

HOMEWORK -1-

Homework MUST be handed in via Canvas ONLY and in the correct assignment folder, in one file representing the entire homework. Your name MUST be included in the document.

Assignment 1 - Database Introduction

Examine the Library management Case Study file available on Canvas. Consider the scenario given below when designing your database:

- A library has books, videos, and CDs that it issues to its users and is available at the premises of the library for the authorized users.
- For systematic arrangements, all library material has id # and a title.
- Books have one or more authors, videos have one producer and one or more actors, while CDs have one or more entertainers.
- Due to high demand of library resources, the library maintains one or more copies of each library item (book, video or CD).
- Copies of all library material can be issued to users but with some rules and restrictions.
- For every item issued, the library records the user information, issue date and time, as well as return date and time.

Based on your design solutions, answer the following:

1. Define instances of all relations that might be found as part of the Library Management System (LMS), and indicate the following (remember to use proper formatting with no exceptions):
 - 1.1. The attributes of each relation.
 - 1.2. The relation schema for each relation.
 - 1.3. A suitable domain for each attribute.
2. For two main relations you have defined in question 1:
 - 2.1. Identify and describe at least two realistic *referential integrity constraints* for each relation selected such as primary keys, foreign keys, etc... For the tables and attributes, etc...
 - 2.2. Express your keys in relational algebra (where they are called *referential integrity constraints*).
3. Write a relational algebra expression representing the following:
 - 3.1. List the titles of all the books that are currently checked out
 - 3.2. Retrieve a list of all borrower id's and the book id's they checked out
 - 3.3. Retrieve a list of the phone numbers of all overdue book owners, together with the number of days they are overdue.