

# ECS505U Software Engineering

## Laboratory Exercise (**Assessed, 2.5% of final mark**)

### Generating UML State Diagrams

Version 1.4, 21/11/2017

#### 1. Prerequisites

- You should have access to Visual Paradigm. For campus students, version 14.1 is pre-installed on all machines. For non-campus students check the QMplus course page for download and licensing information.
- You should watch the tutorial video titled “UML state diagram video tutorial” available on QMplus course page.

#### Item:

1. After a staff orders an item, item is entered to the system as an ordered item.
2. When an ordered item is received, it is considered available.
3. Available items can be either in the library or on loan.
4. Only items in the library can be loaned.
5. An item is considered on loan when loaned by a member.
6. An item that is returned from a loan is considered in library.
7. As soon as an item is loaned, the number of loans for that item is increased in the system.
8. Available items can be lost; lost items are no longer available.
9. An item can be loaned 10000 times, after 10000 loans it's considered a retired item.
10. Items can get damaged, items marked as damaged by staff are considered retired.
11. Retired items are not available (anymore) and only items in the library can be retired by staff.
12. Retired and lost items stay in the system until they are removed from the system.

#### HINTS:

- We assume that each item has a variable to keep track of number of times it's loaned and when the item is loaned the number is increased (by calling the `increaseNumberOfLoans` method).
- To retire an item (either damaged or reached 10000 loans), it must be returned to the library.

<b>You are expected use the names below in your state diagram for item.</b>
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Ordered, Available, InLibrary, OnLoan, Retired, Lost, receiveItem, loanItem, returnItem, numberOfLoans, markDamaged, itemLost, removeItem, increaseNumberOfLoans, entry
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#### Member:

1. When a user registers, he/she becomes a member (record entered to the system).
2. Members can loan items only if their balance is 0.
3. Members can return items they loaned.
4. A member can loan up to 5 items.
5. A member is considered on limit when his/her number of loans reaches five.
6. If a loan is not returned by its return date, then the member (with the loan) is considered to have a late item.
7. A member on limit cannot loan and to be able to loan again they need to return item(s).
8. Members who has late items cannot loan until they return the late items.
9. Members must be able unregister (when a member unregisters his/her record removed from the system).

#### HINTS:

- Members are checked if they have a late fee to pay before they loan.
- A loan can pass its return date no matter what state the member is in.
- Members can return items no matter what state they are in. However, returning an item might not cause a change in every state.

<b>You are expected use the names below in your state diagram for member.</b>
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CanLoan, OnLimit, HasLateItem, loanItem, balance, numberOfLoans, loanPassedReturnDate, returnItem, returnLateItems, unregisterUser
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