Amelia Rotondo
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Homework #3

8.18)

a) How many copies of the book titled *The Lost Tribe* are owned by the library branch whose name is 'Sharpstown'?

Relational Solution:

$TLT \leftarrow \sigma_{Name = \text{“The Lost Tribe”}} (BOOK)$

$ST \leftarrow \sigma_{Name = \text{“Sharpstown”}} (LIBRARY\_BRANCH)$

$CTLT \leftarrow \pi_{Branch\_id,\ No\_of\_copies} (BOOK\_COPIES \bowtie_{Book\_id = Book\_id} TLT)$

$Result \leftarrow \pi_{No\_of\_copies} (ETLT \bowtie_{Branch\_id = Branch\_id} ST)$

SQL:

```
SELECT no_of_copies
FROM BOOK_COPIES CTLT, LIBRARY_BRANCH ST, BOOK TLT
WHERE TLT.Name=”The Lost Tribe” AND ST.Name=”Sharpstown” AND
BOOK_COPIES.book_id=TLT.book_id and CTLT.branch_id=ST.branch_id
```

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c) Retrieve the names of all borrowers who do not have any books checked out.

Relational Solution:

Result ← π_{Name} (BORROWER $\bowtie_{Card\_no\ !=\ Card\_no}$ BOOK_LOANS)

SQL:

```
SELECT name
FROM BORROWER, BOOK_LOANS
WHERE NOT BORROWER.card_no = BOOK_LOANS.card_no
```

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e) For each library branch, retrieve the branch name and total number of books loaned from the branch

NOTE: I am going to write "F" in place of the Relational Algebra Aggregate Function from the French Script MT. Consider this an error in translation.

Relational Solution:

LBN(branch_id, T) ← $\sigma_{Branch\_id}{}^{F}{}_{COUNT(*)}$ (BOOK_LOANS)

Result ← $\pi_{Branch\_name,\ LBN(Branch\_id,\ T)}$ (LIBRARY_BRANCH $\bowtie_{Branch\_id=Branch\_id}$ LBN)

SQL:

```
SELECT branch_name AND COUNT(*)
FROM BOOK_LOANS LBN, LIBRARY_BRANCH
WHERE LIBRARY_BRANCH.branch_id = LBN.branch_id AND LBN IN
(SELECT T FROM (SELECT branch_id, COUNT(*) AS T FROM BOOK_LOANS BY
BRANCH_ID)
```

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g) For each book authored (coauthored) by Stephen King, retrieve the title and number of copies owned by the library branch who's name is Central

Relational Solution:

$SK \leftarrow \sigma_{Author\_name = \text{“Stephen King”}} (BOOK\_AUTHORS)$

$BSK \leftarrow BOOK \bowtie_{Book\_id=Book\_id} SK$

$CLB \leftarrow \sigma_{Branch\_name = \text{“Central”}} (LIBRARY\_BRANCH)$

$CBC \leftarrow BOOK\_COPIES \bowtie_{Branch\_id=Branch\_id} CLB$

$Result \leftarrow \pi_{Title,\ No\_of\_copies} (BSK \bowtie_{book\_id=book\_id} CBC)$

SQL:

```
SELECT Title, No_of_copies
FROM BOOK AUTHORS SK, BOOK BSK, LIBRARY_BRANCH CLB, BOOK_COPIES
CBC
WHERE SK.Author_name = “Stephen King” AND CLB.Branch_name = “Central” AND
BOOK.Book_id = SK.Book_id AND BOOK_COPIES.Branch_id=CLB.Branch_id
BSK.Book_id = CBC.Book_id
```