Group No.: ____Y____   Project No.: ___E_____

Project Name: _____

PHASE - III
LOGICAL DATABASE DESIGN

I. CHANGES MADE:

1. In the requirement specification:
    <none>
2. In the ER Diagram:
    a. Price is removed as weak entity and made as an attribute for the entity room. So, booking relation is now between customer and room.
    b. Specialization for services entity.
    c. Created service id, employee id.
    d. Booking id is made as a key attribute.
    e. Hotel id is added as attribute.

II. CONVERTING ER DIAGRAM INTO RELATIONAL SCHEMA:

1. Step-1: Handling entities and attributes.

    CUSTOMER (customer id, first name, mid name, last name, pin code, country, city, driving license, pan card, Aadhar, passport, visa);

    HOTEL (hotel id, hotel name, address);

    INVOICE (invoice id, date, status, details);

    WEBSITE (URL);

    EMPLOYEE (employee id, name, salary, designation, gender);

    ROOM (room number, price);

    SECURITY (cc tv cameras, fire safety measures, record of criminals);

    CUSTOMER_PHONE (customer id, phone number);

    CUSTOMER_EMAIL (customer id, email id);

2. Step-2: Handling binary relationship types.

    CUSTOMER (customer id, first name, mid name, last name, pin code, country, city, driving license, pan card, Aadhar, passport, visa, URL, room number);

INVOICE (<u>invoice id</u>, date, status, details, customer_id, bill id);

HOTEL (<u>hotel id</u>, hotel name, address, URL);

ROOM (<u>room number</u>, price, hotel name, URL);

3. Step-3: Handling weak entities.

BILL (<u>bill id</u>, <u>invoice id</u>, amount, b_name, date);

4. Step-4: Handling high degree relationship types.

BOOKING (<u>customer id</u>, <u>room number</u>, <u>URL</u>, <u>booking id</u>, start date, end date);

HAS (<u>hotel name</u>, <u>employee id</u>);

5. Step-5: Handling specializations

ROOM (<u>room number</u>, price, hotel name, URL, room type);
SINGLEROOM (<u>room number</u>);
DOUBLEROOM (<u>room number</u>);
MULTIROOM (<u>room number</u>);
SERVICES (<u>service id</u>, service type);
GYM (<u>service id</u>);
MEDICAL SERVICES (<u>service id</u>);
TOURISM (<u>service id</u>);
RESTAURANTS (<u>service id</u>, lunch, dinner, breakfast, beverages);

III. **NORMALIZING THE RELATIONAL SCHEMA**:
  1. <u>Converting to 1NF.</u>

<completed>

  2. <u>Converting to 2NF.</u>

ROOM_1 (<u>room number</u>, price, hotel name, room type);
BOOKING_1 (<u>customer id</u>, <u>room number</u>, <u>URL</u>, <u>booking id</u>);
BOOKING_2 (<u>booking id,</u> start date, end date);
BILL_1 (<u>bill id</u>, <u>invoice id</u>);
BILL_2 (<u>bill id</u>, amount, b_name, date);

  3. <u>Converting to 3NF.</u>

CUSTOMER (customer id, first name, mid name, last name, pin code, country, city, driving license, pan card, Aadhar, passport, visa, URL, room number);

INVOICE (invoice id, date, status, details, customer_id, bill id);

HOTEL (hotel id, hotel name, address, URL);

WEBSITE (URL);

EMPLOYEE (employee id, name, salary, designation, gender);

ROOM_1 (room number, price, hotel name, room type);

SINGLEROOM (room number);

DOUBLEROOM (room number);

MULTIROOM (room number);

CUSTOMER_PHONE (customer id, phone number);

SECURITY (cc tv cameras, fire safety measures, record of criminals)

CUSTOMER_EMAIL (customer id, email id);

BILL_1 (bill id, invoice id);

BILL_2 (bill id, amount, b_name, date);

BOOKING_1 (customer id, room number, URL, booking id);

BOOKING_2 (booking id, start date, end date);

HAS (hotel name, employee id);

SERVICES (service id, service type);

GYM (service id);

MEDICAL SERVICES (service id);

TOURISM (service id);

RESTAURANTS (service id, lunch, dinner, breakfast, beverages);

4. Converting to BCNF.

CUSTOMER (customer id, first name, mid name, last name, pin code, country, city, driving license, pan card, Aadhar, passport, visa, URL, room number);

INVOICE (invoice id, date, status, details, customer_id, bill id);

HOTEL (hotel id, hotel name, address, URL);

WEBSITE (URL);

EMPLOYEE (employee id, name, salary, designation, gender);

ROOM_1 (room number, price, hotel name, room type);

SINGLEROOM (room number);

DOUBLEROOM (room number);

MULTIROOM (room number);

CUSTOMER_PHONE (customer id, phone number);

SECURITY (cc tv cameras, fire safety measures, record of criminals)

CUSTOMER_EMAIL (customer id, email id);

BILL_1 (bill id, invoice id);

BILL_2 (bill id, amount, b_name, date);

BOOKING_1 (<u>customer id</u>, <u>room number</u>, <u>URL</u>, <u>booking id</u>);

BOOKING_2 (<u>booking id,</u> start date, end date);

HAS (<u>hotel name</u>, <u>employee id</u>);

SERVICES (<u>service id</u>, service type);

GYM (<u>service id</u>);

MEDICAL SERVICES (<u>service id</u>);

TOURISM (<u>service id</u>);

RESTAURANTS (<u>service id</u>, lunch, dinner, breakfast, beverages);

IV. FINAL RELATIONAL SCHEMA:

CUSTOMER (<u>customer id</u>, first name, mid name, last name, pin code, country, city, driving license, pan card, Aadhar, passport, visa, URL, room number);

INVOICE (<u>invoice id</u>, date, status, details, customer_id, bill id);

HOTEL (<u>hotel id</u>, hotel name, address, URL);

WEBSITE (<u>URL</u>);

EMPLOYEE (<u>employee id</u>, name, salary, designation, gender);

ROOM_1 (<u>room number</u>, price, hotel name, room type);

SINGLEROOM (<u>room number</u>);

DOUBLEROOM (<u>room number</u>);

MULTIROOM (<u>room number</u>);

CUSTOMER_PHONE (<u>customer id</u>, <u>phone number</u>);

SECURITY (cc tv cameras, fire safety measures, record of criminals)

CUSTOMER_EMAIL (<u>customer id</u>, <u>email id</u>);

BILL_1 (<u>bill id</u>, <u>invoice id</u>);

BILL_2 (<u>bill id</u>, amount, b_name, date);

BOOKING_1 (<u>customer id</u>, <u>room number</u>, <u>URL</u>, <u>booking id</u>);

BOOKING_2 (<u>booking id,</u> start date, end date);

HAS (<u>hotel name</u>, <u>employee id</u>);

SERVICES (<u>service id</u>, service type);

GYM (<u>service id</u>);

MEDICAL SERVICES (<u>service id</u>);

TOURISM (<u>service id</u>);

RESTAURANTS (<u>service id</u>, lunch, dinner, breakfast, beverages);

V. **CHALLENGES FACED**:
   1. <the given ER diagram was not appropriate for the database requirement and was difficult to convert to relational schema. So, we have made some changes accordingly>