CSE 3241 Project Checkpoint 02 – Relational Model and Relational Algebra

Names	Date
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In a **NEATLY TYPED** document, provide the following:

1. Provide a current version of your ER Model as per Project Checkpoint 01. If you were instructed to change the model for Project Checkpoint 01, make sure you use the revised version of your ER Model.

   CUSTOMER- customer id, username, name, address, phone number, transaction

   BOOK- ISBN, Name, author first name, author last name, price, genre, publisher

   EMPLOYEE- employee id, username, name, address, work phone number, position

   SELLER- seller id, mailing address, publishers worked with, contact within the company

   TECHNICAL STAFF- employee id, username, name, address, work phone number, last time and date logged into company database
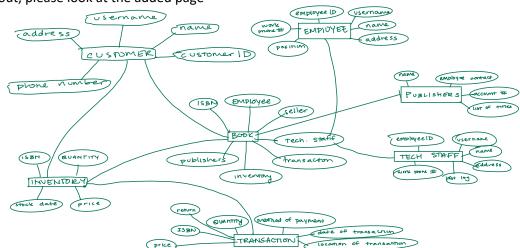
   PUBLISHERS- name, employee contact, account number, [list of titles]

   INVENTORY – ISBN, quantity, price, stock date

   TRANSACTION – price, ISBN, quantity, method of payment, date of transaction, location of transaction, return, max purchase, customer ID

2. Map your ER model to a relational schema. Indicate all primary and foreign keys.

   I drew this out, please look at the added page

3. Given your relational schema, provide the relational algebra to perform the following queries. If your schema cannot provide answers to these queries, revise your ER Model and your relational schema to contain the appropriate information for these queries:

   a. Find the titles of all books by Pratchett that cost less than $10

   $$\sigma_{price < \$10} \left(\pi_{author\,LastName = 'Pratchett'} \; Book \right)$$

   b. Give all the titles and their dates of purchase made by a single customer (you choose how to designate the customer)

   $$\pi_{(BookTitle, \, date\,of\,Purchase)} \left(\sigma_{CUSTOMER} \left(Book * Transaction \right) \right)$$

   c. Find the titles and ISBNs for all books with less than 5 copies in stock

   $$\pi \left(BOOK \; TITLE, \, ISBN \right) \left(\sigma_{INVENTORY.stock \, < \, 5} \right)$$

   d. Give all the customers who purchased a book by Pratchett and the titles of Pratchett books they purchased

   $$\pi_{(CUSTOMER.name, \, Book.author\,LastName \, = \, 'Pratchett', \, book.title)} \left(CUSTOMER * BOOK \right)$$

   e. Find the total number of books purchased by a single customer (you choose how to designate the customer)

   $$\pi \; SUM \left(CUSTOMER.Transactions \right)$$

   f. Find the customer who has purchased the most books and the total number of books they have purchased

   $$\pi \; transactions.maxpurchase \left(CUSTOMER \bowtie_{CUSTOMER.customerID \, = \, Transaction.customerID} TRANSACTION \right)$$

4. Come up with three additional interesting queries that your database can provide. Give what the queries are supposed to retrieve in plain English and then as relational algebra. Your queries should include joins and at least one should include an aggregate function. At least one of your queries should use "extra" entities you added to your model in Checkpoint 01.

   BEST SELLERS - Book name, ISBN, Publisher
   CLEARENCE – discounted price, book name, ISBN, time on shelf
   DISPLAY BOOK – book on display, book name, inventory stock, ISBN