**Q: 4**

**L1: Library Management Aggregation Assignment**

**Objective:**

**Use MongoDB Aggregation Framework to derive insights from a library system containing books, borrowers, and loan records.**

**Insert the following data into your MongoDB collections.**

**books Collection**

[

{

"\_id": "Book1",

"title": "The Alchemist",

"author": "Paulo Coelho",

"genre": "Fiction",

"publishedYear": 1988

},

{

"\_id": "Book2",

"title": "Clean Code",

"author": "Robert C. Martin",

"genre": "Programming",

"publishedYear": 2008

},

{

"\_id": "Book3",

"title": "1984",

"author": "George Orwell",

"genre": "Dystopian",

"publishedYear": 1949

},

{

"\_id": "Book4",

"title": "Atomic Habits",

"author": "James Clear",

"genre": "Self-help",

"publishedYear": 2018

},

{

"\_id": "Book5",

"title": "The Pragmatic Programmer",

"author": "Andy Hunt",

"genre": "Programming",

"publishedYear": 1999

}

]

**borrowers Collection**

[

{ "\_id": "User1", "name": "Alice", "email": "alice@example.com", "membershipDate": ISODate("2023-01-15") },

{ "\_id": "User2", "name": "Bob", "email": "bob@example.com", "membershipDate": ISODate("2023-02-10") },

{ "\_id": "User3", "name": "Charlie", "email": "charlie@example.com", "membershipDate": ISODate("2023-03-05") },

{ "\_id": "User4", "name": "David", "email": "david@example.com", "membershipDate": ISODate("2023-04-12") }

]

**loans Collection**

[

{ "\_id": "Loan1", "bookId": "Book1", "borrowerId": "User1", "loanDate": ISODate("2023-05-01"), "returnDate": ISODate("2023-05-15"), "status": "Returned" },

{ "\_id": "Loan2", "bookId": "Book2", "borrowerId": "User1", "loanDate": ISODate("2023-05-20"), "returnDate": null, "status": "Borrowed" },

{ "\_id": "Loan3", "bookId": "Book3", "borrowerId": "User2", "loanDate": ISODate("2023-04-10"), "returnDate": ISODate("2023-04-25"), "status": "Returned" },

{ "\_id": "Loan4", "bookId": "Book2", "borrowerId": "User3", "loanDate": ISODate("2023-05-05"), "returnDate": null, "status": "Borrowed" },

{ "\_id": "Loan5", "bookId": "Book4", "borrowerId": "User1", "loanDate": ISODate("2023-03-01"), "returnDate": ISODate("2023-03-10"), "status": "Returned" },

{ "\_id": "Loan6", "bookId": "Book1", "borrowerId": "User4", "loanDate": ISODate("2023-05-01"), "returnDate": ISODate("2023-05-15"), "status": "Returned" },

{ "\_id": "Loan7", "bookId": "Book5", "borrowerId": "User3", "loanDate": ISODate("2023-06-01"), "returnDate": null, "status": "Borrowed" },

{ "\_id": "Loan8", "bookId": "Book2", "borrowerId": "User1", "loanDate": ISODate("2023-06-15"), "returnDate": null, "status": "Borrowed" },

{ "\_id": "Loan9", "bookId": "Book2", "borrowerId": "User1", "loanDate": ISODate("2023-07-01"), "returnDate": null, "status": "Borrowed" }

]

**Aggregation Tasks (Write queries in query.txt)**

📌 Use $lookup, $unwind, $group, $project, $match, $sort, $limit. 💡 Use $cond or $size only when mentioned as a hint.

**Task 1: List of books borrowed by each borrower**

**Task 2: Top 3 most borrowed books**

**Task 3: Borrower’s loan history with book details (borrowerId = User1)**

**Task 4: Borrowers who have borrowed more than 2 books**

**Task 5: Full report of all loans (with borrower name and book title)**

**Task 6: Genre-wise count of borrowed books**

**Task 7: Current borrowed books (status = "Borrowed") with borrower and book title**

**Task 8: Number of returned books per borrower**

**Task 9: Borrowers who borrowed multiple genres**

**Task 10: List borrowers with total borrow count and names**