Homework #2

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Question #1

a. Valid Operation

b. Valid Operation

c. Key Constraint (Key #4 is already taken)

d. Key Constraint, Not Null Constraint (Key cannot be null)

e. Valid Operation

f. Valid Operation

g. Integrity Constraint (Did not update `WORKS_ON` or `DEPENDANT`)

h. Integrity Constraint (Did not update `WORK_ON`)

i. Valid Operation

j. Integrity Constraint (Did not update `WORKS_ON`)

k. Valid Operation

Question #2

Grader note: the rho (ρ) is too small in LaTeXto be distinguished from a subscript, so instead P is used in it's place.

a. $\Pi_{\text{Fname, Minit, Lname}}(\sigma_{\text{Dno = '5'} \wedge \text{hours = }>10}(\texttt{Project} \bowtie_{\text{Dname = 'ProjectX'}} \texttt{Works\_On}))$

b. $\Pi_{\text{Fname = Dependent\_Name}}(\texttt{Employee} \bowtie \texttt{Dependent})$

c. $\Pi_{\text{Fname, LName}}(\texttt{Employee} \div \Pi_{\text{Super\_SSN}}(\sigma_{\text{Fname = 'Frankline'} \wedge \text{Lname = 'Wong'}}\texttt{DEPARTMENT}))$

d. $\Pi_{\text{Lname, Sum\_Hours}}(s_{\text{name}}\mathcal{F}_{\text{sum hours}}(\texttt{PROJECT} \bowtie \rho_{\text{ESSN = SSN}}\texttt{Works\_On}))$

e. $\texttt{Employee1} \leftarrow \texttt{Employee} \bowtie \rho_{\text{ESSN = SSN}}\texttt{Work\_On}$
$\Pi_{\text{Lname, PNo}}\texttt{Employee1} \div \Pi_{\text{Pno}}\texttt{Employee1}$

f. $\Pi_{Lname}(\Pi_{\text{Lname, SSN}}\texttt{Employee} - \Pi_{\text{Lname, SSN}}(\texttt{Employee} \bowtie \rho_{\text{ESSN = SSN}}\texttt{Works\_On}))$

g. $\Pi_{\text{Fname, Average Salary}}({}_{\text{DName}}\mathcal{F}_{\text{average salary}}\text{P}_{\text{Dno = Dnumber}}\texttt{Employee} \bowtie (\texttt{Department} \bowtie \texttt{Works\_On}))$

h. ${}_{\text{Sex}}\mathcal{F}_{\text{average salary}}(\sigma_{\text{sex = 'female'}}\texttt{Employee})$

i. $\texttt{Department1} \leftarrow \text{P}_{\text{DNumber = DNo}}\texttt{Project} \bowtie \text{P}_{\text{ESSN = SSN}}\texttt{Works\_On}$
$\Pi_{\text{Fname , Address}}((\texttt{Employee} \bowtie \texttt{Department1} - \sigma_{\text{Dlocation = 'Houston'}}\texttt{Department1}) \bowtie (\sigma_{\text{Dlocation = 'Houston'}}\text{P}_{\text{DNumber = DNo}}(\texttt{Department} \bowtie \texttt{Dept\_Locations})))$

j. $\Pi_{\text{Lname}}(\texttt{Employee} \bowtie_{\text{SSN = MGR\_SSN}} \texttt{Department} \bowtie \text{P}_{\text{ESSN = SSN}}) - \Pi_{\text{Lname}}\texttt{Employee}$

Question #3

- `Cust#` (`ORDER`)
- `Order` (`ORDER_ITEM`, `SHIPMENT`)
- `Item#` (`ORDER`, `ITEM`)
- `Warehouse#` (`SHIPMENT`)

Assumptions

- Table headers with the same name are not unique.