COMP 3004 Deliverable 2

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Design Justification

This system decomposition divides the HinLIBS patron features into two main subsystems: the Catalogue Subsystem and the Borrowing and Holds Subsystem, following the Boundary–Control–Entity design pattern. Each subsystem groups together classes that are closely related in responsibility, which helps maximize cohesion. For example, the Catalogue Subsystem includes only classes related to searching and representing catalogue data, such as SearchCatalogueUI, SearchCatalogueController, Catalogue, Item, and its specific item types (Book, Magazine, Movie, and VideoGame). Keeping all catalogue-related functionality within one subsystem makes the design easier to understand and maintain. The Borrowing and Holds Subsystem groups all functionality related to borrowing and holds together, including the boundary classes (PatronAccountUI, BorrowItemUI, ReturnItemUI, PlaceHoldUI), control classes (BorrowItemController, ReturnItemController, HoldController), and entity classes (Patron, Loan, and Hold).

This grouping ensures that everything related to borrowing, returning, and placing holds is handled within one focused area of the system, which improves cohesion.
Coupling is minimized by ensuring that boundary (user interface) classes only communicate with control classes and never directly with entity classes. This means the user interface does not depend on how data is stored or managed. Instead, all logic flows through the controllers, which act as intermediaries between the UI and the data. In addition, interaction between the two subsystems is kept limited. The Borrowing and Holds Subsystem only interacts with the Catalogue Subsystem through the shared Item entity when checking availability or updating an item’s status. This single controlled connection prevents unnecessary dependencies between subsystems.

Overall, this decomposition keeps related responsibilities grouped together while reducing unnecessary connections between different parts of the system. This results in a design with high cohesion and low coupling that is easier to understand, maintain, and expand in the future.

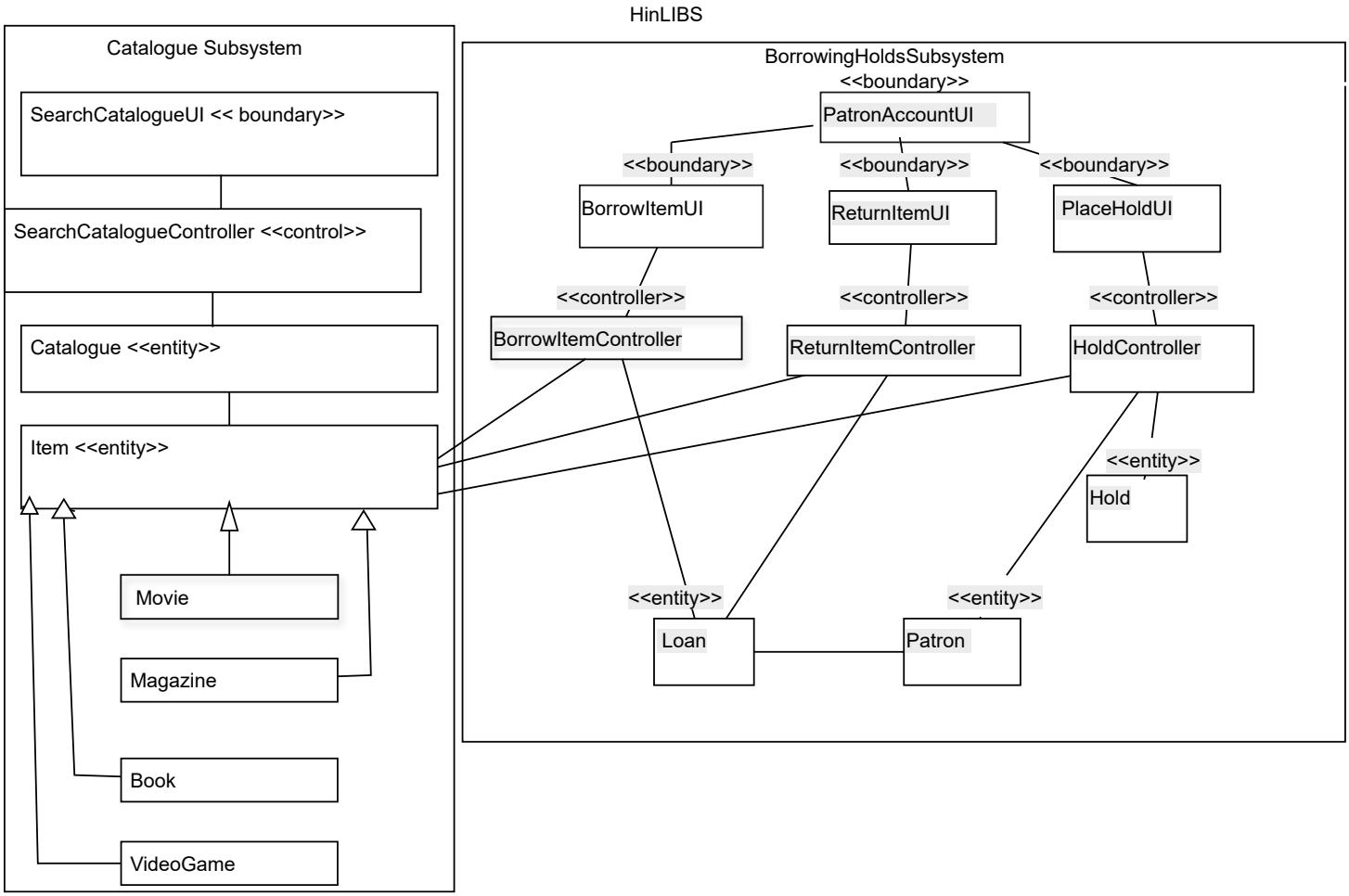

Figure 1: HinLIBS Catalogue and Borrowing Subsystem Decomposition