ASSIGNMENT 4

1- Define the five basic relational algebra operations. Define the Join, Intersection, and Division operations in terms of these five basic operations.

2- Discuss the differences between the five Join operations: Theta join, Equijoin, Natural join, Outer join, and Semijoin. Give examples to illustrate your answer.

A) For following questions, you should formulate the following queries in relational algebra according to relational schemas that are depicted below.

Employee (empNo, fName, lName, address, DOB, sex, position, deptNo)
Department (deptNo, deptName, mgrEmpNo)
Project (projNo, projName, deptNo)
WorksOn (empNo, projNo, dateWorked, hoursWorked)

1. List all employees.

2. List all the details of employees who are female.

3. List the names and addresses of all employees who are managers.

4. Produce a list of the names and addresses of all employees who work for the IT department.

5. Produce a list of the names of all employees who work on the SCCS project.

6. Produce a complete list of all employee whose manager name is “Zoran.”
B) What are the results of following relational algebra operations?

Tables:

<table>
<thead>
<tr>
<th>student</th>
<th>enrolledIn</th>
<th>subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>id</td>
<td>name</td>
<td>id</td>
</tr>
<tr>
<td></td>
<td></td>
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</tr>
<tr>
<td>1234</td>
<td>joe</td>
<td>1234</td>
</tr>
<tr>
<td>4000</td>
<td>hector</td>
<td>1234</td>
</tr>
<tr>
<td>2000</td>
<td>ling</td>
<td>1234</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4000</td>
</tr>
</tbody>
</table>

1- \( \Pi_{\text{name}}(\text{student}) \)

2- \( \sigma_{\text{code}=\text{cp1500 OR code=cp3010}}(\text{subject}) \)

3- \( \sigma_{\text{name}=\text{joe}}(\text{student} \bowtie \text{enrolledIn}) \)

4- \( \text{student} - \sigma_{\text{name}=\text{ling}}(\text{student}) \)

5- \( \text{student} \bowtie_{\text{student}.id = \text{enrolledIn}.id} \text{enrolledIn} \)

6- \( \Pi_{\text{id,code}}(\sigma_{\text{name}=\text{joe}}(\text{student} \bowtie \text{enrolledIn}) \)

7- \((\sigma_{\text{name}=\text{hector}}(\text{student})) \bowtie \text{enrolledIn} \bowtie \text{subject} \)

8- \( \Pi_{\text{name, lecturer}}(\sigma_{\text{lecturer}=\text{curtis}}(\text{subject} \bowtie \text{enrolledIn} \bowtie \text{student})) \)

9- Who teaches cp1500?