SRD (CITS4401) Practical Class 2
Requirements Analysis

Objectives

In this practical you will gain experience with the analysis and modelling activities of identifying objects and classes, associations between classes, and decomposing a system into subsystems. You should use UML notation, but that is not the main focus of this practical. Whilst working in groups you will have the opportunity to argue for and against and to evaluate your choice of models from the many different solutions possible.

Task

This practical is to be undertaken by students in groups of 2 or 3. Further reading about these activities is detailed in the B&D sections listed under Lectures 3, 4, 5, and 6.

1. Study the description of the required behaviour of a University Library system given below.
2. Draw a **UML use case diagram** for the system to reflect the following analysis: the actors in this system are the BookBorrower, JournalBorrower, Browser and Librarian; the required functionality of the system is captured by 8 use cases: BorrowCopyofBook, ReturnCopyofBook, BorrowJournal, ReturnJournal, ExtendLoan, BrowseLibrary, ReserveBook, UpdateCatalog.
3. Use the 3 object identification methods studied in lectures (grammatical analysis, entity-boundary-control, and CRC method) to **identify potential objects and classes** to be modelled in this system. Divide your group so that each member needs to work on one method only. Initially, focus on just the first 4 use cases for borrowing and returning a book or a journal. If you have time you can return to identify the objects for the full system.
4. Each group member should present their identified objects, and the group should select objects for the model from the potential objects suggested. What criteria do you use to include or reject?
5. Identify the relationships in this system between classes and label with role and multiplicity as necessary. Remember that class A is **associated with** class B if A has to know about B.
6. Use a **UML sequence diagram** to document the activities and interactions between objects which occur in the BorrowCopyofBook use case.
7. Select an object with non-trivial dynamic behaviour (for example the journal class), and describe the behaviour of that object using a **UML statechart diagram**.
University Library Case Study

You have been contracted to develop a computer system for a university library. After some careful investigation, the following facts emerge about the required system.

**Books and Journals** The library contains books and journals. It may have several copies of a given book. Some of the books are for short term loans only. All other books may be borrowed by any library member for 3 weeks. Only members of staff may borrow journals. Members of the library can normally borrow up to 6 items at a time but members of staff may borrow up to 12 items at one time. New books and journals arrive regularly, and old ones are sometimes disposed of. The current year’s journals are sent away to be bound into volumes at the end of each year.

**Borrowing** It is essential that the system keeps track of when books and journals are borrowed and returned, since the current system already does that. The new system should produce reminders when a book is overdue. There may in future be a requirement for users to be able to extend the loan of a book if it is not reserved.

**Browsing** The system should allow users to search for a book on a particular topic by a particular author etc., to check whether a copy of the book is available for loan and, if not, to reserve the book. Anybody can browse in the library.

**Case Study Reference:** Stevens & Pooley, *Using UML*, Addison Wesley 2000

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