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Part 1 Universal Schema

Attribute	
SSN	A
Campus address	B
Home address	C
Phone	D
Occupation(student or professor)	E
Name	F
Email(For contacting about expired card, or overdue books)	G
Borrow Limit(5 Max books)	H
Book Type(If it’s a rare book can't lend)	I
Library Card Number	J
Expiration date(For books)	K
Loan date(For books)	L
ISBN	M
Title	N
Author	O
Edition	P
Language	Q
Book Description	R
Copy Number	S
Status	T
Subject	U
Staff Id	V

Staff Name	W

Job Title	X
Borrow ID	Y

Part 2 Dependency set(Minimal cover)
1. A-> BCDEFGHJ
2. S->IMNOPQRU
3. AM->KLT
4. V->WX

1. SSN->Campus address, Home address, Phone, Occupation, Name, Email, Borrow Limit, Library Card Number

2. Copy Number->Book Type,ISBN, Title, Author, Edition, Language, Book Description,Subject

3.SSN x ISBN ->Loan Date, Expiration Date, Status

4.Staff Id->Staff Name, Job title

Part 3 3NF
Member(ABCDEFGHJ)
BookCopy(SM)
Book(MNOPQRU)
Borrowed(MAKLTY)
Staff(UVW)

FK= Foreign Key

Member(**SSN,**Campus address, Home address, Phone, Occupation, Name, Email, Borrow Limit, Library Card Number)

BookCopy(**Copy Number,ISBN(FK**))

Book(**ISBN**, Title, Author, Edition, Language, Book Description, Subject)

Borrowed(ISBN(FK),SSN(FK),CopyNumber(FK),Loan date, Expiration date,Status,**BorrowID**)

(Added BorrowID to make it easier to insert data into the Borrowed table)

Staff(**Staff Id** ,Staff Name, Job Title)

Part 4 Non Trivial functions and queries involved in the functions

Furqans functions

AUTHORS OF BORROWED BOOKS THAT BEGINS WITH R (can be changed to any letter)

```
SELECT b.Author, b.ISBN
FROM Borrowed bor, Book b
WHERE bor.ISBN = b.ISBN AND b.Author LIKE 'R%'
```

How many overdue books do all Professors combined have

```
SELECT m.Occupation, COUNT(b.Borrow_ID)
FROM Borrowed b, Member m
WHERE b.SSN = m.SSN AND b.Status = "Overdue" AND m.Occupation = "Professor"
```

Only Professor with overdue books with name beginning with letter J but have a overdue book in a week

```
SELECT m.Name, b.status
FROM Member m, Borrowed b
WHERE m.Name LIKE 'J%' AND b.SSN = m.SSN AND b.Status = "Overdue" AND
m.Occupation = "Professor" AND
DATEDIFF(CAST(NOW() AS DATE), CAST(b.Expiration_date AS DATE)) >= 7
```

All books past expiration date ordered by occupation

```
SELECT m.Occupation, COUNT(b.Borrow_ID)
FROM Member m, Borrowed b
WHERE b.SSN = m.SSN AND b.Status = "Overdue"
GROUP BY m.Occupation
```

List all books and amount of copy #'s they have

```
Select b.title,b.ISBN, COUNT(bc.Copy_Number)
FROM Book b, BookCopy bc
WHERE b.ISBN = bc.isbn
GROUP BY b.ISBN
```

Jeffreys Function

Check students active borrow books

Select **b**.Title, **b**.Author, **bor**.Loan_Date,**bor**.Expiration_Date,**m**.Name,m.Occupation
From Borrowed **bor** ,Book **b**, Member **m**, BookCopy **bc**
Where **bor**.ssn = **m**.ssn AND **b**.ISBN = **bc**.ISBN AND **b**.ISBN = **bor**.isbn AND **m**.Occupation = ‘student’ AND **bor**.Status = ‘borrowed’ AND bc.CopyNumber = bor.CopyNumber