



**National University of Computer & Emerging Sciences, Karachi**  
**Fall-2019 CS-Department**  
**Mid-1 Examination**



**28<sup>th</sup> October 2019, 11:00 AM –12:00 PM**

<b>Course Code:CS-309</b>	<b>Course Name: Object Oriented Analysis &amp; Design</b>
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<b>Student Roll No:</b>	<b>Section :</b>

The Defence Central Library (DCL) is a public organization managing the 99 public libraries that operate in Defence Karachi. DCL has decided to redesign its collection material database.

Currently, the database holds information on:

- Books, videos and CDs available for borrowing;
- Every item (book, video, CD) has a unique collection #, a title, and an ISBN# which is unique for every publication; every item may be in good order or damaged (see below); note that if there are 10 copies of a single book, they have distinct collection #s, but identical ISBN#s;
- Books can be in English, or another language; in either case, the database stores the language the book is written in;
- Books have a publisher and one or more authors; CDs and videos have a unique producer, and one or more artists. In addition, the database maintains data on library users and their borrowed material:
- Each user has a unique userID, address, phone#; users can be adults, children or seniors; seniors can borrow material for longer periods, while children pay a nominal fine of \$0.05/day for un-returned material;
- When a user selects an item to be borrowed, the library clerk updates the database, recording userID, collection#, and date of borrowing;
- When a user returns an item, the library clerk updates the database, recording the date when the item was returned; if the item is overdue, the clerk also collects a fine calculated as DaysLate \* fine/day; the fine per day amount is \$0.50, \$0.05, \$1.00 for seniors, children and adult users respectively; the clerk also records (in the database) the fine collected, if any; in addition, the clerk checks if the returned item is damaged, and if so, records this information (in the database, again).

To add new material to the collection, DCL orders it from XYZ Co., a wholesale supplier. When it arrives, it is catalogued (i.e., an entry is added to the database) and it is made available in some library. Damaged and unused material is removed from the collection. This is done once every six months. The process consists of selecting all items that are damaged, or haven't been borrowed in the last year, and physically removing them from the collection.

**Question No. 1**

Read the above scenario, and design the following diagrams.

- Use Case Diagram.
- Class Diagram.

**Question No. 2**

Briefly describe the following

- a. What is the difference between Linear and Iterative approach?
- b. What is the difference between Inception and Elaboration?
- c. Draw the SDLC.
- d. What is the System Study?
- e. What are the communication rules allowed in ECB Diagram?