Databases HW2 By Daniel McDonough

Question 1)

Book(ISBN,Publishername,NumPages,title,type)
FOREIGN KEY Book(Publishername) REFERENCES Publisher(name)

Publisher(name,phone,address,startyear)

Author(ID,address,Dob,name)

AuthorPhone(ID,phone#)
FOREIGN KEY AuthorPhone(ID) REFERENCES Author(ID)

Contract-Lines(Linenum,ContractID,booktype,duedate,Partial Payment)
FOREIGN KEY Contract-Lines(ContractID) REFERENCES Contract(ContractID)

Novel(ISBN,sequal)
FOREIGN KEY Novel(ISBN) REFERENCES Book(ISBN)
Textbook(ISBN,edition)
FOREIGN KEY Textbook(ISBN) REFERENCES Book(ISBN)
Writes(ID,ISBN)
FOREIGN KEY Writes(ISBN) REFERENCES Book(ISBN)
FOREIGN KEY Writes(ID) REFERENCES Author(ID)

Publishes(ISBN, publish date)
FOREIGN KEY Publishes(ISBN) REFERENCES Book(ISBN)

Contract(ContractID,AuthorID,Publishername,Numbooks,Date,totalPayment)
FOREIGN KEY Contract(AuthorID) REFERENCES Author(ID)
FOREIGN KEY Contract(Publishername) REFERENCES Publisher(name)

Question 2)

Q1) $\Pi_{name}(\sigma_{phone\#=\text{'1-555-444-7777'}}(\text{Author} \bowtie \text{AuthorPhone}))$

Q2) $\Pi_{ISBN,PublisherName,NumPages,Title,type,sequal,edition}(\sigma_{ISBN = \text{'1112223333444'}}(\text{Book}) \bowtie (\sigma_{ISBN = \text{'1112223333444'}}(\text{Textbook}) \bowtie (\sigma_{ISBN = \text{'1112223333444'}}(\text{Novel}))))$

Q3) $\Pi_{publishername\ ,Authorname,PublisherAddress,AuthorAddress,date}(\sigma_{date > \text{'Jan-01-2007'} \wedge date < \text{"Dec-31-2008"},\ totalPayment > \text{'100000'}}(\text{Contract} \bowtie \text{Author} \bowtie \text{Publisher})$

Q4) $\Pi_{name}(\sigma_{\ books>\text{'10'}}(\gamma_{publishername,books <- count(ISBN)}(\text{Book})))$

Q5) $\Pi_{numpages}(\sigma_{title=\text{'The Country'},edition=\text{'3'}}(\text{book} \bowtie \text{textbook})$

Q6) R1 <- $\Pi_{contractID}(\text{Contract})$

R2 <- $\Pi_{contractID}(\sigma_{totalpayment = currentPayments}(\Pi_{\ ContractID,totalPayment}(\text{Contract} \bowtie (\gamma_{contractID,currentPayments<-sum(PartialPayment)}(\text{contract-Lines})))$

R3 <- R1-R2

Question 3)

Q1) $\Pi_{title,year}$ (Book $\bowtie$($\sigma_{authorname = \text{“Mark Smith”}}$ (Author)$\bowtie$ ($\sigma_{authorname=\text{'2'}}$($\gamma_{ISBN,authorname<-count(name)}$(WrittenBy)))

Q2) R1<-($\gamma_{basketID,booksinbag<-sum(number)}$(BasketContains))$\bowtie$ShoppingBasket)

$\Pi_{email,totalbooks}(\gamma_{email,totalbooks<-sum(booksinbag)}(R1) \bowtie (Customer))$

Q3) $\delta(\Pi_{name}((\sigma_{\ year=\text{'2010'} \vee year = \text{'2011'}}(\text{Book})) \bowtie \text{WrittenBy}))$

Question 4)

Q1)

R⋈S			
X	B	**C**	**V**
1	2	**5**	**1**
1	2	**7**	**1**

Q2) Empty

Q3)

R⋈S	
A	C
3	5

Q4)

R		
X	B	C
1	2	5
3	4	6
1	2	7

Q5) Empty