. Each class should have appropriate attributes, constructors, and methods.
2. The **Book** class should have attributes such as **title**, **author**, **ISBN**, and availability status (**available** or **unavailable**).
3. The **Patron** class should have attributes such as **name**, **email**, and a list of borrowed books.
4. The **Transaction** class should have attributes such as **book**, **patron**, **borrowedDate**, and **dueDate**.
5. Implement a method in the **Library** class to add books to the library's collection.
6. Implement a method in the **Library** class to register new patrons.
7. Implement a method in the **Library** class to borrow books. This method should check if the book is available, update its status, add it to the patron's borrowed books list, and create a new transaction object.
8. Implement a method in the **Library** class to return books. This method should update the book's availability status, remove it from the patron's borrowed books list, and update the transaction object with the return date.
9. Implement a method in the **Library** class to display a list of all books in the library.
10. Implement a method in the **Library** class to display a list of all patrons.
11. Implement a method in the **Library** class to display a list of all borrowed books and their respective patrons.
12. Implement a method in the **Library** class to display a list of all overdue books and their respective patrons.
13. Implement a method in the **Library** class to generate a report of the most frequently borrowed books.

You are required to design the classes, write the necessary methods to fulfill the requirements, and demonstrate the functionality of the Library Management System by writing a sample code that uses the implemented classes.

Keep in mind the principles of OOP, such as encapsulation, inheritance, and polymorphism, while designing and implementing the solution.

Make sure Don’t use Chat GPT reference at any cost.