Mark: 8

Cosc344 Assignment 1

Team: 3
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Members: Andy Randell, Ben Taylor, Elsie Sun, Nikki Meadows

1. Mini-world Description

   We have chosen the LIBRARY mini-world for the purpose of this assignment. Our Library mini-world consists of all University libraries. The database for LIBRARY keeps track of individual library buildings, staff, books, students, study rooms and part time jobs. The part of the library that we have modelled in our assignment is described as follows:

   - The library mini-world is organised into individual library buildings. Each library has a unique name, address, opening hours and number of study rooms. Each library contains many books, many study rooms and is managed by many staff.
   - To keep track of the staff who work in the library, we store their full name, staff ID, DDI and email address.
   - For each book in a library, we store the book's status, category, IBSN, author, location, title and publisher. An individual book is contained in one library, and can be borrowed or returned by one student at a time.
   - A library contains multiple study rooms that can be booked by a student. For each study room, we store the room ID, room number, library name and status.
   - Students can borrow and return many books, book a study room and get a part time job within the library. For each student, we store their student ID, their full name, their email address and date of birth.
   - A student can get a part time job within a library. For each job, we store the student's job title, salary and department. For each student that gets a part time job, they work for one staff member.

2. Entities and Attributes

   - STAFF
     - Name: composite (Fname, Mname, Lname), single-valued, string
     - Staff_ID: simple, key attribute single-valued, integer
     - DDI: simple, single-valued, string
     - Email_address: simple, single-valued, string
     - Salary: simple, single-valued, real
   - STUDENT
     - Name: composite (Fname, Mname, Lname), single-valued, string
     - Student_ID: simple, key attribute single-valued, integer

- Email_address: simple, single-valued, string
- DoB: simple, derived attribute single-valued, date

- BOOK
  - Title: simple, single-valued, string
  - Author: composite (Fname, Mname, Lname), single-valued, string
  - Publisher: simple, single-valued, string
  - Location: composite (Lib_name, Area, Call_num), single-valued, string
  - Category: simple, multi-valued, string
  - ISBN: simple, key attribute single-valued, string
  - Status: simple, multi-valued, string

- LIB_BUILDING
  - Lib_name: simple, key attribute single-valued, string
  - Lib_address: composite(number, street, area, city) single-valued, string
  - Opening_hours: simple, singled-valued, string
  - Num_rooms: simple, singled-valued, integer
- STUDY_ROOM
  - Status: simple, multi-valued, string
  - Room_id: simple, key attribute single-valued, integer
  - Rnum: simple, single-valued, string
  - Lib_name: simple, single-valued, string

- PART_TIME_JOB (weak entity)
  - Job_title: simple, weak key attribute single-valued, string
  - Department: simple single-valued, string
  - Salary: simple, single-valued, real

3. Relationship
   - WORK_FOR

     1:N relationship.

A staff member offers many part-time jobs for students in order to work for him/ her, but students that have a PART_TIME_JOB work for one staff member.

STAFF and PART_TIME_JOB are both partial participation.

- BORROWS

  1: N relationship.

  Each student can borrow multiple books, but a book can only be borrowed by one student. Each time a student borrows a book, we will store the Borrow_date and Due_date.

  STUDENT and BOOK are both partial participation.

- RETURNS

  1: N relationship.

  Each student can return multiple books, but a book can only be returned by one student. Each time a student returns a book, we will store Return_date.

  STUDENT and BOOK are both partial participation.

- WORK_IN

  N: M relationship.

  Each staff member can work in multiple library buildings, and each library building can have many staff members working inside.

  STAFF and LIBRARY BUILDING are both total participation.

- GETS

  1:N relationship.

  A student may get a part time job within the library, and there are many part time jobs for students.

  STUDENT is partial participation, and PART_TIME_JOB is total participation.

- BOOKS

  1:N relationship.

  A student may book a group study room, and a room may be booked by students to use. When a room is booked, we will store the time and duration of the booking.

  Both STUDENT and STUDY_ROOM are in partial participation.

- CONTAINS (relationship between STUDY_ROOM and LIB_BUILDING)

  1: N relationship.

Each study_room can belong to only one library, but each library may have many study rooms.

STUDY_ROOM is total participation, LIB_BUILDING is partial participation.

- CONTAINS (relationship between BOOK and LIB_BUILDING)

It is better to give a a different name.

1: N relationship.

Each book can belong to only one library, but each library may have many books.

BOOK is total participation, LIB_BUILDING is partial participation.

Since multiple copies of the same book have the same ISBN, ISBN can't be a key attribute. Barcode is commonly used in libraries to identify books.

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4. ER-diagram

Due_date could be modelled as a derived attribute with value derived from borrow_date.

DoB is modelled as a derived attribute. How can its value be derived?

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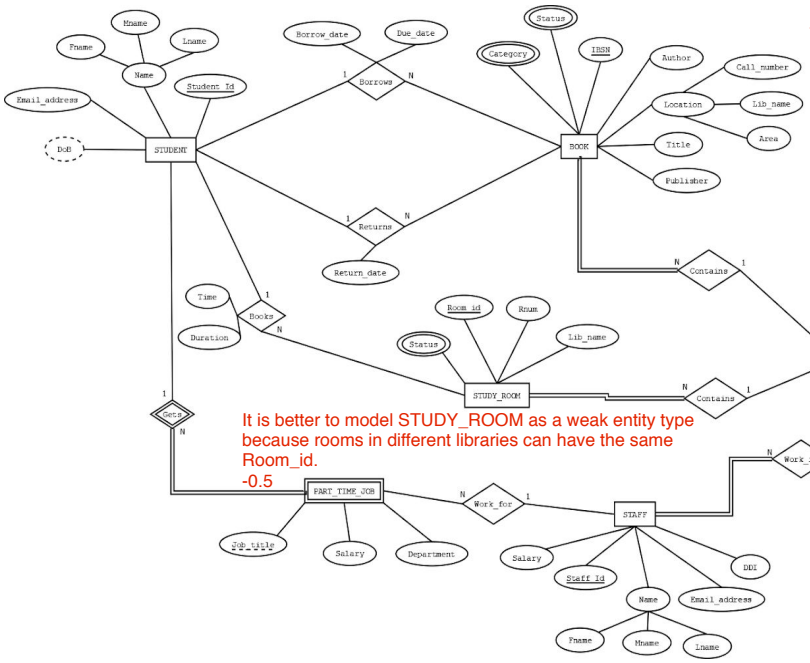

There is no need to have Location attribute in Book, since the library a book is contained is represented using the Contains relationship type.

The same for Lib_name in STUDY_ROOM

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It is better to model STUDY_ROOM as a weak entity type because rooms in different libraries can have the same Room_id.

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it is better to model Num_rooms as a derived attribute.

5. Teamwork Summary

We organised our group meetings using a mixture of email and facebook messenger. Each team member attended all of our set group meetings. In our group meetings, we were able to discuss our entities, attributes and relationships for our mini-world. Our mini-world idea was Elsie's. In our first group meeting, we divided our assignment as equally as possible, and agreed upon the following arrangement:

- The BOOK and LIB_BUILDING entity types and corresponding attributes were completed by Elsie. Elsie also modelled both of the Contains relationships and completed their descriptions.
- Nikki completed the STUDENT and STUDY_ROOM entities and attributes. Nikki also modelled the Borrows and Returns relationships and their descriptions.
- The PART_TIME_JOB entity and attributes were completed by Andy. Andy Modelled the Gets and Works_for relationships and their descriptions.
- Ben completed the STAFF entity and attributes. Ben modelled the Books and Work_in relationships and the description for these relationships.