Relational Algebra – Class Exercise – 1 https://dbis-uibk.github.io/relax/calc/gist/93fc0fcb193d2ca528edbd2470fce7a1

a. *Find the names of members who have borrowed any book published by "McGrawHill".*

b. *Find the names of members who have borrowed more than five books published by "McGrawHill". A member can borrow the same book more than once.*

c. *Find the names and membership numbers of members who have borrowed more than one different books published by "McGrawHill". A member can borrow the same book more than once.*

d. *For each publisher, find the name and membership number of members who have borrowed more than one book of that publisher.*

e. *Find the members who didn't borrow any 'Scholastic' books. Give the names and memberNo's of those members.*

f. Find the members who borrowed the most number of books.

g. *Find the pair of members who borrowed the same books.*

Solutions:

a. π memberNo,name (Member ⋈ Borrowed ⋈ (σ publisher='McGrawHill' Books))

b. R = σ (numBooks>5) (γ memberNo;count(isbn)->numBooks (Borrowed ⋈ (σ publisher='McGrawHill' Books)))
π name, numbooks (Member ⋈ R)

c. R1 = π memberNo,isbn (Borrowed ⋈ (σ publisher='McGrawHill' Books))
R2 = σ (numBooks>1) (γ memberNo;count(isbn)->numBooks R1)
π name,numBooks (Member ⋈ R2)

d. R = σ (numBooks>1) (γ memberNo,publisher;count(isbn)->numBooks (Borrowed ⋈ Books))
π publisher,name,memberNo (Member ⋈ R)

e. σ isbn=null (Member ⟕ (Borrowed ⋈ (σ publisher='Scholastic' Books)))

f. R1 = γ memberNo;COUNT(isbn)→numBooks (Borrowed)
   Member ⋈ R1 ⋈ (numBooks =maxNBooks) γ MAX(numBooks)->maxNBooks (R1)

g. Borrowed ⋈ (Borrowed.isbn=B.isbn ∧ Borrowed.memberNo<B.memberNo) (ρ B (Borrowed))