

SQL Database Implementation Assumptions:

At the next admission, previous future visits are annulled. A patient can only have one future visit at a time. The only admission that will have a future visit is the most recent one.

Below is the relational algebra used to figure out how to implement the queries.

Q1: $\sigma_{\text{occupiedFlag}=1}(\text{Room})$

Q2: $\sigma_{\text{supervisorID}=10}(\text{Employee})$

Q3: $\text{Result} \leftarrow \gamma_{\text{Patient_SSN}, \text{TotalInsured} \leftarrow \text{Sum}(\text{Payment})}(\Pi_{\text{Patient_SSN}, \text{InsurancePayment}}(\text{Admission}))$

Q4: $R1 \leftarrow (\gamma_{\text{patient_SSN}, \text{visits} \leftarrow \text{count}(\text{Num})}(\text{Admission}))$

$\text{Result} \leftarrow \Pi_{\text{SSN}, \text{firstName}, \text{lastName}, \text{visits}}(\text{Patient} \bowtie_{\text{Patient.SSN}=R1.\text{patient_SSN}} R1)$

Q5: $\Pi_{\text{roomNum}}(\sigma_{\text{Serial\#}='A01-02X'}(\text{Equipment}))$

Q6: $R1 \leftarrow (\gamma_{\text{EmpID}, \text{TotalRoom} \leftarrow \text{count}(\text{RoomNum})}(\text{RoomAccess}))$

$R2 \leftarrow \Pi_{\text{Max}(\text{TotalRoom})}(R1)$

$\text{Result} \leftarrow \sigma_{\text{TotalRoom}=R2}(R1)$

Q7: $\text{Result} \leftarrow \gamma_{\text{emprank}, \text{count}(\text{emprank})}(\text{Employee})$ (need to rename)

Q8: $R1 \leftarrow \Pi_{\text{Patient_SSN}}(\sigma_{\text{Future_Visit} \neq \text{NULL}}(\text{Admission}))$

$\text{Result} \leftarrow \Pi_{\text{SSN}, \text{FirstName}, \text{LastName}, \text{Future_Visit}}(\text{Patient} \bowtie R1)$

Q9: $R1 \leftarrow \sigma_{\text{count} < 3}(\gamma_{\text{TypeID}, \text{Quanityty} \leftarrow \text{count}(\text{Serial\#})}(\text{Equipment}))$

$\text{Result} \leftarrow \Pi_{\text{TypeID}, \text{model}, \text{count}}(R1 \bowtie_{\text{TypeID}=ID} \text{EquipmentType})$

Q10: $\Pi_{\text{FutureVisit}}(\sigma_{\text{Patient_SSN}=111223333}(\text{Admission}))$

Q11: $R1 \leftarrow \Pi_{\text{Num}}(\sigma_{\text{Patient_SSN}=111223333}(\text{Admission}))$

$R2 \leftarrow \gamma_{\text{DoctorID}, \text{count}(\text{DoctorID})}(\text{Examine} \bowtie_{\text{AdmissionNum}=\text{Num}} R1)$

$\text{Result} \leftarrow \Pi_{\text{DoctorID}}(\sigma_{\text{count} < 2}(R2))$

Q12: $R1 \leftarrow \Pi_{\text{TypeID}}(\sigma_{\text{PurchaseYear}=2010}(\text{Equipment}))$

$R2 \leftarrow \Pi_{\text{TypeID}}(\sigma_{\text{PurchaseYear}=2011}(\text{Equipment}))$

$\text{Result} \leftarrow \delta(R1 \cap R2)$