Devoir 1
Introduction aux bases de données

a) Algèbre relationnelle : π_{title} (Book)

   Calcul relationnel : { b.title : Book(b) }

b) Algèbre relationnelle : $\pi_{borrowerNo}$ (Borrower)

   Calcul relationnel : { b.borrowerNo: Borrower(b) }

c) Algèbre relationnelle : π_{title} ($\sigma_{year=2002}$(Book))

   Calcul relationnel : { b.title : Book(b) $\wedge$ b.year = 2002 }

d) Algèbre relationnelle : π_{copyNo} (BookCopy) $\bowtie_{BookCopy.copyNo != BookLoan.copyNo}$ π_{copyNo} (BookLoan)

   Calcul relationnel : { b.$_{copyNo}$: BookCopy(b) $\wedge$ ($\forall$c : BookLoan(c) $\wedge$ b.copyNo != c.copyNo)}

e) Algèbre relationnelle : π_{copyNo} ($\sigma_{ISBN=X}$ (BookCopy)) $\bowtie_{BookCopy.copyNo != BookLoan.copyNo}$ π_{copyNo} (BookLoan)

   Calcul relationnel : { (b.$_{copyNo}$: BookCopy(b) $\wedge$ b.ISBN=X $\wedge$ $\exists$c : BookLoan(c) $\wedge$ b.copyNo != c.copyNo)}

f) Algèbre relationnelle : $\pi_{borrowerName}$ (Borrower $\bowtie_{Borrower.borrowerNo=BookLoan.borrowerNo}$ BookLoan $\bowtie_{BookLoan.copyNo=BookCopy.copyNo}$ π_{copyNo} ($\sigma_{ISBN=X}$ (BookCopy)))

   Calcul relationnel : { b.borrowerName : BookCopy(b) $\wedge$ ($\exists$c$\exists$d:Bookloan(c) $\wedge$ c.borrowerNo=BookLoan $\wedge$ BookCopy(d) $\wedge$ c.copyNo=d.copyNo $\wedge$ d.ISBN=X) }

g) Algèbre relationnelle : $\pi_{borrowerName}$ (Borrower $\bowtie_{Borrower.borrowerNo=BookLoan.borrowerNo}$ BookLoan)
   Calcul relationnel : {b.borowerName:Borrower(b) $\wedge$ ($\exists$c : BookLoan(c) $\wedge$ b.borrowerNo=c.borrowerNo}

h) $\rho_R(\text{bookCount}) \; \mathfrak{I}_{\text{COUNT bookNo}} \; (\sigma_{\text{ISBN= 0-321-52306-7}} (\text{BookCopy})))$

i) $\rho_R(\text{bookCount}) \; \mathfrak{I}_{\text{COUNT bookNo}} \; (\sigma_{\text{ISBN= 0-321-52306-7}} (\text{BookCopy} \bowtie_{\text{BooyCopy.bookNo!=BookLoan.bookNo}} \text{BookLoan}) \quad)$