

Team Members:

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Project Theme Assigned by Facilitator:

- Campus Resource Centre Borrowing System

1. Project Title

- **Campus Resource Borrow & Return Management System (Command-Line Application)**

2. Problem Description

- The Campus Resource Centre currently relies on a paper-based logbook to record borrowed resources.
- Manual record keeping often results in missing, duplicated, or inaccurate borrowing records.
- Students must physically visit the centre to check resource availability, which can lead to wasted time.
- Staff members find it difficult to track return dates and identify overdue resources.
- The current process causes double borrowing, long waiting times, and poor accountability.
- A simple digital system is needed to improve efficiency and accuracy.
- The proposed system will store users, resources, and borrowing transactions digitally.
- This will reduce human error and make borrowing and returning faster and more reliable.

3. Main Features of the Program

- Menu-driven command-line interface for easy user interaction.
- Automatic user role assignment based on email domain during registration or login.
- Emails ending with **@edu.com** are assigned the **staff/admin** role.

- Emails ending with **@student.com** are assigned the **student** role.
- Role-based access control:
 - Students can borrow resources, return resources, and view available items.
 - Staff/admin users can add, update, and remove resources.
- Management of campus resources under predefined categories.
- Borrow and return functionality with automatic validation of resource availability.
- File-based tracking of borrowing transactions.
- Generation of formatted reports displayed in the terminal and optionally saved to files.

4. Borrowing Rules and Constraints

- Only users with the **student** role are allowed to borrow and return resources.
- Staff/admin users manage resources and generate system-wide reports.
- A resource can only be borrowed if its available quantity is greater than zero.
- When a resource is borrowed:
 - A transaction is created.
 - The resource quantity is reduced by one.
 - The transaction status is set to **borrowed**.
- The due date is automatically set to **3 days after the borrow date**.
- When a resource is returned:
 - The return date is recorded.
 - The resource quantity is increased by one.
 - The transaction status is set to **returned** or **overdue** if returned late.
- The system prevents:
 - Borrowing unavailable resources.
 - Returning resources that were not borrowed.

- Returning the same resource more than once.
- The system may enforce a maximum of **two active borrowings per student**.

5. Resource Categories

- **Books**

- Textbooks
- Reference books
- Journals
- Past examination papers

- **IT Equipment**

- Laptops
- Tablets
- Projectors
- External hard drives

- **Study & Learning Aids**

- Calculators
- Whiteboards
- Markers
- Charts

6. Report Generation Features

- List of all currently borrowed resources.
- List of overdue resources.
- Individual student borrowing history.
- Daily or weekly borrowing summary.
- Most frequently borrowed resources by category.
- Reports displayed as formatted text in the command-line interface.
- Reports may optionally be saved as text files.

7. Data to Be Stored in Files (JSON)

- All system data will be stored persistently using JSON files.

users.json

Purpose: Stores both student and staff/admin user details.

User roles are automatically assigned based on email domain.

Example Structure:

- ```
{ "user_id": "U001", "name": "Alice", "email": "alice@student.com", "role": "student" }
```

### **items.json**

- Stores campus resource information.
- ```
{ "item_id": "I001", "name": "Laptop", "category": "IT Equipment", "quantity": 5 }
```

borrowing.json

- Stores borrow and return transaction records.
- ```
{ "transaction_id": "T001", "user_id": "U001", "item_id": "I001", "borrow_date": "2025-02-10", "due_date": "2025-02-13", "return_date": null, "status": "borrowed" }
```

## 8. Initial List of Planned Classes

- **User**
  - Stores user ID, name, email, and role.
- **Resource**
  - Represents a campus resource, its category, and available quantity.
- **BorrowTransaction**
  - Records borrowing and return activities, including dates and status.
- **FileManager**
  - Handles loading and saving of JSON files.
- **ReportManager**
  - Generates command-line and file-based reports.
- **SystemManager**
  - Controls core system logic, role-based menus, borrowing, returning, and reporting.