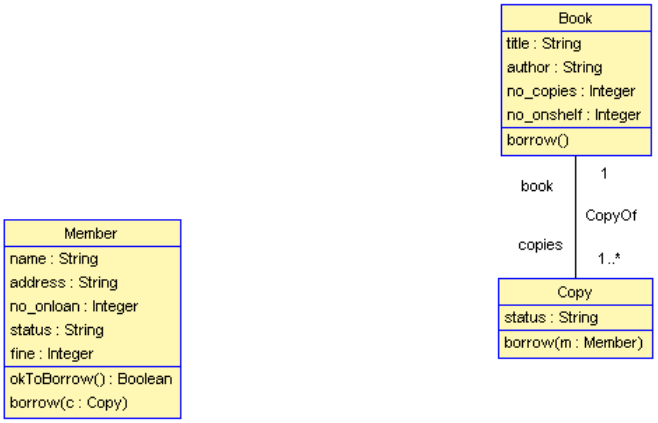
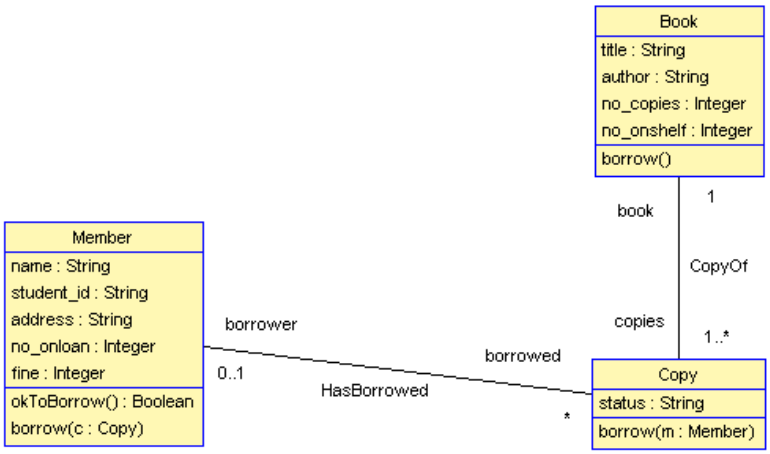
USE Lab Test (Soft Eng 1)

0. Load the sample USE code in lib.use and open class diagram view. You should see something like below on rearranging. Save your layout as lib_default.clt, it will be useful later when reloading USE code.

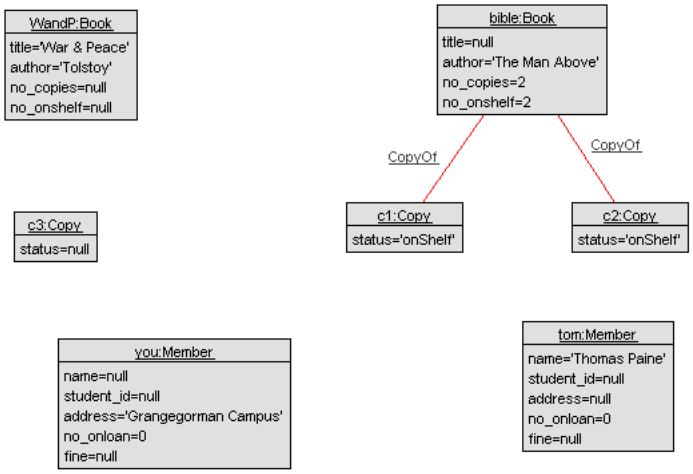


1. Modify the USE code so that class diagram looks like below and copy and paste it into a Word document report.docx.



(10 marks)

2. Load the test objects provided in lib.soil, open an object diagram view and reorganise the objects to like (and save the layout as lib.olt) :



3. Put your name and student number as attributes into the Member object **you** (two ways to do this).

   Make **c3** a copy of the Book object **WandP** and update in an appropriate way the attributes **no_copies**, **no_onshelf** in **WandP**; and the **status** attribute in **c3**.

   Save your you new object model to the SOIL file lib.soil and copy/paste the new object diagram to your report.

   (10 marks)

4. Implement the **Member** operation **okToBorrow()**. It should return either **true** or **false**. It is ok for a member to borrow if no_onloan < 2, otherwise it is not.

   Then reload your USE code and the test objects and run this operation on **tom**. Open a sequence diagram view and copy/paste the diagram to your report.

   (20 marks)

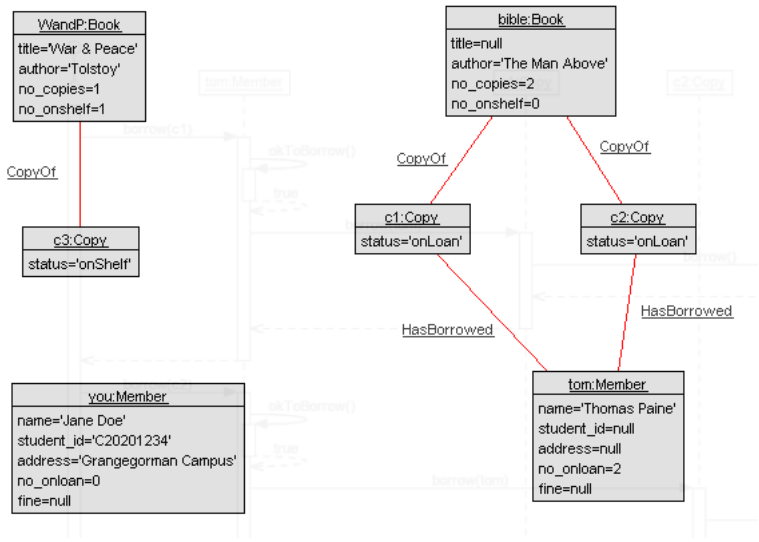
5. Next implement the three **borrow()** operations. Recall the sequence diagrams you demoed in StarUML. One borrow() sends a borrow() message to the next object and so on.
   - Member borrow(c:Copy). It should first check that it's ok for the member to borrow and if it is, it updates a member attribute and in turn sends a borrow() message to **c**.
   - Copy borrow(m:Member)
   - Book borrow()

   Each borrow() operation should update its own object's attributes and should result in the objects being linked.

   (20 marks)

6. Once implemented, reload your USE model and the objects and try to get **tom** to borrow **c**1 , **c2**, and **c3**.

   Your resulting object diagram should result in something like below. If it works, save your updated object model to lib.soil.



Open a sequence diagram view, copy/paste it to the report. Also copy/paste your object diagram to the report.

(20 marks)

7. In the constraints section add 2 preconditions and 2 postcondition to specify more precisely the operation Member::borrow(c:Copy).

   Preconditions should state that the member has not already borrowed **c** and that **c** has not been borrowed by someone else.

   Postconditions should state the **c** has now been borrowed by the member and that **no_onloan** has been updated. (see recent Aircraft USE model)

   (20 marks)

8. (optional) Reload everything and try to get **you** to borrow the copy of **WandP** and **c1**. If any conditions are violated, copy/paste them from the command window to your report.

9. Save your report as a PDF named report.pdf and upload it along with lib.use, lib.soil.