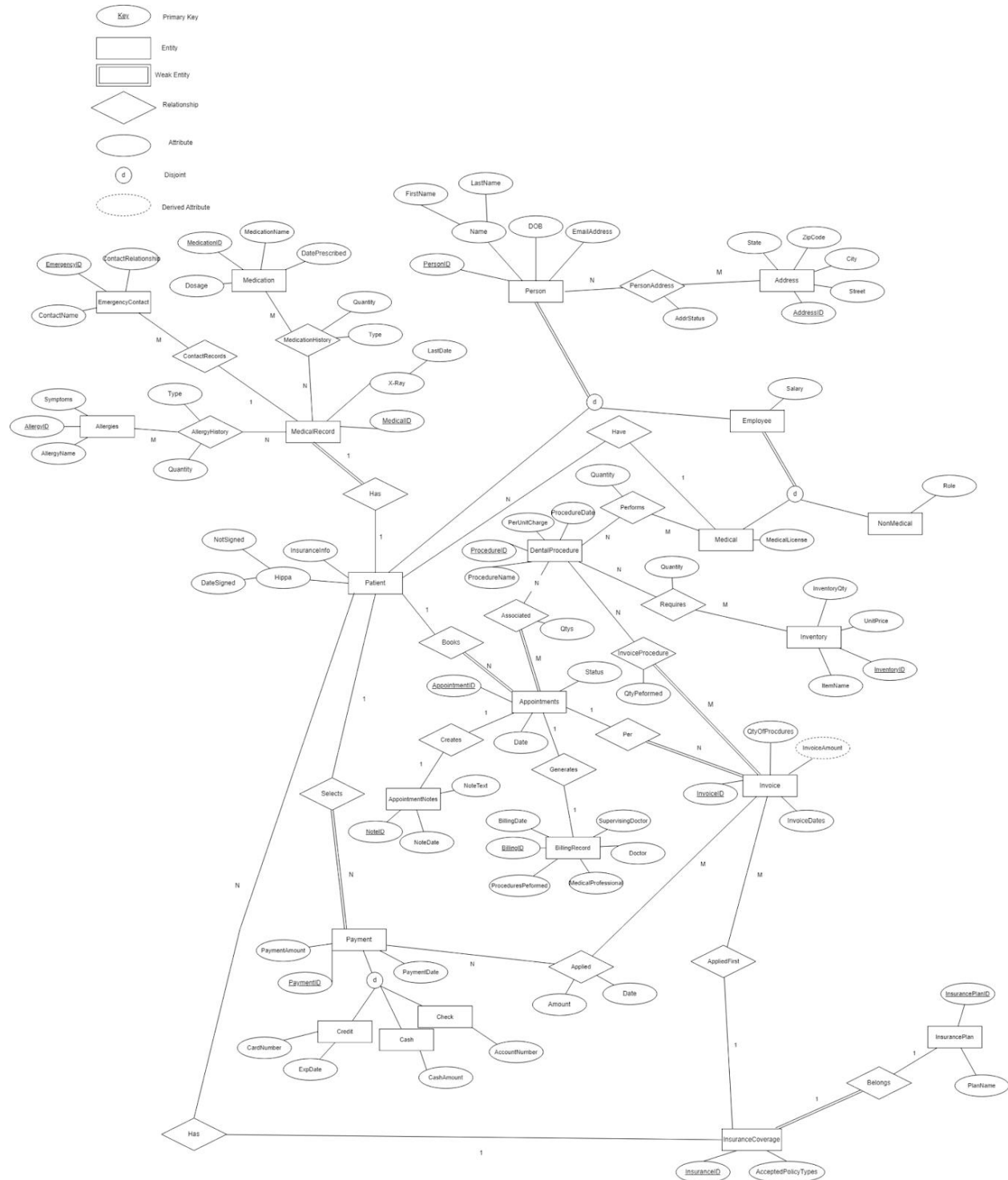


## Current ERD:



## Final Relational Schema:

- Person(PersonID(PK), FirstName, LastName, DOB, EmailAddress)
- Patient (PatientID(PK), DateSigned, NotSigned, **MedID(FK)**)

- PatientInsurance(**InsuranceID(PK)**, InsuranceInfo,)
- Employee(**EmployeeID(PK)**, Salary)
- Address(**AddressID(PK)**, Street, City, ZipCode, State)
- MedicalRecord(**MedicalID(PK)**, LastDate, **PatientID(FK)**)
- Allergies(**AllergyID(PK)**, Symptoms, AllergyName)
- Medication(**MedicationID(PK)**, MedicationName, DatePrescribed, Dosage)
- EmergencyContact(**EmergencyID(PK)**, ContactName, ContactRelationship, **MedicalID(FK)**)
- Medical(**MedID(PK)**, MedicalLicense)
- NonMedical(**NonMedID(PK)**, Role)
- DentalProcedure(**ProcedureID(PK)**, PerUnitCharge, ProcedureName, ProcedureDate)
- Inventory(**InventoryID(PK)**, InventoryQty, UnitPrice, ItemName)
- Appointments(**AppointmentID(PK)**, Date, Status **PatientID(FK)**, **BillingID(PK)**)
- AppointmentNotes(**NoteID(PK)**, NoteDate, NoteText, **AppointmentID(FK)**)
- BillingRecord(**BillingID(PK)**, BillingDate, SupervisingDoctor, Doctor, MedicalProfessional, ProceduresPerformed, **AppointmentID(FK)**)
- Invoice(**InvoiceID(PK)**, QtyOfProcedures, InvoiceDates, **AppointmentID(FK)**, **InsuranceID(FK)**)
- Payment(**PaymentID(PK)**, PaymentAmount, PaymentDate, **PatientID(FK)**)
- Credit(**CreditID(PK)**, CardNumber, ExpDate)
- Cash(**CashID(PK)**, CashAmount)
- Check(**CheckID(PK)**, AccountNumber)
- InsuranceCoverage(**InsuranceID(PK)**, AcceptedPolicyTypes)
- InsurancePlan(**InsurancePlanID(PK)**, PlanName **InsuranceID(FK)**)
- PersonAddress(**PersonID(PK)**, **AddressID(PK)**, AddrStatus)
- Associated(**ProcedureID(PK)**, **AppointmentID(PK)**, Qtys)
- InvoiceProcedure(**ProcedureID(PK)**, **InvoiceID(PK)**, QtyPerformed)
- Applied(**PaymentID(PK)**, **InvoiceID(PK)**, Date, Amount)
- Requires(**ProcedureID(PK)**, **InventoryID(PK)**, Quality)
- Performs(**ProcedureID(FK)**, **MedID(FK)**, Quantity)
- AllergyHistory(**AllergyID(PK)**, **MedicalID(PK)**, Quantity, Type)
- MedicationHistory(**MedicationID(PK)**, **MedicalID(PK)**, Quantity, Type)

### Relational Alegbra:

- 1A  $\rightarrow \sigma$  (PT.PatientID = P.PersonID AND M.MedicationID = PT.PatientID  
 1B  $\rightarrow \pi$  (P.LastName, M.MedicationName, M.DatePrescribed, M.Dosage) (Person  $\bowtie$  Medication  $\bowtie$  Patient))(1B)
- 2A  $\rightarrow \sigma$  (P.PersonID = IP.InsuranceID AND IP.InsurancePlanID = PT.PatientID AND IC.InsuranceID = IP.InsurancePlanID AND IP.PlanName = 'Delta Dental Insurance')  
 2B  $\rightarrow \pi$  (p.FirstName, p.LastName, p.DOB, p.EmailAddress) (Person  $\bowtie$  InsurancePlan  $\bowtie$  Patient  $\bowtie$  InsuranceCoverage))(2A)
- 3A  $\rightarrow \sigma$  (DP.ProcedureID = BR.BillingID AND DP.ProcedureID = M.MedID AND M.MedID = BR.BillingID AND BR.Doctor = 'Dr. Smillow')  
 3B  $\rightarrow \pi$  (DP.ProcedureName, DP.ProcedureDate, BR.Doctor) (DentalProcedure  $\bowtie$  BillingRecord  $\bowtie$  Medical))(3A)

4. 4A  $\leftarrow \sigma(P.\text{PersonID} = PT.\text{PatientID} \text{ AND } AP.\text{AppointmentID} = PT.\text{PatientID} \text{ AND } I.\text{AppointmentID} = AP.\text{AppointmentID} \text{ AND } I.\text{InvoiceDate} < 30 \text{ AND } A.\text{Amount} > 10)$   
 4B  $\leftarrow \pi(P.\text{FirstName}, P.\text{LastName}, P.\text{EmailAddress}, I.\text{InvoiceDate})(\text{Person} \bowtie \text{Patient} \bowtie \text{Invoice} \bowtie \text{Appointments} \bowtie \text{Applied})(4A)$

5. 5A  $\leftarrow (\sigma P.\text{PersonID} = PT.\text{PatientID} \wedge PY.\text{PatientID} = PT.\text{PatientID} \wedge PY.\text{PaymentDate} < \text{CURRENT\_DATE})$   
 5B  $\leftarrow \pi(P.\text{FirstName}, P.\text{LastName}, P.\text{EmailAddress}, \text{SUM}(PY.\text{PaymentAmount})) \text{ AS } \text{TotalRevenue} (\text{Person} \bowtie \text{Patient} \bowtie \text{Payment})(5A)$

6. 6A  $\leftarrow \sigma(\text{QtyProcedure} < 5 \text{ AND } \text{ProcedureDate} \geq \text{'CurrentDate'} - \text{'CurrentYearDays'})$   
 (DentalProcedure  $\bowtie$  Invoice)  
 6B  $\leftarrow \pi(P.\text{FirstName}, P.\text{LastName}) (\text{Medical} \bowtie \text{Person})(6A)$

7. 7A1  $\leftarrow \text{FMAX}(\text{PerUnitCharge})(\text{DentalProcedure})$  7B  $\leftarrow$   
 $\text{FCOUNT}(\text{ProcedureName})(\text{DentalProcedure} \bowtie 7A1)$  ResultG  $\leftarrow \pi(\text{ProcedureID},$   
 $\text{ProcedureName}, \text{PerUnitCharge}, \text{QtyOfProcedures})(\text{DentalProcedure} \bowtie \text{Invoice} \bowtie 7B)$

8. 8A1  $\leftarrow \text{FCOUNT}(\text{PaymentID}), \text{SUM}(\text{PaymentAmount})(\sigma(\text{Credit} = 1)(\text{Payment}))$  8A2  $\leftarrow$   
 $\text{FCOUNT}(\text{PaymentID}), \text{SUM}(\text{PaymentAmount})(\sigma(\text{Cash} = 1)(\text{Payment}))$  8A3  $\leftarrow$   
 $\text{FCOUNT}(\text{PaymentID}), \text{SUM}(\text{PaymentAmount})(\sigma(\text{Check} = 1)(\text{Payment}))$  Result  $\leftarrow \text{Credit} \cup$   
 $\text{Cash} \cup \text{Check}$

9. ResultI  $\leftarrow \pi(\text{PlanName}, \text{InsurancePlanID}, \text{FCOUNT}(\text{PatientID}))(\text{InsurancePlan} \bowtie$   
 $\text{InsuranceCoverage} \bowtie \text{Patient})$