CS-303 - Assignment 1

Monu Kumar Soyal - 200010029

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Answer 1:

[a]

(i). Names of all branches located in "Chicago"

$$\pi_{branch\_name}(\sigma_{branch\_city=\text{“}Chicago\text{”}}(Branch))$$

(ii). Names of all borrowers who have a loan in the branch "Downtown"

$$\pi_{customer\_name}(\sigma_{(branch\_name=\text{“}Downtown\text{”})}(loan \bowtie borrower)$$

[b] Primary Key / Foreign key

Table	Primary Key	Foreign Key
Branch	branch_name	None
customer	customer_name	None
loan	loan_number	branch_name (references to Branch)
borrower	customer_name, loan_number	customer_name (references to customer),loan_number (references to loan)
account	account_number	branch_name (references to Branch)
depositor	customer_name, account_number	customer_name(references to customer), account_number(references to account)

[c]

(i). Loan numbers with a loan value greater than $10,000

$$\pi_{loan\_number}(\sigma_{amount>10000}(loan))$$

(ii). Names of all depositors who have an account with a value greater than $6,000

$$\pi_{customer\_name}(\sigma_{balance>6000}(account \bowtie depositor))$$

(iii). Names of all depositors who have an account with a value greater than $6,000 at the "Uptown" branch.

$$\pi_{customer\_name}(\sigma_{balance>6000 \ \wedge \ branch\_name="Uptown"}(account \bowtie depositor))$$

Answer 2:

(i). $\pi_{Name}(\sigma_{age>25}(User))$

Name
Victor
Jane

(ii). $(\sigma_{Id>2 \ \vee \ age!=31}(User))$

Id	Name	Age	Gender	OccupationId	CityId
1	John	25	Male	1	3
2	Sara	20	Female	3	4
3	Victor	31	Male	2	5
4	Jane	27	Female	1	3

(iii). $(\sigma_{User.OccupationId=Occupation.OccupationId}(User \ X \ Occupation))$

Id	Name	Age	Gender	OccupationId	CityId	OccupationId	OccupationName
1	John	25	Male	1	3	1	Software Engineer
2	Sara	20	Female	3	4	3	Pharmacist
3	Victor	31	Male	2	5	2	Accountant
4	Jane	27	Female	1	3	1	Software Engineer

(iv). $(User \bowtie Occupation \bowtie City)$

Id	Name	Age	Gender	OccupationId	CityId	OccupationName	CityName
1	John	25	Male	1	3	Software Engineer	Boston
2	Sara	20	Female	3	4	Pharmacist	New York
3	Victor	31	Male	2	5	Accountant	Toronto
4	Jane	27	Female	1	3	Software Engineer	Boston

(v). $\pi_{Name,Gender}(\sigma_{CityName=\text{“}Boston\text{”}}(User \bowtie City))$

Name	Gender
John	Male
Jane	Female
