IT-214

Database Management System

PROJECT TITLE:

"TOURISM GUIDE DATABASE"

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FUNCTIONAL DEPENDENCY SET:

Customer_ID → CustomerName
Customer_ID → ContactNumber
Customer_ID → Email
Customer_ID → Gender
Customer_ID → City
Customer_ID → DOB
ContactNumber → Customer_ID
ContactNumber → CustomerName
ContactNumber → Email
ContactNumber → Gender
ContactNumber → City
ContactNumber → DOB
Destination_Name → Type of Place
Destination_Name → City
Destination_Name → Nearby Landmark
Destination_Name → Area
Destination_Name → Pincode
Destination_Name → Bus_Station(Distance)
Destination_Name → Railway_Station(Distance)
Pincode → Area
Pincode → City
{City, Pincode} → Area
{Area, Pincode} → City
{Nearby Landmark, Pincode} → City
{Nearby Landmark, Pincode} → Area
{Landmark, Area, City} → Pincode
{Dest_Name, Sight_Name} → Timing
{Dest_Name, Sight_Name} → TicketPrice
{Dest_Name, Sight_Name} → Distance_from_Dest
{Cust_ID, Destination_Name} → Start_Date
{Cust_ID, Destination_Name} → No_of_Days
Tour_ID → Company Name
Tour_ID → Website
Tour_ID → Email_ID
Tour_ID → Rating
{Destination_Name, Tour_ID, Customer_ID} → StartDate
{Destination_Name, Tour_ID, Customer_ID} → EndDate
{Destination_Name, Tour_ID, Customer_ID} → Budget_Constraint
{Destination_Name, Tour_ID, Customer_ID} → Children
{Destination_Name, Tour_ID, Customer_ID} → Adults
{Tour_ID, Destination_Name} → Consultant_Fee
{Tour_ID, Destination_Name} → Refund Percentage
{Tour_ID, Destination_Name, Days} → Amount
Hotel_ID → Hotel Name
Hotel_ID → Type of Hotel
Hotel_ID → Distance from Destination

Hotel_ID → Rating
Hotel_ID → Website
Website→ Hotel_ID
Website → Type of Hotel
Website → Distance from Destination
Website → Hotel Name
Website → Rating
{Hotel_ID, Room_Type} → Total Rooms
{Hotel_ID, Room_Type} → Price
{RoomType, Hotel_ID, Days} → Amount Percentage
Hotel_ID → ContactNumber
{Hotel_ID, Room_Type, Room_No, Startdate} → Cust_ID
{Hotel_ID, Room_Type, Room_No, Startdate} → EndDate
{Hotel_ID, Room_Type, Room_No, Startdate} → Tour_ID
{Hotel_ID, Room_Type, Room_No, Startdate} → Children
{Hotel_ID, Room_Type, Room_No, Startdate} → Adults
{Hotel_ID, Room_Type, Startdate, Cust_ID} → Tour_ID
{Hotel_ID, Room_Type, StartDate, Cust_ID} → CancellationDate
{Hotel_ID, Room_Type, StartDate, Cust_ID} → EndDate
{Hotel_ID, Cust_ID} → Stars
{Dest_Name, Cust_ID} → Stars
{Tour_ID, Cust_ID} → Stars
{Cust_ID, StartDate} → Hotel_ID

MINIMAL FUNCTIONAL DEPENDENCY SET:

Customer_ID → CustomerName
Customer_ID → ContactNumber
Customer_ID → Email
Customer_ID → Gender
Customer_ID → City
Customer_ID → DOB

Destination_Name → Type of Place
Destination_Name → City
Destination_Name → Nearby Landmark
Destination_Name → Area
Destination_Name → Pincode
Destination_Name → Bus_Station(Distance)
Destination_Name → Railway_Station(Distance)
Pincode → Area
Pincode → City
{Landmark, Area, City} → Pincode
{Dest_Name, Sight_Name} → Timing
{Dest_Name, Sight_Name} → TicketPrice
{Dest_Name, Sight_Name} → Distance_from_Dest
{Cust_ID, Destination_Name} → Start_Date
{Cust_ID, Destination_Name} → No_of_Days
Tour_ID → Company Name
Tour_ID → Website
Tour_ID → Email_ID
Tour_ID → Rating
{Destination_Name, Tour_ID, Customer_ID} → StartDate
{Destination_Name, Tour_ID, Customer_ID} → EndDate
{Destination_Name, Tour_ID, Customer_ID} → Budget_Constraint
{Destination_Name, Tour_ID, Customer_ID} → Children
{Destination_Name, Tour_ID, Customer_ID} → Adults
{Tour_ID, Destination_Name} → Consultant_Fee
{Tour_ID, Destination_Name} → Refund Percentage
{Tour_ID, Destination_Name, Days} → Amount
Hotel_ID → Hotel Name
Hotel_ID → Type of Hotel
Hotel_ID → Distance from Destination
Hotel_ID → Rating
Hotel_ID → Website
Website→ Hotel_ID
Website → Type of Hotel
Website → Distance from Destination
Website → Hotel Name
Website → Rating
{Hotel_ID, Room_Type} → Total Rooms
{Hotel_ID, Room_Type} → Price

{RoomType, Hotel_ID, Days} → Amount Percentage
Hotel_ID → ContactNumber
{Hotel_ID, Room_Type, Room_No, Startdate} → Cust_ID
{Hotel_ID, Room_Type, Room_No, Startdate} → EndDate
{Hotel_ID, Room_Type, Room_No, Startdate} → Tour_ID
{Hotel_ID, Room_Type, Room_No, Startdate} → Children
{Hotel_ID, Room_Type, Room_No, Startdate} → Adults
{Hotel_ID, Room_Type, Startdate, Cust_ID} → Tour_ID
{Hotel_ID, Room_Type, StartDate, Cust_ID} → CancellationDate
{Hotel_ID, Room_Type, StartDate, Cust_ID} → EndDate
{Hotel_ID, Cust_ID} → Stars
{Dest_Name, Cust_ID} → Stars
{Tour_ID, Cust_ID} → Stars
{Cust_ID, StartDate} → Hotel_ID

NORMALIZATION PROOFS:

CUSTOMER (<u>Customer_ID</u>, CustomerName,ContactNumber, Email, Gender, City, DOB) :
Customer_ID → {CustomerName, ContactNumber,Email,Gender, City, DOB}
ContactNumber → {Customer_ID,CustomerName, Email,Gender, City, DOB}

Computing the primary key:
{Customer_ID}$^+$ → {Customer_ID,CustomerName, ContactNumber,Email,Gender, City, DOB}
{ContactNumber}$^+$ → {Customer_ID,CustomerName, ContactNumber,Email,Gender, City, DOB}

Customer_ID and ContactNumber can both be the primary key.

BCNF Proof:
The relation is in BCNF because all functional dependencies have Customer_ID or ContactNumber on the left.

DESTINATION (<u>Destination_Name</u>, Type of Place, City, Nearby Landmark, Area, Pincode, Bus_Station(Distance), Railway_Station(Distance))**:**
Destination_Name → {Type of Place, City, Nearby Landmark, Area, Pincode, Bus_Station(Distance), Railway_Station(Distance)}
Pincode → Area
Pincode → City
{Landmark, Area, City} → Pincode

Computing the primary key:
{Destination_Name}$^+$ → {Destination_Name, Type of Place, City, Nearby Landmark, Area, Pincode, Bus_Station(Distance), Railway_Station(Distance)}
{Destination_Name} is the primary key.

BCNF Proof:
The relation is not in BCNF because the last three functional dependencies do not have the primary key on left.

SIGHTSEEING PLACES (<u>Dest_Name</u>, <u>Sight_Name</u>, Timing, Ticket_price, Distance_from_Dest)**:**
{Dest_Name, Sight_Name} → {Timing, TicketPrice, Distance_from_Dest}

Computing the primary key:
{Dest_Name, Sight_Name}$^+$ → {Dest_Name, Sight_Name, Timing, TicketPrice, Distance_from_Dest}
{Dest_Name, Sight_Name} is the primary key.

BCNF Proof:
The relation is in BCNF because all functional dependencies have the primary key {Dest_Name, Sight_Name} on the left.

VISITED (<u>Destination_Name</u>, <u>Customer_ID</u>, No_of_Days, StartDate)**:**
{Destination_Name, Customer_ID} → {No_of_Days, StartDate}

Computing the primary key:
{Destination_Name, Customer_ID}$^+$ → {Destination_Date, Customer_ID, No_of_Days, StartDate}

{Desination_Name, Customer_ID} is the primary key.

BCNF Proof:
The relation is in BCNF because all functional dependencies have the primary key {Desination_Name, Customer_ID} on the left.

TOURS & TRAVELS (<u>Tour_ID</u>, Company Name, Website, Email_ID, Rating):
Tour_ID → {Company Name, Website, Email_ID, Rating}

Computing the primary key:
{Tour_ID}$^+$ → {Tour_ID, Company Name, Website, Email_ID, Rating}
{Tour_ID} is the primary key.

BCNF Proof:
The relation is in BCNF because all functional dependencies have the primary key {Tour_ID} on the left.

TOURIST (<u>Destination_Name, Tour_ID, Customer_ID</u>, StartDate, EndDate, Budget_Constraint, Children, Adults):
{Destination_Name, Tour_ID, Customer_ID} → {StartDate, EndDate, Budget_Constraint, Children, Adults

Computing the primary key:
{Destination_Name, Tour_ID, Customer_ID}$^+$ → {Destination_Name, Tour_ID, Customer_ID, StartDate, EndDate, Budget_Constraint, Children, Adults}
{Destination_Name, Tour_ID, Customer_ID} is the primary key.

BCNF Proof:
The relation is in BCNF because all functional dependencies have the primary key {Destination_Name, Tour_ID, Customer_ID} on the left.

PRICING CONDITIONS (<u>Tour_ID, Destination_Name</u>, Consultant_Fee, Refund_Percentage):
{Tour_ID, Destination_Name} → {Consultant_Fee, Refund_Percentage}

Computing the primary key:
{Tour_ID, Destination_Name}$^+$ → {Tour_ID, Destination_Name, Consultant_Fee, Refund_Percentage}
{Tour_ID, Destination_Name} is the primary key.

BCNF Proof:
The relation is in BCNF because all functional dependencies have the primary key {Destination_Name, Tour_ID} on the left.

PACKAGES (<u>Tour_ID, Destination_Name, Day</u>, Amount):
{Tour_ID, Destination_Name, Days} → Amount

Computing the primary key:
{Tour_ID, Destination_Name, Days}$^+$ → Amount
{Tour_ID, Destination_Name, Days} is the primary key.

BCNF Proof:
The relation is in BCNF because all functional dependencies have the primary key {Tour_ID, Destination_Name, Days} on the left.

HOTELS (<u>Hotel_ID</u>, Hotel Name, Type of Hotel, Distance from Destination, Rating, Website):
Hotel_ID → {Hotel Name, Type of Hotel, Distance from Destination, Rating, Website}
Website→ {Hotel_ID, Hotel Name, Type of Hotel, Distance from Destination, Rating}

Computing the primary key:
{Hotel_ID}$^+$ → {Hotel_ID, Hotel Name, Type of Hotel, Distance from Destination, Rating, Website}
{Website}$^+$ → {Hotel_ID, Hotel Name, Type of Hotel, Distance from Destination, Rating, Website}
{Hotel_ID} and {Website} can both be the primary keys.

BCNF Proof:
The relation is in BCNF because all functional dependencies have the primary key {Hotel_ID} or {Website} on the left.

ROOM TYPE (<u>Hotel_ID, Room_Type</u>, Total Rooms, Price):
{Hotel_ID, Room_Type} → {Total Rooms, Price}

Computing the primary key:
{Hotel_ID, Room_Type}$^+$ → {Hotel_ID, Room_Type, Total Rooms, Price}
{Hotel_ID, Room_Type} is the primary key.

BCNF Proof:
The relation is in BCNF because all functional dependencies have the primary key {Hotel_ID,Room_Type} on the left.

REFUND POLICY (<u>RoomType, Hotel_ID, Days</u>, Amount Percentage):
{RoomType, Hotel_ID, Days} → Amount Percentage

Computing the primary key:
{RoomType, Hotel_ID, Days}$^+$ → {RoomType, Hotel_ID, Days, Amount Percentage}
{RoomType, Hotel_ID, Days} is the primary key.

BCNF Proof:
The relation is in BCNF because all functional dependencies have the primary key {RoomType, Hotel_ID, Days} on the left.

BOOKINGS (Hotel_ID, Room_Type, Room_No, Startdate, Cust_ID, Enddate, Tour_ID, Children, Adults):
{Hotel_ID, Room_Type, Room_No, Startdate} → {Cust_ID, Enddate, Tour_ID, Children, Adults}

Computing the primary key:
{Hotel_ID, Room_Type, Room_No, Startdate}$^+$ → {Hotel_ID, Room_Type, Room_No, Startdate, Cust_ID, Enddate, Tour_ID, Children, Adults}
{Hotel_ID, Room_Type, Room_No, Startdate} is the primary key.

BCNF Proof:
The relation is in BCNF because all functional dependencies have the primary key {Hotel_ID, Room_Type, Room_No, Startdate} on the left.

CANCELLATIONS (Hotel_ID, Room_Type, Startdate, Cust_ID, Tour_ID,CancellationDate, EndDate):
{Hotel_ID, Room_Type, Startdate, Cust_ID} → {Tour_ID, CancellationDate, EndDate}

Computing the primary key:
{Hotel_ID, Room_Type, Startdate, Cust_ID}$^+$ → {Hotel_ID, Room_Type, Startdate, Cust_ID, Tour_ID, CancellationDate, EndDate}
{Hotel_ID, Room_Type, Startdate, Cust_ID} is the primary key.

BCNF Proof:
The relation is in BCNF because all functional dependencies have the primary key {Hotel_ID, Room_Type, Startdate, Cust_ID} on the left.

RATING_HOTEL (Hotel_ID, Cust_ID, Stars):
{Hotel_ID, Cust_ID} → Stars

Computing the primary key:
{Hotel_ID, Cust_ID}$^+$ → {Hotel_ID, Cust_ID, Stars}
{Hotel_ID, Cust_ID} is the primary key.

BCNF Proof:
The relation is in BCNF because all functional dependencies have the primary key {Hotel_ID, Cust_ID} on the left.

RATING_DEST (Dest_Name, Cust_ID, Stars):
{Dest_Name, Cust_ID} → Stars

Computing the primary key:
{Dest_Name, Cust_ID}$^+$ → {Hotel_ID, Cust_ID, Stars}
{Dest_Name, Cust_ID} is the primary key.

BCNF Proof:
The relation is in BCNF because all functional dependencies have the primary key {Dest_Name, Cust_ID} on the left.

RATING_T&T (<u>Tour_ID, Cust_ID</u>, Stars):
{Tour_ID, Cust_ID} → Stars

Computing the primary key:
{Tour_ID, Cust_ID}$^+$ → {Hotel_ID, Cust_ID, Stars}
{Tour_ID, Cust_ID} is the primary key.

BCNF Proof:
The relation is in BCNF because all functional dependencies have the primary key {Tour_ID, Cust_ID} on the left.

ROOM NUMBER (<u>Hotel_ID, Room_Type, Room_No</u>):

Computing the primary key:
{Hotel_ID, Room_Type, Room_No}$^+$ → {Hotel_ID, Room_Type, Room_No}
{Hotel_ID, Room_Type, Room_No} is the primary key.

This relation only has a non-trivial functional dependency. So, it is in BCNF, as all functional dependencies only have the primary key on the left.

TOUR CONTACT DETAILS (<u>Tour_ID, TContactNumber</u>):

Computing the primary key:
{Tour_ID, TContactNumber}$^+$ → {Tour_ID, ContactNumber}
{Tour_ID, TContactNumber} is the primary key.

This relation only has a non-trivial functional dependency. So, it is in BCNF, as all functional dependencies only have the primary key on the left.

AVAILABLE HOTEL(<u>Destination Name , Hotel_ID</u>) :

Computing the primary key:
{Destination Name, Hotel_ID}$^+$ → {Destination Name , Hotel_ID}
{Destination Name, Hotel_ID} is the primary key.

This relation only has a non-trivial functional dependency. So, it is in BCNF, as all functional dependencies only have the primary key on the left.

HOTEL CONTACT DETAILS (<u>Hotel_ID,HContactNumber</u>):

Computing the primary key:
{Hotel_ID, HContactNumber}$^+$ → {Hotel_ID, ContactNumber}
{Hotel_ID, HContactNumber} is the primary key.

This relation only has a non-trivial functional dependency. So, it is in BCNF, as all functional dependencies only have the primary key on the left.