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I) Writing algebra relationship according to questions below:

1) Find employee who work in room 4

$A \leftarrow \Pi_{departmentID}\ (\sigma_{departmentName = "room\ 4"}\ (DEPARTMENT))$

$B \leftarrow A \bowtie EMPLOYEES$

2) Find employees with salaries above 30 000

$Result \leftarrow \sigma_{salary > 30000}\ (EMPLOYEES)$

3) For each department, indicate the department name and room location

$Result \leftarrow \Pi_{departmentName, address}\ (DEPARTMENT \bowtie DEPARTMENTADDRESS)$

4) The average salary of all female employee

$A \leftarrow \Pi_{salary}\ (\sigma_{gender = "Female"}\ (EMPLOYEES))$

$Result \leftarrow \mathcal{F}_{average\ (salary)}\ (A)$

5) Find the names and addresses of all employees of the "Nghien Cuu" department

$A \leftarrow \Pi_{departmentID}\ (\sigma_{departmentName = "Nghien\ Cuu"}\ (DEPARTMENT))$

$Result \leftarrow \Pi_{lastName, middleName, firstName, address}\ (EMPLOYEES \bowtie A)$

6) Find the employees who are both project managers and within the "Research" department

$M \leftarrow \Pi_{E_2.employeeID}\ (EMPLOYEES\ E_1 \bowtie_{E_1.managerID = E_2.employeeID} EMPLOYEES\ E_2)$

$R \leftarrow \Pi_{departmentID}\ (\sigma_{departmentName = "Research"}\ (DEPARTMENT))$

$E \leftarrow \Pi_{employeeID}\ (R \bowtie EMPLOYEES)$

$Result \leftarrow (M \bowtie EMPLOYEES) \cap (E \bowtie EMPLOYEES)$

7) Find employees who are not involved in any projects.

$E \leftarrow \Pi_{employeeID}\ (ASSINGNMENT)$

$B \leftarrow \Pi_{employeeID}\ (EMPLOYEES) - E$

$Result \leftarrow B \bowtie EMPLOYEES.$