Lab Exercise 3 (Relational Algebra)

1. The following tables form part of a database held in a Relational Database Management System:

   Operator (**opCode**, opName)
   Journey (**opCode, destinationCode**, price)
   Destination (**destinationCode**, destinationName, distance)

   a. List the details of journeys less than £100.

   b. List the names of all destinations.

   c. Find the names of all destinations within 20 miles.

2. For the relations R and S given below:

R

A	B	C
1	2	3
4	5	6
7	8	9

S

B	C	D
2	3	10
2	3	11
6	7	12

Compute:

(i) $\Pi_{A,C}(R)$ (ii) $\sigma_{B=2}(S)$

3. Produce the output for the following relational algebra expressions for the relations below.

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

Occupation

OccupationId	OccupationName
1	Software Engineer
2	Accountant
3	Pharmacist
4	Library Assistant

City

CityId	CityName
1	Halifax
2	Calgary
3	Boston
4	New York
5	Toronto

a. $\Pi_{Name}\left(\sigma_{Age>25}(User)\right)$

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

c. $\sigma_{User.OccupationId=Occupation.OccupationId}(User \times Occupation)$

d. $User \bowtie Occupation \bowtie City$

e. $\Pi_{Name,Gender}\left(\sigma_{CityName="Boston"}(User \bowtie City)\right)$