

CP 363 Assignment 1 - Database Application

Tourism Agency Booking System DBMS

Group 37

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Application Description

The Tourism Agency Booking System DBMS is designed to optimize a tourism agency's daily operations by offering a comprehensive data management solution. It simplifies tour bookings, streamlines customer management, and facilitates efficient payment tracking, all while seamlessly integrating travel, accommodations, and guide services.

Entities

The table below outlines the 10 selected entities and their attributes, data types, and constraints.

Entity Name	Attribute Name	Data Type	Constraints
Customer	customer_id	INT	PRIMARY KEY, NOT NULL, UNIQUE
	first_name	VARCHAR(50)	NOT NULL
	last_name	VARCHAR(50)	NOT NULL
	email	VARCHAR(100)	NOT NULL, UNIQUE
	phone	VARCHAR(15)	NOT NULL, UNIQUE
	address	VARCHAR(200)	Optional
	preferred_destinations	MULTIVALUED	A customer can have multiple preferred destinations
Tour_Package	package_id	INT	PRIMARY KEY, NOT NULL, UNIQUE
	package_name	VARCHAR(100)	NOT NULL
	destination	VARCHAR(100)	NOT NULL
	price_per_person	DECIMAL(10,2)	NOT NULL
	start_date	DATE	NOT NULL
	end_date	DATE	NOT NULL

Booking	booking_id	INT	PRIMARY KEY, NOT NULL, UNIQUE
	booking_date	DATE	NOT NULL
	customer_id	INT	FOREIGN KEY references -> Customer(customer_id)
	package_id	INT	FOREIGN KEY references -> Tour_Package(package_id)
	number_of_people	INT	NOT NULL
	total_cost	DECIMAL(10,2)	NOT NULL
Payment	payment_id	INT	PRIMARY KEY, NOT NULL, UNIQUE
	booking_id	INT	FOREIGN KEY references -> Booking(booking_id)
	payment_date	DATE	NOT NULL
	payment_amount	DECIMAL(10,2)	NOT NULL
	payment_mode	VARCHAR(20)	Examples: "Cash," "Credit Card", "Online"
Guide	guide_id	INT	PRIMARY KEY, NOT NULL, UNIQUE
	guide_name	VARCHAR(50)	NOT NULL
	contact_number	VARCHAR(15)	NOT NULL, UNIQUE
	language	VARCHAR(50)	NOT NULL
	availability_status	VARCHAR(20)	Examples: "Available," "Assigned"
Tour_Schedule	schedule_id	INT	PRIMARY KEY, NOT NULL, UNIQUE
	package_id	INT	FOREIGN KEY references -> Tour_Package(package_id)

	guide_id	INT	FOREIGN KEY references -> Guide(guide_id)
	schedule_date	DATE	NOT NULL
Hotel	hotel_id	INT	PRIMARY KEY, NOT NULL, UNIQUE
	hotel_name	VARCHAR(100)	NOT NULL
	location	VARCHAR(100)	NOT NULL
	contact_number	VARCHAR(15)	NOT NULL, UNIQUE
Package_Hotel	package_id	INT	FOREIGN KEY references -> Tour_Package(package_id)
	hotel_id	INT	FOREIGN KEY references -> Hotel(hotel_id)
	stay_duration	INT	NOT NULL
Transportation	transport_id	INT	PRIMARY KEY, NOT NULL, UNIQUE
	transport_type	VARCHAR(50)	Examples: “Bus,” “Train”, “Flight”
	capacity	INT	NOT NULL
	availability_status	VARCHAR(20)	Examples: “Available,” “Booked”
Package_Transport	package_id	INT	FOREIGN KEY references -> Tour_Package(package_id)
	transport_id	INT	FOREIGN KEY references -> Transportation(transport_id)
	cost	DECIMAL(10,2)	NOT NULL

Meaningful Relationships

The meaningful relationships in the Tourism Agency Booking System DBMS:

Relationship	Cardinality	Participation	Explanation
Customer - Booking	1:N	Customer: Partial, Booking: Total	A customer can make multiple bookings, but every booking must be linked to a customer.
Tour_Package - Booking	1:N	Tour_Package: Partial, Booking: Total	A tour package can have multiple bookings, but every booking must belong to one package.
Booking - Payment	1:1	Booking: Partial, Payment: Total	Not all bookings are paid upfront, but every payment must correspond to a booking.
Tour_Package - Tour_Schedule	1:N	Tour_Package: Partial, Tour_Schedule: Total	A package may have multiple schedules, but every schedule belongs to one package.
Guide - Tour_Schedule	1:N	Guide: Partial, Tour_Schedule: Total	A guide can have multiple schedules, but every schedule must have one assigned guide.
Tour_Package - Package_Hotel	1:N	Tour_Package: Partial, Package_Hotel: Total	A package can include multiple hotels, but every hotel in the package references one package.
Tour_Package - Package_Transport	1:N	Tour_Package: Partial, Package_Transport: Total	A package can include multiple transport options, but each transport option references a single package.

Package_Hotel - Hotel	N:1	Package_Hotel: Total, Hotel: Partial	A hotel may not be part of a package, but every package hotel references an existing hotel.
Package_Transport - Transportation	N:1	Package_Transport: Total, Transportation: Partial	A transport may not be part of a package, but every package transport references an existing transport.
Guide - Tour_Package	M:N	Guide: Partial, Tour_Package: Partial	Guides can handle multiple packages, and a package may involve multiple guides.

Business Rules

- Unique Identification and Relationships
 - Each entity must have a unique primary key, including customers, bookings, payments, tour packages, guides, hotels, and transportation.
- Booking Rules
 - A booking cannot be created without specifying a valid **customer_id** and **package_id**.
 - The total cost of a booking is calculated as:

$$\text{total_cost} = \text{number_of_people} \times \text{price_per_person}$$
- Payments
 - Payments must not exceed the total cost of the associated booking.
 - Every payment must reference a valid booking and specify a valid payment mode (e.g., Cash, Credit Card, Online).
- Tour Schedules and Guides
 - Each tour schedule must correspond to a valid **package_id** and **guide_id**.
 - Guides must have an availability status of "Available" to be assigned to a schedule.
- Hotels and Transportation
 - Every package must include at least one hotel and one transportation option.
 - The transportation capacity must equal or exceed the number of people in any associated booking.
- Multivalued Attribute
 - The **preferred_destinations** attribute for customers stores multiple travel interests, enabling personalized package recommendations.
- Data Integrity
 - All foreign key constraints must be satisfied to ensure referential integrity.
 - Mandatory fields are enforced with **NOT NULL** constraints to prevent missing data.
- Hotel and Package Duration
 - The **stay_duration** in the **Package_Hotel** entity must align with the scheduled duration of the tour package.
- Guide Assignment Rules
 - A guide cannot be assigned to overlapping schedules on the same day.
 - Guides must be fluent in the primary language of the tour destination.
- Cancellation Policies
 - Bookings can only be cancelled up to 48 hours before the start date of the tour package.
 - When a booking is cancelled, the package availability must be updated accordingly.

Multivalued Attribute

The preferred_destinations attribute, part of the Customer entity in the Tourism Agency Booking System, lets customers specify their travel interests. By determining the number of places they would like to see, the agency can offer customized tour package recommendations, simplifying and customizing the planning process.