

TravelHub: Optimized Database Management for Enhanced Tour and Travel Services

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1 Introduction

We are creating a database for a Tour and Travel agency. Our database provides predefined packages for tourist places along with guide assistance during the travel. Also, we are allowing customers to customise their own package, which includes selecting places and tourist guides according to their preferred language and gender, choosing extra services such as Hotel service and Mode of transportation.

2 Purpose of the database

- Providing assistance at tourist places
 - Providing tourist guides in new places so that customers can enjoy the trip smoothly.
 - Providing transport facilities.
- Booking Hotels and transportation
 - Provide Hotel facilities and mode of transportation during the journey according to their preferences.
- Customised booking
 - Allowing customers to choose their own destination places and their own transport.
 - Displaying reviews and providing offers while booking.

3 Users of the database

- Tour and Travel Agency
- Hotel organizer
- Tour guide
- Restaurant service provider

4 Application of database

- Travel agency can use this database for booking journey in an efficient way by providing best and attractive offers, display suggestions according to ratings and allowing customers comfort at anytime. This could be used for efficient pricing of the packages for different tourist places.
- Hotel organizer could estimate the time of peak tourism by studying previous bookings and prepare offers and facilities accordingly.
- A tour guide could make itself available at the correct time and learn languages which most tourists prefer.
- Restaurant Service provider could access the information about places from which most tourists visit. And design their menu and dishes such that it matches the interest of tourists.

5 Database Requirements

5.1 Requirements

This database facilitates a tour and travel agency and contains data about Tourists, Tour Guides, Travel Agents, and Tour Packages. It also contains data for customized packages such as Customizable Places, Customizable Transport, Customizable Hotel, and Customised Bookings.

1. This database contains records of the Tourists registered in the travel agency which includes their ID, name, identity_type and identity_number (which can be aadhaar card, pan card, passport, etc.), contact_number and address.
2. These registered tourists can make a booking of the already present packages from Tour.Packages or customize their own package according to their needs using Customizable.Places, Customizable.Transport AND Customizable.Hotel.

3. Tour Packages contains all the packages which the tour and travel agency provides. It includes destination (for example, Hyderabad), places to visit (for example, Golconda Fort, Charminar), Number of days and nights of the tour (for example, 3 days and 2 nights). These packages don't allow the user to customize anything like places, transport mode and hotels.
4. Bookings table contains records of the bookings made by tourists. It contains tourist_id of the tourist who booked the package, package_id of the package chosen, booking_date, tourists' ids of the other tourists for the trip, total_amount, amount_paid (may be paid totally or just advance payment) and amount_due (remaining amount to be paid after the trip).
5. We have another mode of booking which is customized booking. It allows tourists to customize the places they want to visit, the mode of transport they want and the hotels they want to stay in. The choice for these customised selection of places, transport and hotels is stored in Customizable_Places, Customizable Transport AND Customizable_Hotel and record for these bookings is stored in Customized_Bookings.
6. Customizable_Places contains the destination name (for example, Hyderabad), place name (for example, Charminar) and its cost (which includes the cost of tour guide available for that place) which is later going to be used to calculate total price of the customised package.
7. Customizable_Transport contains source_location and destination_location, duration of transport, transport_mode and transport_price for it which is later going to be used to calculate total price of the customised package.
8. Customizable_Hotel contains hotel_name, hotel_rating and hotel_price for day and night which we can use to calculate cost for hotel based on number of days and nights which is later going to be used to calculate total price of the customised package.
9. Customized_Bookings contains booking information for the customised bookings. It is same as bookings but differs by some attributes. place_id contains the id of the place selected, transport_booking_id contains the id of transport selected and hotel_booking_id contains the id of hotel selected, guide_preferences, total_amount derived from the cost of places, transport and hotel. Rest of the attributes are same as Bookings table.
10. On booking, tourist can pay the whole amount at once during booking or pay advance amount during booking and pay the rest due amount after the tour. This is recorded in the PAYMENTS table.
11. Payments contains records of all the payments done. It might be the total payment or the advance payment. It contains booking_type (might be for pre-given packages or customised packages), booking_id, payment_date, payment_amount and payment_method.

5.2 Strong entity types

1. Tourists
 - (a) Tourist.ID (Primary key)
 - (b) Name {First Name, Second Name} (Composite)
 - (c) Identity.Type (Single-valued)
 - (d) Identity.Number (Single-valued)
 - (e) Contact.Number (Single-valued)
 - (f) Address {House.Number, Postal.Code, Street.Address} (Composite)
2. Tour.Guide
 - (a) Guide.ID (Primary key)
 - (b) Name First Name, Second Name (Composite)
 - (c) Identity.Type (Single-valued)
 - (d) Identity.Number (Single-valued)
 - (e) Gender (Single-valued)
 - (f) Contact.Number (Single-valued)
 - (g) Languages.Spoken (Multi-valued)
 - (h) Rating (Single-valued)
 - (i) Serving.Destination (Single-valued)
 - (j) Availability.status (single-valued)
3. Travel.Agents
 - (a) Agent.ID (Primary Key)
 - (b) Name First Name, Second Name (Composite)
 - (c) Identity.Type (Single-valued)
 - (d) Identity.Number (Single-valued)
 - (e) Contact.Number (Single-valued)
4. Tour.Packages
 - (a) Package ID (Primary Key)
 - (b) Destination (Single-valued)
 - (c) Places (Multi-valued)
 - (d) Days (Single-valued)
 - (e) Nights (Single-valued)
 - (f) Price (Single-valued)
5. Customizable.Places

- (a) Place_ID (Primary key)
 - (b) Destination_Name (Single-valued)
 - (c) Place_Name (Single-valued)
 - (d) Cost (Single-valued)
6. Customizable_Transport
- (a) Transport_ID (Primary key)
 - (b) Source_Location (Single-valued)
 - (c) Destination_Location (Single-valued)
 - (d) Duration (Single-valued)
 - (e) Transportation Mode (Single-valued)
 - (f) Transport_Price (Single-valued)
7. Customizable_Hotel
- (a) Hotel_ID (Primary Key)
 - (b) Hotel_Name (Single-valued)
 - (c) Hotel_Rating (Single-valued)
 - (d) Hotel_Price {Day,Night} (composite)

5.3 Weak entity types

1. Reviews_and_Feedback
- (a) Review_ID (Partial Key)
 - (b) Tourist_ID (Foreign Key to Tourists Table)
 - (c) Package_ID (Foreign Key to Tour Packages Table)
 - (d) Rating (Single-valued)
 - (e) Comments (Single-valued)
 - (f) Date_of_Review {Day, Month, Year} (Composite)
2. Offers
- (a) Offer_ID (Partial Key)
 - (b) Package_ID (Foreign Key to Tour Packages Table)
 - (c) Offer_Name
 - (d) Description
 - (e) Discount_Percentage
 - (f) Status (expired or applicable)
3. Bookings

- (a) Booking_ID (Partial Key)
 - (b) Tourist_ID (Foreign Key to Tourists Table)
 - (c) Package_ID (Foreign key to Tour Packages)
 - (d) Booking_Date {Day, Month, Year} (Composite)
 - (e) Tourists'_IDs (Multi-valued)
 - (f) Total_Amount (Single-valued)
 - (g) Amount_Paid (Single-valued)
 - (h) Amount_Due (Single-valued)
4. Customizable_Transport_Booking
- (a) Transport_Booking_ID (Partial Key)
 - (b) Transport_ID (Foreign key to Transport Table)
 - (c) Departure_Date_and_Time {Day, Month, Year, Hour, Minute} (Composite)
5. Customizable_Hotel_Booking
- (a) Hotel_Booking_ID (Partial Key)
 - (b) Hotel_ID (Single-valued)
 - (c) Booking_Date {Day, Month, Year} (Composite)
 - (d) Duration {Day, Night} (composite)
 - (e) Cost (Single-valued) (Derived attribute)
6. Customized_Bookings
- (a) Custom_Booking_ID (Partial Key)
 - (b) Tourist_ID (Foreign Key to Tourists Table)
 - (c) Booking_Date {Day, Month, Year} (Composite)
 - (d) Place_ID (Foreign Key to Custom Places Table)
 - (e) Transport_Booking_ID (Foreign Key to Custom Transport Booking Table)
 - (f) Hotel_Booking_ID (Foreign Key to Custom Transport Booking Table)
 - (g) Guide_Preferences {Gender, Language} (Composite)
 - (h) Tourists'_IDs (Multi-valued)
 - (i) Total_Amount (Single-valued) (Derived attribute)
 - (j) Amount_Paid (Single-valued)
 - (k) Amount_Due (Single-valued)
7. Payments

- (a) Payment ID (Partial Key)
- (b) Booking_Type (Single-valued)
- (c) Booking_ID (Single-valued)
- (d) Payment.Date (Single-valued)
- (e) Payment.Amount (Single-valued)
- (f) Payment Method (Single-valued)

5.4 Relationship Types

- – Relationship Name: Tour_Guide- “Assigned to” – Tour Packages
 - Participating Entity: Tour Guide, Tour Packages
 - Degree: 2
 - Min/Max ratio : (1,N)-(1,N)
- – Relationship Name: Reviews and Feedback – “given by” – Tourists
 - Participating Entity: Reviews and Feedback, Tourist
 - Degree: 2
 - Min/Max ratio : (1,1)-(0,N)
- – Relationship Name: Tour Packages – “has offer” – Offers
 - Participating Entity: Tour Package, offers
 - Degree: 2
 - Min/Max ratio : (0,N)-(1,1)
- – Relationship Name: Tourist – “travels together with” – Tourists
 - Participating Entity: Tourist
 - Degree: 1
 - Min/Max ratio : (0,N)-(0,N)
- – Relationship Name: Travel Agents – “assisting for booking” – Tourists
 - Participating Entity: Travel Agents, Tourists
 - Degree: 2
 - Min/Max ratio : (0,N)-(1,1)
- – **(BONUS)** Relationship Name (Recurrence relation): Tourists
 - “has booked package for” – Tourists
 - Roles: One is the tourist who booked the package and others are the accompanying tourists
 - Participating Entity: Travel Agents, Tourists
 - Degree: 1
 - Min/Max ratio : (0,N)-(1,1)
- – **(BONUS)** Relationship Name: Bookings – “booked by ” - tourist – “through” – Tour_agents – “by paying” – payments
 - Participating Entity: Bookings, Tourists, Tour Agents, Payments
 - Degree: 4
 - Min/Max ratio : (1,1)-(1,N)-(0,N)-(1,1)

6 Functionality requirements

6.1 Retrieval operations

1. Selection: Choosing which rows are to be returned.
 - (a) List all details of packages to a particular destination.
 - (b) List all details of tour guides who speak a particular language.
2. Projection: Choosing which columns are to be returned.
 - (a) Get all the Transport_Booking_ID and Hotel_Booking_ID from the Customized_Bookings.
3. Aggregate: (SUM, MAX, MIN, AVG) Perform an operation on the data to get the desired output.
 - (a) (SUM) Total payment due for a particular month.
 - (b) (SUM) Numbers of guides at a particular place.
 - (c) (MIN) The minimum price of the package for a particular destination.
4. Search: Search (partial text match) for entries in an entity, matching for sub-parts of the entries.
 - (a) List names of tour guides, travel agents, and tourists whose name starts with 'P'.

6.2 Analysis

1. Average income earned by the agency per month (Using Payment ID).
2. Find 'Mode' of the months from dates of tours so that the agency can know which month they should balance well or reward bonuses to employees.
3. Analyse the reviews of the tour guides/agents and assign them accordingly to tourists.

6.3 Modification operations

1. Insert: Insertion of data, check for violations of integrity constraints. E.g-
 - (a) Insert new payment after the payment was done.
 - (b) Insert reviews after tourist comment.
2. Update operation: Updating data of certain attributes. E.g-
 - (a) Update the rating of the tour guide every time after the review.
 - (b) Update offers(expired or applicable) after certain date.

3. Delete operation: Deleting entire row/s of data E.g-
 - (a) Remove bookings if they are canceled by tourists.
 - (b) Delete hotels if they shut down.

7 Summary

This database will help travel and tour companies manage their bookings better. It will also keep track of customer information and bookings, making it easier for companies to see how they're doing and where they can improve their services.

Simultaneously, we're making it easy for customers to ask questions and understand what these companies offer. Our goal is to make things smoother for both the companies and their customers.

8 Assumptions

- All tour guides have the same cost.
- All predefined services in the packages are fixed and cannot be altered.
- The customizable package can have single place booking and single transport booking.
- One package can have multiple offers but one offer applies to only one package.