Data Modeling Example Like Hwk3

You are the data modeler for Clampett Airlines (CA). Their motto is "Our Customers Stand Up for Clampett Airlines." They need to upgrade their old Aircraft Maintenance and Airline Reservation Systems.

**Part 1. Aircraft Maintenance System**

CA has a diverse set of aircraft including jets, helicopters, and balloons. Each of the aircraft has a unique serial number for identification. The maximum number of seats varies on each aircraft.

Aircraft(serialNr, maxSeats, aircraftType, lastMaintDt, successProbability) - **SuperClass**

Previously, CA wasn't consistent in tracking maintenance on the aircraft. CA now wants to know the last maintenance date for each aircraft. Additionally, they wish to record each maintenance activity including the particular aircraft, date, work description, and employee ID of the mechanic who did the work. For new aircraft, there won't be any maintenance activity. For older aircraft, there should be many maintenance activities. Because of better maintenance, CA also wants to record the probability of a successful flight for each aircraft.

Maintenance(serialNr, maintDt, workDescTxt, mechanicEmpId,) (serialNr, mainDt = key)

Aircraft 1 … 0N Maintenance

For CA's balloons, CA must also know the lift type. For jets and helicopters, CA needs to know the engineType and number of pilots needed. For helicopters, they also need to know whether it can land on water. For jets, CA also wants to know its fuel consumption ratio.

Balloon(serialNr, liftType) **-subclass**

Jet(serialNr, engineType, numberPilots, fuelConsumptionRatio) **-subclass**

Helicopter(serialNr, engineType, numberPilots, waterLandingInd) **-subclass**

Show a UML diagram of the data model for this Aircraft Maintenance System. Underline the keys.

**Part 2. Airline Reservation System**

Customers will use the new website to make flight reservations.

Reservation(confNm, email, )

When a customer creates a reservation, the reservation is assigned a reservation confirmation number. A reservation requires an email address. The CA Call Center personnel in Bugtussle can look up reservations by email when the customer doesn't have his/her confirmation number. CA doesn't provide assigned seating.

There may be many passengers associated with a reservation, but there must be at least one. For each passenger, CA wants to record name, gender, and birthdate. Within a reservation, you may assume passenger names are unique.

Reservation 1…1N Passenger

Passenger(confNm, name, gender, birthdt)

A reservation may also reference one or more scheduled flights. Most reservations have round trip flights. CA calls each flight for a reservation a flight leg.

Reservation … 1N FlightLeg

FlightLeg(confNm, flightNr, flighDt)

CA maintains a flight schedule which lists flight numbers by date. The flight numbers are reused each week for a different scheduled flight. (This means that if someone wants a reservation on flight #102, the date is also needed.) For each scheduled flight, CA records the airplane's serial number, the origin airport, destination airport, expected departure and arrival times, the maximum number of seats, and the number of seats sold. CA always tries to sell 10% more seats than it has on each scheduled flight.

FlightSchedule(flightNr, flightDt, serialNr, origin, dest, expDepTm, expArrTm, maxNumberSeats, numberSeatsSold)

Show the data model for the CA reservation system using:

1. Relational Model

FlightSchedule(flightNr, flightDt, serialNr, origin, dest, expDepTm, expArrTm, numberSeatsSold)

Reservation(confNm, email)

FlightLeg(confNm, flightNr, flightDt)

Passenger(confNm, name, gender, birthDate)

B. UML Diagram using numeric ranges

For both A and B, underline keys.