EEET2482/COSC2082 – Software Engineering Design, Advanced Programming Techniques

Week 8 – Exercises

Exercise 1:

1. Defines a class namely **Book** with following private attributes and public methods (also provide constructor for it):
   * **title** (string)
   * **availableCopies** (integer) which is the number of copies of the book which are available to borrow.
   * **namesOfBorrowers** (vector of strings) which are names of the book’s borrowers.
2. Define another class namely **User** with following attributes and public methods (also provide constructor for it):
   * **name** (string)
   * **borrowedBooks** (vector of pointers of Book objects).

* bool **doBorrow**(Book &abook): to borrow a book from the library (must record the book in *borrowedBooks*, borrower name in *namesOfBorrowers* of the book and reduce its *availableCopies****)****.* 
  + void **doReturn**(Book &abook): to return a book to the library (*reverse the activities above*).

Create a vector of **three Book objects** using dynamic memory allocation.

Create **two User objects** and test all methods (with the created book objects).

1. What is the relationship type between **Book** and **User** classes**?** Draw class diagram for the above program.
2. Create another class namely **SuperUser** in which the **doBorrow**() function is overridden to allow the SuperUser borrow two books at a time.

bool **doBorrow**(Book &book1, Book &book2):

Exercise 2:

You are involved in development of a software for school management. The following details are as follows:

*Each staff are managed by his/her name and department. He/she can belong to one or none of department. It is possible for a staff to join or leave a department in some cases (e.g. leave or change to another department).*

*The system allows to manage each department by its name and location, each of which needs to have at least one staff. For the academic department, its number of courses will be recorded. Whereas, for non-academic department, the number of services is monitored.*

1. Draw the class diagram for the above system.
2. Write a C++ program to implement the above system (test all attributes and methods in main() function).