

DBMS

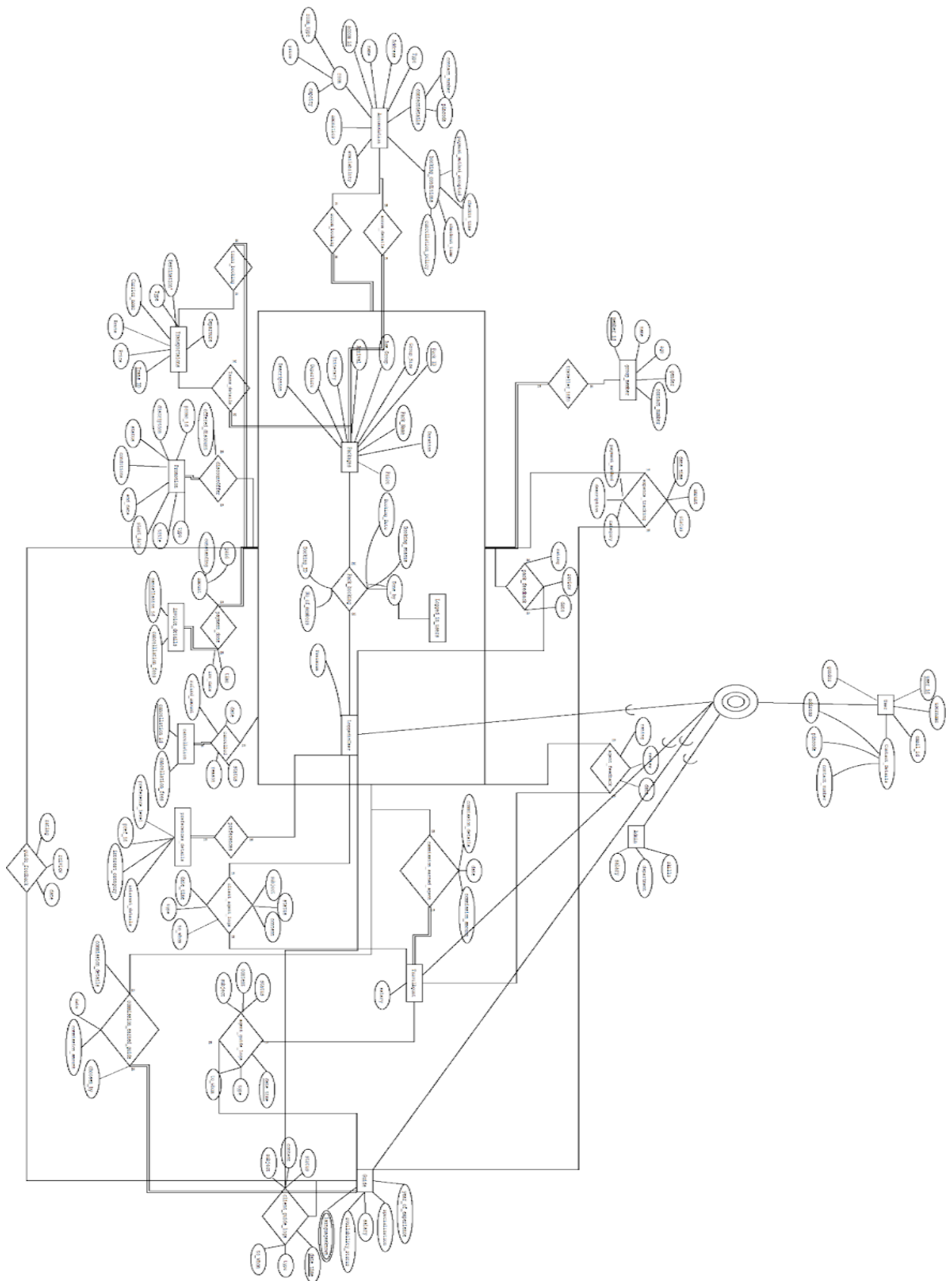
WonderLust Heaven

Jenish Vadodariya - 202301202
Archan Maru - 202301217
Dwarkesh Vaghasiya - 202301225
Manan Ghonia - 202301240
Charvik Tejani - 202301242

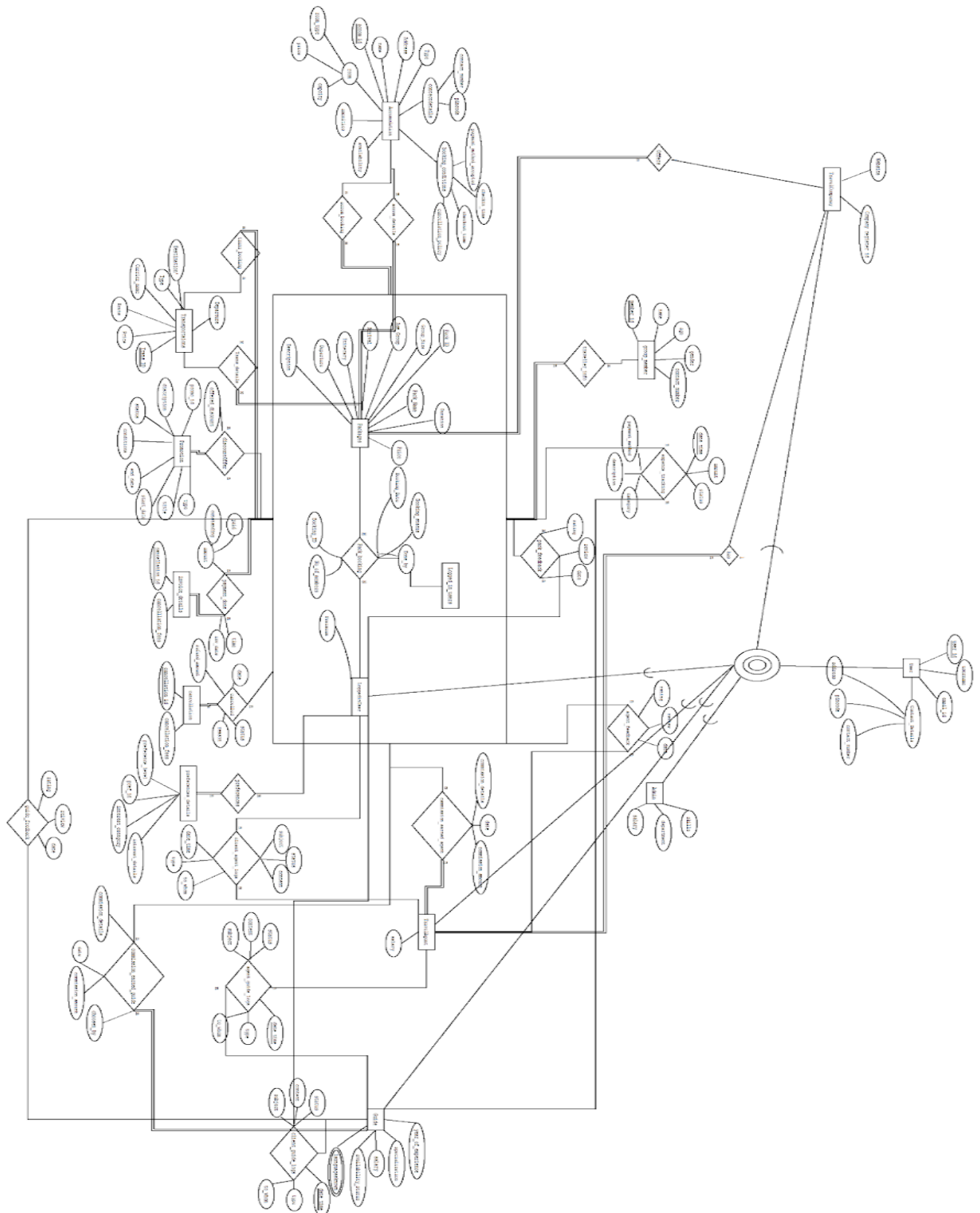
ERD to Relational mapping:

Here, in this file, we are attaching old ERD as well as modified ERD as we have made some changes in the ERD like we have added common attributes of subclass to the superclass (i.e., contact_number, pincode, address) and added TravelCompany new subclass added and new relation and some attribute changes made like we removed gender from user since there is no gender of company.

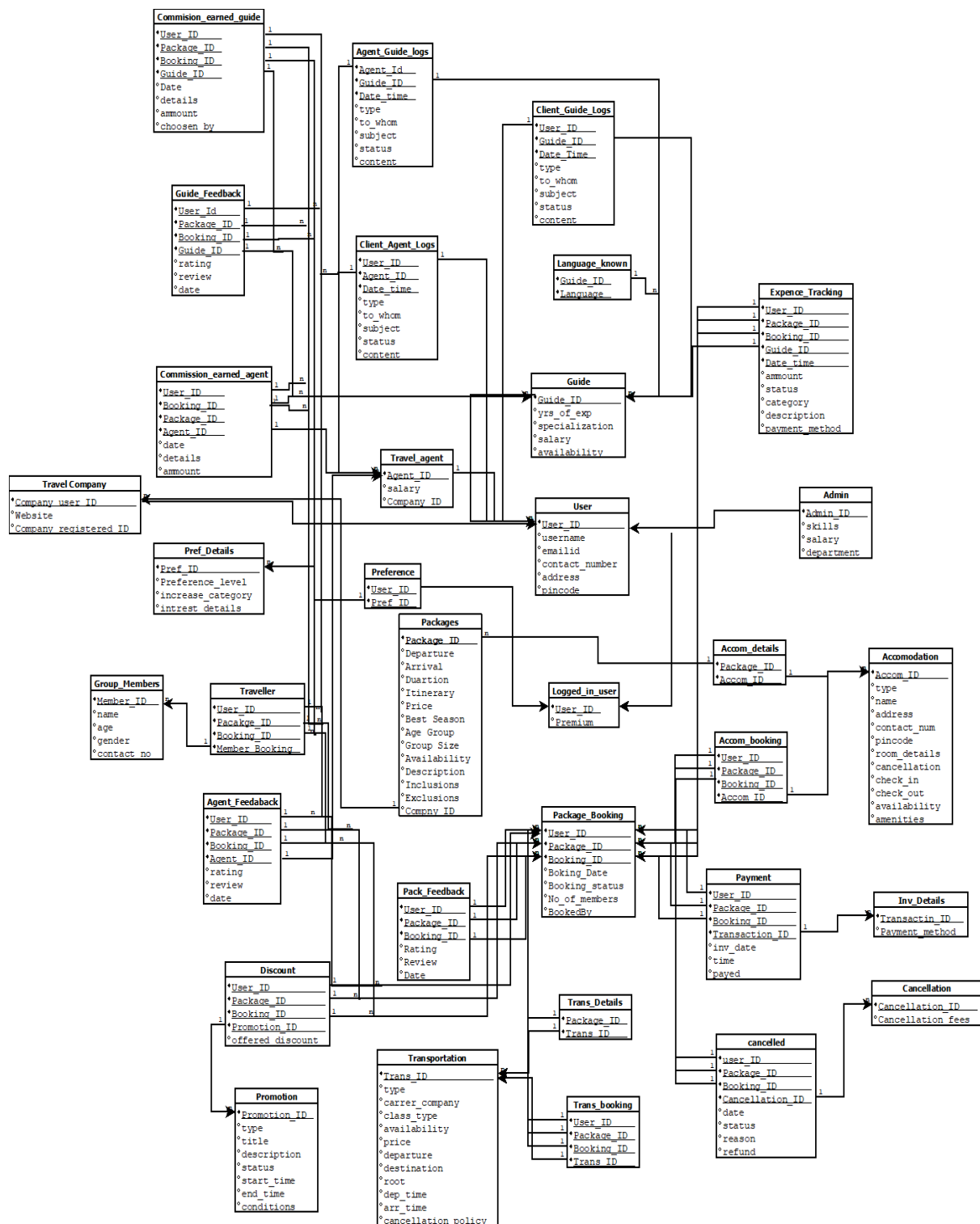
OLD Schema



NEW Schema : added Company and change in some attribute



Relational Schema According To new ER Diagram



Projected FD SET

FDs of Relation: User

user_id \rightarrow user_name
user_id \rightarrow email_id
user_id \rightarrow contact_number
user_id \rightarrow pincode
user_id \rightarrow address

As closure of {user_id} determines all the attributes of this relation, so it is a super-key. Hence, this relation is in **BCNF**.

FDs of Relation: Company

user_id \rightarrow user_name
user_id \rightarrow email_id
user_id \rightarrow contact_number
user_id \rightarrow pincode
user_id \rightarrow address
user_id \rightarrow website
user_id \rightarrow companyregisterid

As closure of {user_id} determines all the attributes of this relation, so it is a super-key. Hence, this relation is in **BCNF**.

FDs of Relation: LoggedInUser

user_id \rightarrow user_name
user_id \rightarrow email_id
user_id \rightarrow contact_number
user_id \rightarrow pincode
user_id \rightarrow address
user_id \rightarrow gender
user_id \rightarrow premium

As closure of {user_id} determines all the attributes of this relation, so it is a super-key. Hence, this relation is in **BCNF**.

FDs of Relation: Travel Agent

agent_id \rightarrow user_name
agent_id \rightarrow email_id
agent_id \rightarrow contact_number
agent_id \rightarrow pincode
agent_id \rightarrow address
agent_id \rightarrow gender
agent_id \rightarrow salary

As closure of {agent_id} determines all the attributes of this relation, so it is a super-key. Hence, this relation is in **BCNF**.

FDs of Relation: Guide

guide_id \rightarrow user_name
guide_id \rightarrow email_id
guide_id \rightarrow contact_number
guide_id \rightarrow pincode
guide_id \rightarrow address
guide_id \rightarrow gender
guide_id \rightarrow salary
guide_id \rightarrow yrs_of_experience
guide_id \rightarrow specialization
guide_id \rightarrow availability_status

As closure of {guide_id} determines all the attributes of this relation, so it is a super-key. Hence, this relation is in **BCNF**.

FDs of Relation: Admin

admin_id \rightarrow user_name
admin_id \rightarrow email_id

admin_id → contact_number
admin_id → pincode
admin_id → address
admin_id → gender
admin_id → salary
admin_id → skills
admin_id → department

As closure of {admin_id} determines all the attributes of this relation, so it is a super-key. Hence, this relation is in **BCNF**.

FDs of Relation: Packages

package_id → package_name
package_id → departure_dest
package_id → arrival_dest
package_id → duration
package_id → itinerary
package_id → price
package_id → best_season
package_id → age_group
package_id → grp_size
package_id → availability
package_id → description
package_id → inclusions
package_id → exclusions

As closure of {package_id} determines all the attributes of this relation, so it is a super-key. Hence, this relation is in **BCNF**.

FDs of Relation: Package_booking

(user_id, package_id, booking_id) → booking_date
(user_id, package_id, booking_id) → booking_status
(user_id, package_id, booking_id) → no_of_members
(user_id, package_id, booking_id) → done_by

As closure of {user_id, package_id, booking_id} determines all the attributes of this relation, so it is a super-key. Hence, this relation is in **BCNF**.

FDs of Relation: Accommodation

accom_id → type_
accom_id → name_
accom_id → address_
accom_id → contact_number
accom_id → pincode
accom_id → room_type
accom_id → room_price
accom_id → room_capacity
accom_id → payment_method_accepted
accom_id → cancellation_policy
accom_id → checkin_time
accom_id → checkout_time
accom_id → availability_
accom_id → amenities

As closure of {accom_id} determines all the attributes of this relation, so it is a super-key. Hence, this relation is in **BCNF**.

FDs of Relation: Transportation

trans_id → type_
trans_id → carrier_company
trans_id → classtype
trans_id → available_seats
trans_id → price
trans_id → depart_location
trans_id → dest_location
trans_id → route_
trans_id → depart_time
trans_id → arrival_time
trans_id → payment_method_accepted
trans_id → cancellation_policy

$\text{trans_id} \rightarrow \text{amenities}$

As closure of $\{\text{trans_id}\}$ determines all the attributes of this relation, so it is a super-key. Hence, this relation is in **BCNF**.

FDs of Relation: Expense_tracking

$(\text{user_id}, \text{package_id}, \text{booking_id}, \text{guide_id}, \text{date_time}) \rightarrow \text{amount}$
 $(\text{user_id}, \text{package_id}, \text{booking_id}, \text{guide_id}, \text{date_time}) \rightarrow \text{status}$
 $(\text{user_id}, \text{package_id}, \text{booking_id}, \text{guide_id}, \text{date_time}) \rightarrow \text{category}$
 $(\text{user_id}, \text{package_id}, \text{booking_id}, \text{guide_id}, \text{date_time}) \rightarrow \text{payment_method}$
 $(\text{user_id}, \text{package_id}, \text{booking_id}, \text{guide_id}, \text{date_time}) \rightarrow \text{description_}$

As closure of $\{\text{user_id}, \text{package_id}, \text{booking_id}, \text{guide_id}, \text{date_time}\}$ determines all the attributes of this relation, so it is a super-key. Hence, this relation is in **BCNF**.

FDs of Relation: Group members

$\text{member_id} \rightarrow \text{name_}$
 $\text{member_id} \rightarrow \text{age}$
 $\text{member_id} \rightarrow \text{gender}$
 $\text{member_id} \rightarrow \text{contact_number}$

As closure of $\{\text{member_id}\}$ determines all the attributes of this relation, so it is a super-key. Hence, this relation is in **BCNF**.

FDs of Relation: Invoice_details

$\text{transaction_id} \rightarrow \text{payment_method}$

As closure of $\{\text{transaction_id}\}$ determines all the attributes of this relation, so it is a super-key. Hence, this relation is in **BCNF**.

FDs of Relation: Payment_done

$(user_id, package_id, booking_id, transaction_id) \rightarrow inv_date$
 $(user_id, package_id, booking_id, transaction_id) \rightarrow time_$
 $(user_id, package_id, booking_id, transaction_id) \rightarrow paid$
 $(user_id, package_id, booking_id, transaction_id) \rightarrow outstanding$

As closure of $\{user_id, package_id, booking_id, transaction_id\}$ determines all the attributes of this relation, so it is a super-key. Hence, this relation is in **BCNF**.

FDs of Relation: Cancellation

$cancellation_id \rightarrow cancellation_fees$

As closure of $\{cancellation_id\}$ determines all the attributes of this relation, so it is a super-key. Hence, this relation is in **BCNF**.

FDs of Relation: Cancelled

$(user_id, package_id, booking_id, cancellation_id) \rightarrow date_$
 $(user_id, package_id, booking_id, cancellation_id) \rightarrow status_$
 $(user_id, package_id, booking_id, cancellation_id) \rightarrow reason$
 $(user_id, package_id, booking_id, cancellation_id) \rightarrow refund_amount$
As closure of $\{user_id, package_id, booking_id, cancellation_id\}$ determines all the attributes of this relation, so it is a super-key. Hence, this relation is in **BCNF**.

FDs of Relation: Pack_feedback

$(user_id, package_id, booking_id) \rightarrow rating$
 $(user_id, package_id, booking_id) \rightarrow review$
 $(user_id, package_id, booking_id) \rightarrow date_$

As closure of {user_id, package_id, booking_id} determines all the attributes of this relation, so it is a super-key. Hence, this relation is in **BCNF**.

FDs of Relation: Agent_feedback

(user_id, package_id, booking_id, agent_id) → rating
(user_id, package_id, booking_id, agent_id) → review
(user_id, package_id, booking_id, agent_id) → date_

As closure of {user_id, package_id, booking_id, agent_id} determines all the attributes of this relation, so it is a super-key. Hence, this relation is in **BCNF**.

FDs of Relation: Guide_feedback

(user_id, package_id, booking_id, guide_id) → rating
(user_id, package_id, booking_id, guide_id) → review
(user_id, package_id, booking_id, guide_id) → date_

As closure of {user_id, package_id, booking_id, guide_id} determines all the attributes of this relation, so it is a super-key. Hence, this relation is in **BCNF**.

FDs of Relation: Commission_earned_agent

(user_id, package_id, booking_id, agent_id) → date_
(user_id, package_id, booking_id, agent_id) → details
(user_id, package_id, booking_id, agent_id) → amount

As closure of {user_id, package_id, booking_id, agent_id} determines all the attributes of this relation, so it is a super-key. Hence, this relation is in **BCNF**.

FDs of Relation: Commission_earned_guide

(user_id, package_id, booking_id, guide_id) → date_
(user_id, package_id, booking_id, guide_id) → details

$(\text{user_id}, \text{package_id}, \text{booking_id}, \text{guide_id}) \rightarrow \text{amount}$
 $(\text{user_id}, \text{package_id}, \text{booking_id}, \text{guide_id}) \rightarrow \text{chosen_by}$

As closure of $\{\text{user_id}, \text{package_id}, \text{booking_id}, \text{guide_id}\}$ determines all the attributes of this relation, so it is a super-key. Hence, this relation is in **BCNF**.

FDs of Relation: Preference_details

$\text{pref_id} \rightarrow \text{preference_level}$
 $\text{pref_id} \rightarrow \text{interest_category}$
 $\text{pref_id} \rightarrow \text{interest_details}$

As closure of $\{\text{pref_id}\}$ determines all the attributes of this relation, so it is a super-key. Hence, this relation is in **BCNF**.

FDs of Relation: Promotion

$\text{promotion_id} \rightarrow \text{type_}$
 $\text{promotion_id} \rightarrow \text{title}$
 $\text{promotion_id} \rightarrow \text{description_}$
 $\text{promotion_id} \rightarrow \text{status_}$
 $\text{promotion_id} \rightarrow \text{startdate}$
 $\text{promotion_id} \rightarrow \text{enddate}$
 $\text{promotion_id} \rightarrow \text{conditions}$

As closure of $\{\text{promotion_id}\}$ determines all the attributes of this relation, so it is a super-key. Hence, this relation is in **BCNF**.

FDs of Relation: Discount_offer

$(\text{user_id}, \text{package_id}, \text{booking_id}, \text{promotion_id}) \rightarrow \text{offered_discount}$
As closure of $\{\text{user_id}, \text{package_id}, \text{booking_id}, \text{promotion_id}\}$ determines all the attributes of this relation, so it is a super-key. Hence, this relation is in **BCNF**.

FDs of Relation: Client_agent_logs

(user_id, agent_id, date_time) → type_
(user_id, agent_id, date_time) → to_whom
(user_id, agent_id, date_time) → subject_
(user_id, agent_id, date_time) → status_
(user_id, agent_id, date_time) → content

As closure of {user_id, agent_id, date_time} determines all the attributes of this relation, so it is a super-key. Hence, this relation is in **BCNF**.

FDs of Relation: Client_guide_logs

(user_id, guide_id, date_time) → type_
(user_id, guide_id, date_time) → to_whom
(user_id, guide_id, date_time) → subject_
(user_id, guide_id, date_time) → status_
(user_id, guide_id, date_time) → content

As closure of {user_id, guide_id, date_time} determines all the attributes of this relation, so it is a super-key. Hence, this relation is in **BCNF**.

FDs of Relation: Agent_guide_logs

(agent_id, guide_id, date_time) → type_
(agent_id, guide_id, date_time) → to_whom
(agent_id, guide_id, date_time) → subject_
(agent_id, guide_id, date_time) → status_
(agent_id, guide_id, date_time) → content

As closure of {agent_id, guide_id, date_time} determines all the attributes of this relation, so it is a super-key. Hence, this relation is in **BCNF**.

Minimal FD Set for All Relations (BCNF Proof)

FDs of Relation: User

$\text{user_id} \rightarrow \text{user_name}, \text{email_id}, \text{contact_number}, \text{pincode}, \text{address}$

As closure of $\{\text{user_id}\}$ determines all attributes, it is a super-key \Rightarrow BCNF.

FDs of Relation: Company

$\text{user_id} \rightarrow \text{user_name}, \text{email_id}, \text{contact_number}, \text{pincode}, \text{address}, \text{website}, \text{companyregisterid}$

FDs of Relation: LoggedInUser

$\text{user_id} \rightarrow \text{user_name}, \text{email_id}, \text{contact_number}, \text{pincode}, \text{address}, \text{gender}, \text{premium}$

FDs of Relation: Travel Agent

$\text{agent_id} \rightarrow \text{user_name}, \text{email_id}, \text{contact_number}, \text{pincode}, \text{address}, \text{gender}, \text{salary}$

FDs of Relation: Guide

$\text{guide_id} \rightarrow \text{user_name}, \text{email_id}, \text{contact_number}, \text{pincode}, \text{address}, \text{gender}, \text{salary}, \text{yrs_of_experience}, \text{specialization}, \text{availability_status}$

Super-key \Rightarrow BCNF.

FDs of Relation: Admin

$\text{admin_id} \rightarrow \text{user_name}, \text{email_id}, \text{contact_number}, \text{pincode}, \text{address}, \text{gender}, \text{salary}, \text{skills}, \text{department}$

FDs of Relation: Packages

$\text{package_id} \rightarrow \text{package_name}, \text{departure_dest}, \text{arrival_dest}, \text{duration}, \text{itinerary}, \text{price}, \text{best_season}, \text{age_group}, \text{grp_size}, \text{availability}, \text{description}, \text{inclusions}, \text{exclusions}$

Super-key \Rightarrow BCNF.

FDs of Relation: Package_booking

$(\text{user_id}, \text{package_id}, \text{booking_id}) \rightarrow \text{booking_date}, \text{booking_status}, \text{no_of_members}, \text{done_by}$

Super-key \Rightarrow BCNF.

FDs of Relation: Accommodation

$\text{accom_id} \rightarrow \text{type_}, \text{name_}, \text{address_}, \text{contact_number}, \text{pincode}, \text{room_type}, \text{room_price}, \text{room_capacity}, \text{payment_method_accepted}, \text{cancellation_policy},$

checkin_time, checkout_time, availability_, amenities
Super-key \Rightarrow BCNF.

FDs of Relation: Transportation

trans_id \rightarrow type_, carrier_company, classtype, available_seats, price,
depart_location, dest_location, route_, depart_time, arrival_time,
payment_method_accepted, cancellation_policy, amenities
Super-key \Rightarrow BCNF.

FDs of Relation: Expense_tracking

(user_id, package_id, booking_id, guide_id, date_time) \rightarrow amount, status,
category, payment_method, description_

FDs of Relation: Group members

member_id \rightarrow name_, age, gender, contact_number

FDs of Relation: Invoice_details

transaction_id \rightarrow payment_method

FDs of Relation: Payment_done

(user_id, package_id, booking_id, transaction_id) \rightarrow inv_date, time_, paid,
outstanding

FDs of Relation: Cancellation

cancellation_id \rightarrow cancellation_fees

FDs of Relation: Cancelled

(user_id, package_id, booking_id, cancellation_id) \rightarrow date_, status_, reason,
refund_amount

FDs of Relation: Pack_feedback

(user_id, package_id, booking_id) \rightarrow rating, review, date_

FDs of Relation: Agent_feedback

(user_id, package_id, booking_id, agent_id) \rightarrow rating, review, date_

FDs of Relation: Guide_feedback

(user_id, package_id, booking_id, guide_id) \rightarrow rating, review, date_

FDs of Relation: Commission_earned_agent

(user_id, package_id, booking_id, agent_id) \rightarrow date_, details, amount

FDs of Relation: Commission_earned_guide

$(user_id, package_id, booking_id, guide_id) \rightarrow date_ , details, amount, chosen_by$

FDs of Relation: Preference_details

$pref_id \rightarrow preference_level, interest_category, interest_details$

FDs of Relation: Promotion

$promotion_id \rightarrow type_ , title, description_ , status_ , startdate, enddate, conditions$

FDs of Relation: Discount_offer

$(user_id, package_id, booking_id, promotion_id) \rightarrow offered_discount$

FDs of Relation: Client_agent_logs

$(user_id, agent_id, date_time) \rightarrow type_ , to_whom, subject_ , status_ , content$

FDs of Relation: Client_guide_logs

$(user_id, guide_id, date_time) \rightarrow type_ , to_whom, subject_ , status_ , content$

FDs of Relation: Agent_guide_logs

$(agent_id, guide_id, date_time) \rightarrow type_ , to_whom, subject_ , status_ , content$

Conclusion:

All relations are in BCNF. Thus, the relational schema is well-normalized with no redundancy