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σ (Selection)
 π (Projection)

\bowtie (Join)
 \bowtie (Natural Join)

Homework 3

8.18(a, c, e, g)

Q. Relational Algebra:

$TLT \leftarrow \sigma_{Title = 'The\ Lost\ Tribe'}(BOOK)$

$BN \leftarrow \sigma_{Branch_Name = 'Sharpstown'}(LIBRARY_BRANCH)$

$RESULT \leftarrow \pi_{No_of_Copies}(BOOK_COPIES \bowtie TLT \bowtie BN)$

SQL:

SELECT NO_OF_COPIES FROM BOOK, BOOK_COPIES, LIBRARY_BRANCH
WHERE Title = 'The Lost Tribe' AND BranchName = 'Sharpstown'

Q. Relational Algebra

$LN \leftarrow \sigma_{Br_Card_No = Lr_Card_No}(BOOK_LOANS)$

$RB \leftarrow BORROWER \bowtie LN$

$NO \leftarrow \pi_{Card_No}(RB)$

$NL \leftarrow BORROWER - NO$

$RESULT \leftarrow \pi_{Name}(NL)$

SQL: SELECT Name FROM BORROWER BK WHERE NOT EXISTS (SELECT
* FROM BOOK_LOANS LR WHERE Br_Card_No = Lr_Card_No)

e. Relational Algebra:

$CM \leftarrow BC \text{ Branch-id} = Lb \text{ Branch-id } LIBRARY_BRANCH$

$R \leftarrow BOOK_COPIES \bowtie CM$

$Result \leftarrow \gamma L.branch_name, COUNT(*) (R)$

SQL:

SELECT Lr.Branch-Name, count(*) FROM Book_COPIES BC, LIBRARY_BRANCH Lb
WHERE BC.Branch-Id = Lb.Branch-Id GROUP BY Lb.Branch-Name

g. Relational Algebra:

$BN \leftarrow \sigma Branch_Name = 'Lentvut' \wedge Author_Name = 'Stephen King'$

$RL \leftarrow \gamma BOOK_AUTHORS \bowtie (BOOK)$

$RA \leftarrow RL \bowtie BOOK_COPIES \bowtie LIBRARY_BRANCH$

$Results \leftarrow \pi Title, No_of_copies (RL)$

SQL:

SELECT Title, No_of_copies FROM ((BOOK_AUTHORS NATURAL JOIN
BOOK) NATURAL JOIN BOOK_COPIES) NATURAL JOIN LIBRARY_BRANCH
WHERE Author_Name = 'Stephen King' AND Branch_Name = 'Lentvut'