Raw Data to First Normal Form (1NF)

1NF requires:

- Elimination of repeating groups.
- Each column contains atomic values (no multi-valued or nested attributes).

Example Transformation to 1NF: In the Pilot table, if AircraftTypeRestrictions initially holds multiple values (e.g., "Helicopter, Jet, Propeller"), we need to ensure each entry is atomic. This can be achieved by:

- Creating a separate table Pilot_AircraftTypeRestriction to store each restriction individually, with columns PersonID and AircraftTypeRestriction.

First Normal Form (1NF) to Second Normal Form (2NF)

2NF requires:

- The table must be in 1NF.
- All non-key attributes are fully functionally dependent on the primary key.

To achieve 2NF, we must:

- Remove partial dependencies (where attributes depend only on a part of a composite key).

Example Transformation to 2NF: In the Lease_Agreement table, if LeaseID is the primary key, it fully determines LessorID, LesseeID, AircraftRegistrationNumber, etc. However, if we had a composite key (like LessorID, AircraftRegistrationNumber) as the primary key, we'd need to separate out attributes that depend only on part of this composite key.

Second Normal Form (2NF) to Third Normal Form (3NF)

3NF requires:

- The table must be in 2NF.
- All non-key attributes are non-transitively dependent on the primary key (i.e., no transitive dependencies).

Example Transformation to 3NF: If in the Employee table, TeamID determines SupervisorID (a transitive dependency), it would be better to move SupervisorID into the Team table to satisfy 3NF.

Raw Data Definitions and Normalizations

Customers

Attribute	Data Type	Constraints	Description
`PersonID`	Int	PK, FK	Unique identifier for each customer
`CustomerCategory`	ENUM		Category of the customer
`ContactPerson`	Varchar		Contact person for the customer

Pilot

Attribute	Data Type	Constraints	Description
`PersonID`	Int	PK, FK	Unique identifier for each pilot
`LicenseNumber`	Varchar		License number of the pilot
`AircraftTypeRestrictions`	Varchar		Restrictions on aircraft types the pilot can fly
`OperationalStatus`	Varchar		Operational status of the pilot

Employee

Attribute	Data Type	Constraints	Description
`PersonID`	Int	PK, FK	Unique identifier for each employee
`TeamID`	Int	FK	Identifier for the team the employee belongs to

`Salary`	Decimal		Salary of the employee
`ShiftWorked`	Varchar		Shift worked by the employee
`Field`	Int		Field identifier for the employee

Team

Attribute	Data Type	Constraints	Description
`TeamID`	Int	PK	Unique identifier for each team
`Name`	Varchar		Name of the team
`SupervisorID`	Int	FK	Identifier for the supervisor of the team

Person

Attribute	Data Type	Constraints	Description
`PersonID`	Int	PK	Unique identifier for each person
`Name`	Varchar		Name of the person
`Address`	Varchar		Address of the person
`PhoneNumber`	Varchar		Phone number of the person
`Email`	Varchar		Email address of the person
`SocialInsuranceNumber`	Varchar		Social insurance number of the person
`Role`	ENUM		Role of the person within the organization

Skill_Set

Attribute	Data Type	Constraints	Description
`SkillID`	Int	PK	Unique identifier for each skill set
`PersonID`	Int	FK	Identifier for the person possessing the skill set
`AircraftTypeID`	Int	FK	Identifier for the aircraft type related to the skill
`SkillDescription`	Varchar		Description of the skill

Lease_Agreement

Attribute	Data Type	Constraints	Description
`LeaseID`	Int	PK	Unique identifier for each lease agreement
`LessorID`	Int	FK	Identifier for the lessor
`LesseeID`	Int	FK	Identifier for the lessee
`AircraftRegistrationNumber`	Varchar	FK	Registration number of the leased aircraft
`LeaseStartDate`	DATE		Start date of the lease agreement
`LeaseEndDate`	DATE		End date of the lease agreement
`LeaseTerms`	Text		Terms of the lease agreement
`MonthlyLeaseRate`	Decimal		Monthly lease rate
`SecurityDeposit`	Decimal		Security deposit amount

Aircraft_Type_Skillset

Attribute	Data Type	Constraints	Description
`SkillsetID`	Int	PK	Unique identifier for each skill set
`PersonID`	Int	FK	Identifier for the person possessing the skill set
`AircraftTypeID`	Int	FK	Identifier for the aircraft type related to the skill

Aircraft_Type

Attribute	Data Type	Constraints	Description
`AircraftTypeID`	Int	PK	Unique identifier for each aircraft type
`SizeID`	Int	FK	Identifier for the size category of the aircraft
`CapacityID`	Int	FK	Identifier for the capacity category of the aircraft
`AircraftType`	Varchar		Type of the aircraft
`ModelNumber`	Varchar		Model number of the aircraft

Aircraft_Size

Attribute	Data Type	Constraints	Description
`SizeID`	Int	PK	Unique identifier for each size category
`SizeDescription`	Varchar		Description of the size category

Aircraft_Capacity

Attribute	Data Type	Constraints	Description
`CapacityID`	Int	PK	Unique identifier for each capacity category
`CapacityDescription`	Varchar		Description of the capacity category

Cleaning_Service_Record

Attribute	Data Type	Constraints	Description
`CleaningServiceID`	Int	PK	Unique identifier for each cleaning service record
`AircraftRegistrationNumber`	Varchar	FK	Registration number of the cleaned aircraft
`PersonID`	Int	FK	Identifier for the person performing the cleaning
`Date`	Date		Date of the cleaning service
`CostPerHour`	Decimal		Cost per hour for the cleaning service

Aircraft

Attribute	Data Type	Constraints	Description
`RegistrationNumber`	Varchar	PK	Unique registration number for each aircraft
`CustomerID`	Int	FK	Identifier for the customer owning the aircraft
`AircraftTypeID`	Int	FK	Identifier for the type of the aircraft

| `ParkingStorageLocation` | Varchar | | Parking/storage location of the aircraft | |

Flight_Record

Attribute	Data Type	Constraints	Description
`FlightRecordID`	Int	PK	Unique identifier for each flight record
`PilotID`	Int	FK	Identifier for the pilot responsible for the flight
`AircraftRegistrationNumber`	Varchar	FK	Registration number of the aircraft involved in the flight
`TakeOffDate`	DATETIME		Take-off date and time of the flight
`LandingDate`	DATETIME		Landing date and time of the flight

Flights_Log

Attribute	Data Type	Constraints	Description
`LogID`	Int	PK	Unique identifier for each flight log
`PilotID`	Int	FK	Identifier for the pilot involved in the flight operation
`AircraftRegistrationNumber`	Varchar	FK	Registration number of the aircraft involved in the flight operation
`OperationType`	ENUM		Type of operation performed during the flight
`DateTime`	DATETIME		Date and time of the flight operation

Fueling_Record

Attribute	Data Type	Constraints	Description
`FuelingID`	Int	PK	Unique identifier for each fueling record
`AircraftRegistrationNumber`	Varchar	FK	Registration number of the fueled aircraft
`PersonID`	Int	FK	Identifier for the person performing the fueling
`Price`	Decimal		Price of the fuel
`Gallons`	Decimal		Amount of fuel in gallons
`Liters`	Decimal		Amount of fuel in liters
`Date`	Date		Date of the fueling
`Time`	Time		Time of the fueling
`Amount`	Decimal		Total amount for the fueling

Ownership_History

Attribute	Data Type	Constraints	Description
`OwnershipHistoryID`	Int	PK	Unique identifier for each ownership history record
`CustomerID`	Int	FK	Identifier for the customer who owned the aircraft
`AircraftRegistrationID`	Varchar	FK	Registration ID of the aircraft
`SaleDate`	Date	NULL	Sale date of the aircraft, if applicable

Parking_Reservation

Attribute	Data Type	Constraints	Description
`ReservationID`	Int	PK	Unique identifier for each parking reservation
`CustomerID`	Int	FK	Identifier for the customer making the reservation
`PilotID`	Int	FK	Identifier for the pilot associated with the reservation
`AircraftRegistrationID`	Varchar	FK	Registration ID of the aircraft
`ParkingSlotID`	Int	FK	Identifier for the reserved parking slot
`StartDate`	Date		Start date of the parking reservation
`EndDate`	Date		End date of the parking reservation
`ReservationType`	ENUM		Type of the parking reservation

Parking_Slot

Attribute	Data Type	Constraints	Description
`ParkingSlotID`	Int	PK	Unique identifier for each parking slot
`Location`	Varchar		Location of the parking slot
`SlotType`	ENUM		Type of the parking slot
`UsageType`	ENUM		Usage type of the parking slot
`Status`	ENUM		Status of the parking slot

Parts

Attribute	Data Type	Constraints	Description
`PartID`	Int	PK	Unique identifier for each part
`PartNumber`	Varchar		Part number
`PartName`	Varchar		Part name
`Price`	Decimal		Price of the part

Maintenance_Parts

Attribute	Data Type	Constraints	Description
`MaintenanceID`	Int	PK	Unique identifier for each maintenance part record
`PartID`	Int	FK	Identifier for the part used in maintenance
`Quantity`	Int		Quantity of the part used

Maintenance_Service_Record

Attribute	Data Type	Constraints	Description
`ServiceID`	Int	PK	Unique identifier for each maintenance service record
`AircraftRegistrationID`	Varchar	FK	Registration ID of the aircraft
`ScheduleID`	Int	FK	Identifier for the maintenance schedule
`PersonID`	Int	FK	Identifier for the person performing the maintenance
`MaintenanceDate`	Date		Date of the maintenance

| `CostPerHour` | Decimal | | Cost per hour for the maintenance |
| `MaintenanceType` | Varchar | | Type of maintenance performed |

Maintenance_Schedule

Attribute	Data Type	Constraints	Description
`ScheduleID`	Int	PK	Unique identifier for each maintenance schedule
`AircraftID`	Int	FK	Identifier for the aircraft
`MaintenanceActivity`	Varchar		Description of the maintenance activity
`IntervalHours`	Int		Interval in hours for the maintenance activity
`IntervalMonths`	Int		Interval in months for the maintenance activity

Normalization

The database design adheres to the principles of normalization to eliminate redundancy and ensure data integrity.

First Normal Form (1NF)

- Ensures that each table has a primary key.

- Each column contains atomic values, and each record is unique.

Second Normal Form (2NF)

- Ensures that all non-key attributes are fully functional and dependent on the primary key.

- Removes partial dependencies, where an attribute is dependent on only a part of the primary key.

Third Normal Form (3NF)

- Ensures that there are no transitive dependencies.

- All attributes are functionally dependent only on the primary key.

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