EVENING ASSESSMENT

Code explanation [Part-1]

1. How many classes are created?

Class created :

Book-it represent book

Member- it represent library member

Library- it manages books and members together.

2.What OOPs concepts are used?

* Class & Object-for blueprint and entities.
* Encapsulation - used in data like book details grouped in classes).
* Abstraction - where only required methods are exposed, like borrow\_book.
* Polymorphism - where same method name used differently like \_\_str\_\_

3. Why do we use this statement ?return f"[{self.book\_id}] {self.title} by {self.author} (ISBN: {self.isbn}) — {status}"

def \_\_str\_\_(self):

status = "Available" if self.available else "Issued"

return f"[{self.book\_id}] {self.title} by {self.author} (ISBN: {self.isbn}) — {status}"

We use \_\_str\_\_ because:

* + In Python, \_\_str\_\_ is a special method that defines how an object should look when converted to a string (e.g., when using print(book)).
  + Whatever we return inside \_\_str\_\_ is the string representation of the object.

Why are we using return instead of print?

* + return sends the formatted string back to Python’s print system or any function that converts the object to string. It will store value.
  + If we used print inside \_\_str\_\_, it would only display text once, but print(book) wouldn’t work correctly (it would just show None).

What this line does specifically

* Builds a user-friendly description of the book, showing:  
  + Book ID
  + Title
  + Author
  + ISBN
  + Status (Available / Issued)
* Then returns it as a string.

4. What is the use of “encoding="utf-8" in the code?

When we read or write a file in Python, text must be stored in a specific character encoding.

-utf-8 (Unicode Transformation Format – 8-bit) is the default standard encoding for text worldwide.

-It can represent any character: English, Hindi (नमस्ते), Chinese (你好), emojis.

Consider in our code:

with open(BOOKS\_FILE, "r", encoding="utf-8") as f:

with open(BOOKS\_FILE, "w", encoding="utf-8") as f:

Ensures that book titles, member names, authors can include special characters safely.

* Prevents errors when writing or reading non-English text.

5.Why is the delimiter is used?

Delimiter is a special character (like | or ,) it is used to separate fields in a text file.

Example in books.txt:  
  
B101|Python Basics|Abhi|9781234567890|1

In our project we have used | as delimiter, so the program can easily split data into parts.

6.Why static method is used?

@staticmethod is used when a method does not depend on self or cls.

* Example: converting a line from file into Book object.
* Reason: It belongs to the class but doesn’t need object data.

7. What are attributes in classes?

Attributes are variables inside a class that store data.

* In Book: book\_id, title, author, isbn, available
* In Member: member\_id, name, borrowed\_books

8. What does -> mean in Python?

We use -> in Smart Library code to clearly document what type of object a function returns (e.g., "Book" or "Member"). This makes the code more readable, less error-prone, and easier for IDEs to help you.

### Example in our code

Book.from\_line

def from\_line(line: str) -> "Book":

* line: str → the parameter line should be a string.
* -> "Book" → the function returns an object of type Book.

9. Methods used are:

Methods are functions inside a class that define behavior.

* Book class  
  + \_\_init\_\_ → constructor (creates a Book object)
  + \_\_str\_\_ → string representation of the book
* Member class  
  + \_\_init\_\_ → constructor (creates a Member object)
  + \_\_str\_\_ → string representation of the member
* Library class  
  + \_\_init\_\_ → constructor (creates Library with empty books & members)
  + add\_book → add a book to the library
  + remove\_book → remove a book from library
  + register\_member → add a member
  + borrow\_book → member borrows a book
  + return\_book → member returns a book
  + list\_books → display all books
  + list\_members → display all members

10. Why do we strip()?

We use strip() to:

1. Remove unwanted spaces and newlines when reading from a file.
2. Ensure clean, accurate data before splitting.
3. Avoid bugs where extra \n or spaces would break logic.

Ex:

line = line.strip()

This removes the \n (newline) at the end of each line from books.txt or members.txt.

Without strip(), the data would have extra spaces or line breaks, causing errors when splitting.