

The background features a dark purple gradient with several 3D cubes of varying sizes and orientations scattered across the scene. In the top-left corner, there is a small orange rectangular bar.

Hotel-Apartment Management System

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Introduction to The Ampezzo Regency

The Ampezzo Regency a 3-star hotel , located in one of the most attractive tourist places in Veneto, Italy.

The Ampezzo provides high quality services with a vast range of amenities that accommodate up to a maximum capacity of 74 guests.

The Ampezzo provides 30 rooms including 5-single-bed-standard,20 double-bed deluxe, and 5 suites,plus weekly rentals all with access to free recreation and fitness facilities.

Our data team is hired to manage the database for The Ampezzo, facilitating its business operations. The hotel aims to stand out by offering more features and flexible services.

However, with increasing services comes increasing data, and managing all this data is not going to be easy. To address this, the hotel is designing a database management system to help them manage their data more effectively and facilitate their business.

Problem-statement



Due to the overwhelming number of tourists coming to visit Veneto, Ampezzo Regency has encountered challenges in receiving bookings and accommodating guests during their stays. Problems we have found so far:



Housekeeping Issue: maintaining cleanliness in every room and hotel premises, attending guests, etc. Ampezzo staff members have difficulties keeping track of these issues.



Guest Track Record: The Ampezzo doesn't keep old paper records of guests, so finding info on people who stayed over six months ago is tough.



Billing and Payment Records: The Ampezzo handles billing and payments by hand in a register, on different pages. If a discount is added to a bill, it doesn't show up in the financial records because there's no central system for tracking these changes.



Booking issue: Failure to promptly update guest check-out records in a manual system can lead to room cleaning delays and hinder check-in processes.



Staffing issue: Ampezzo seems to have an inadequate allocation of staff members to their corresponding departments along with unclear staff duties and responsibilities.

Proposed Solutions:

- DBMS will make it easier to keep track of rooms as guests check out, help with staff organization, simplify cleaning schedules, and improve how the hotel runs day-to-day. It'll also help departments communicate better and make things quicker and nicer for guests.
- By using a DBMS, Ampezzo can keep and pull up guest information for a long time, including details of those who visited more than six months ago. This helps offer custom services and build guest loyalty..
- A centralized database lets the managers/owners can keep track of the bills and payment status . This streamlines the accountants' work and prevents billing errors, increasing transparency and protecting the owner from potential financial mishandling.
- **Users:** The main users of the database system at Hotel Ampezzo are the management and various departments. They use it to improve operations and make guests happier. The owner uses it to keep an eye on rooms, manage bookings, and understand occupancy patterns, which helps set the best prices and increase profits. It also helps keep track of guest information, allowing the hotel to provide personalized service to every visitor.

Entities , Attributes and Relationships

Guests

- Guest ID
- Name
- DOB
- Email
- Phone number
- Address
- City
- Country

Guest ratings

- Rating value
- Comment
- Rating date

Bookings

- Booking number
- Start date
- End date

Rooms

- Room ID
- Cleaned date
- Check in date
- Checkout date
- Room status
- Assigned staff

Room types

- Room type
- Price
- Max occupancy
- Description

Staffs

- Staff ID
- Name
- Hire date
- DOB
- Email
- Gender
- Phone number

Roles

- Role title
- Description

Payment methods

- Payment method type

Invoices

- Invoice ID
- Invoice due date
- Invoice status

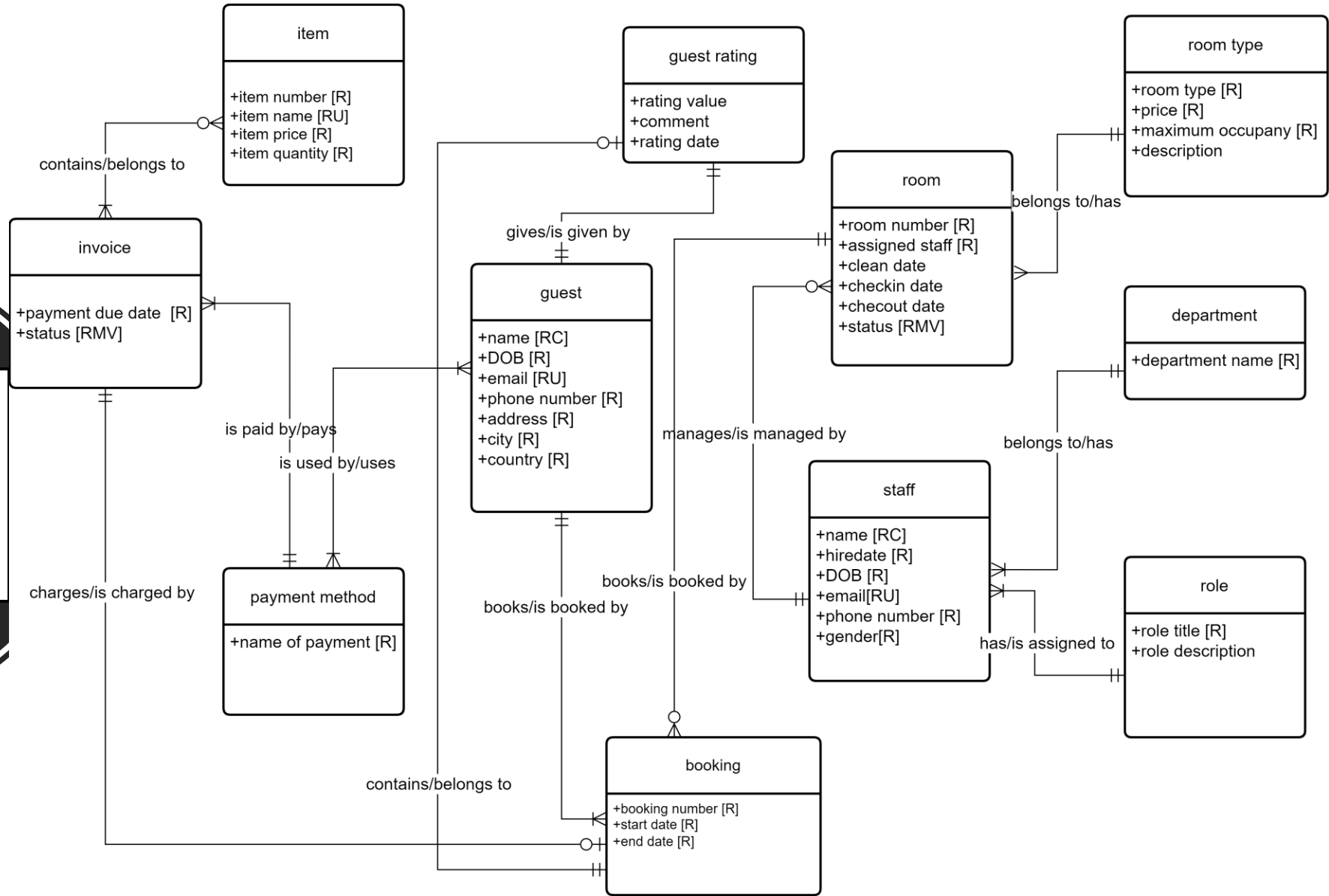
Items

- Item ID
- Item name
- Item price
- Item quantity

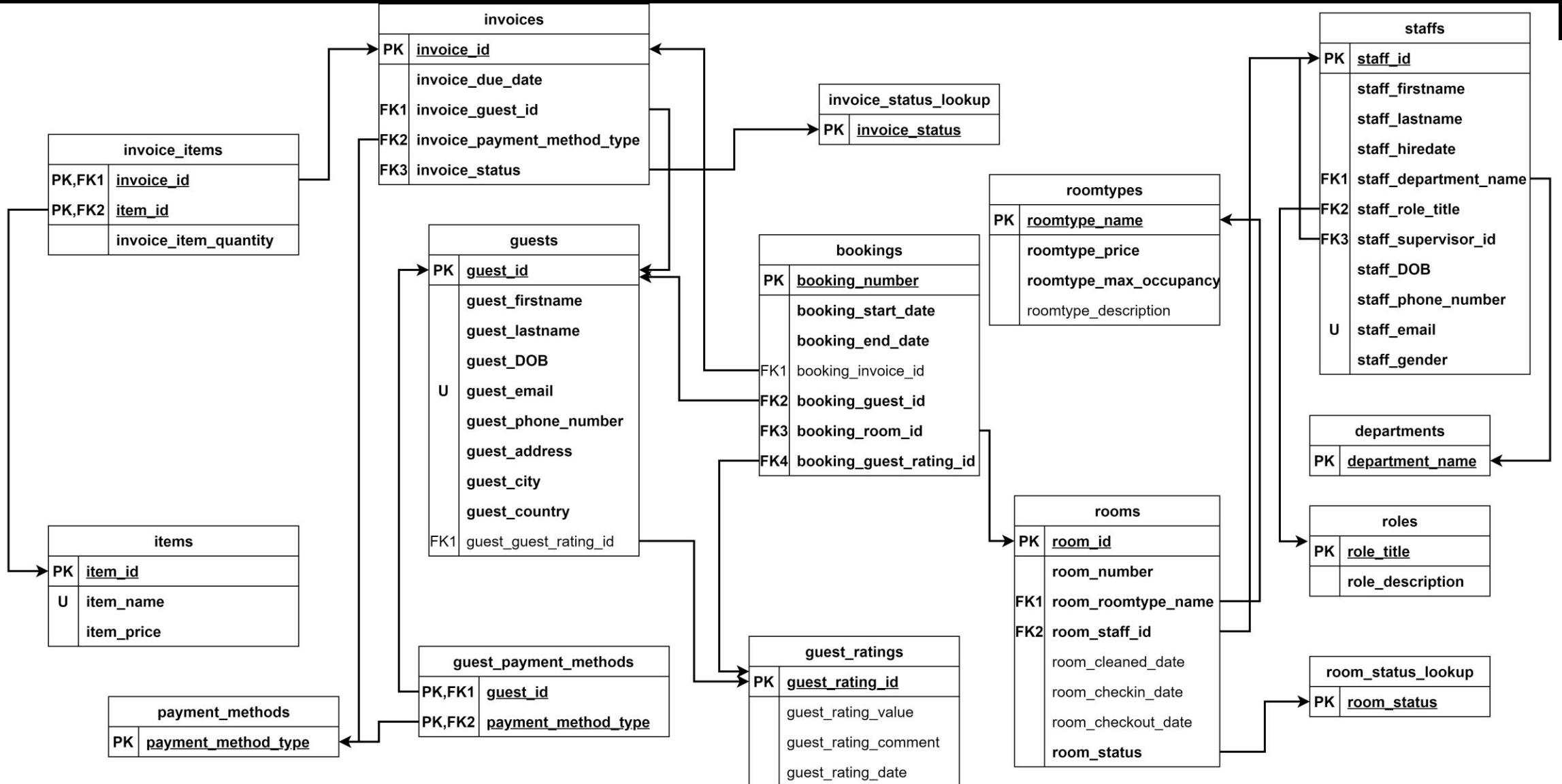
Departments

- Department name

Conceptual Data Model



Logical Data Model



Up/Down SQL Script

```
2  --down
3  if exists(select * from sys.objects where name='v_revenue_chart')
4  | drop view v_revenue_chart
5
6  if exists(select * from sys.objects where name='v_timeseries_chart')
7  | drop view v_timeseries_chart
8
9  if exists (select * from INFORMATION_SCHEMA.TABLE_CONSTRAINTS
10 | where CONSTRAINT_NAME = 'fk_staff_staff_role_title')
11 | alter table staffs drop constraint fk_staff_staff_role_title
12
13 if exists (select * from INFORMATION_SCHEMA.TABLE_CONSTRAINTS
14 | where CONSTRAINT_NAME = 'fk_staff_staff_department_name')
15 | alter table staffs drop constraint fk_staff_staff_department_name
16
17 if exists (select * from INFORMATION_SCHEMA.TABLE_CONSTRAINTS
18 | where CONSTRAINT_NAME = 'fk_staff_staff_supervisor_id')
19 | alter table staffs drop constraint fk_staff_staff_supervisor_id
20
21 if exists (select * from INFORMATION_SCHEMA.TABLE_CONSTRAINTS
22 | where CONSTRAINT_NAME = 'fk_room_room_roomtype_name')
23 | alter table rooms drop constraint fk_room_room_roomtype_name
24
25 if exists (select * from INFORMATION_SCHEMA.TABLE_CONSTRAINTS
26 | where CONSTRAINT_NAME = 'fk_room_room_staff_id')
27 | alter table rooms drop constraint fk_room_room_staff_id
28
29 if exists (select * from INFORMATION_SCHEMA.TABLE_CONSTRAINTS
30 | where CONSTRAINT_NAME = 'fk_room_room_status')
31 | alter table rooms drop constraint fk_room_room_status
32
33 if exists (select * from INFORMATION_SCHEMA.TABLE_CONSTRAINTS
34 | where CONSTRAINT_NAME = 'fk_guest_guest_rating_id')
35 | alter table guests drop constraint fk_guest_guest_rating_id
36
37 if exists (select * from INFORMATION_SCHEMA.TABLE_CONSTRAINTS
38 | where CONSTRAINT_NAME = 'fk_invoice_invoice_guest_id')
39 | alter table invoices drop constraint fk_invoice_invoice_guest_id
40
41 if exists (select * from INFORMATION_SCHEMA.TABLE_CONSTRAINTS
42 | where CONSTRAINT_NAME = 'fk_invoice_invoice_payment_method_type')
43 | alter table invoices drop constraint fk_invoice_invoice_payment_method_type
44
45 if exists (select * from INFORMATION_SCHEMA.TABLE_CONSTRAINTS
46 | where CONSTRAINT_NAME = 'fk_invoice_invoice_status')
```

```
82 drop table if exists staffs
83 drop table if exists rooms
84 drop table if exists guests
85 drop table if exists invoices
86 drop table if exists invoice_items
87 drop table if exists bookings
88
89 drop table if exists departments
90 drop table if exists roles
91 drop table if exists roomtypes
92 drop table if exists guest_ratings
93 drop table if exists payment_methods
94 drop table if exists invoice_status_lookup
95 drop table if exists items
96 drop table if exists room_status_lookup
97 drop table if exists guest_payment_methods
98 GO
```


Up/Down SQL Script

```
163 --rooms
164 create table rooms(
165     room_id int identity not null,
166     room_number varchar (10) not null,
167     room_status varchar (50) not null,
168     room_roomtype_name varchar(50) not null,
169     room_staff_id varchar(10) not null,
170     room_cleaned_date datetime default (getdate()) null,
171     room_checkin_date datetime default (getdate()) null,
172     room_checkout_date datetime default (getdate()) null,
173
174     constraint pk_room_room_id primary key (room_id),
175
176     constraint fk_room_room_roomtype_name
177     | foreign key (room_roomtype_name) references roomtypes (roomtype_n
178
179     constraint fk_room_room_staff_id
180     | foreign key (room_staff_id) references staffs(staff_id),
181
182     constraint fk_room_room_status
183     | foreign key (room_status) references room_status_lookup(room_status)
184
185 )
---
```

```
---
250 --invoices
251 create table invoices (
252     invoice_id varchar(10) not null,
253     invoice_guest_id varchar(10) not null,
254     invoice_payment_method_type varchar (50) not null,
255     invoice_status varchar(50) not null,
256     invoice_due_date date not null,
257
258     constraint pk_invoice_invoice_id primary key (invoice_id),
259
260     constraint fk_invoice_invoice_guest_id
261     | foreign key (invoice_guest_id) references guests (guest_id),
262
263     constraint fk_invoice_invoice_payment_method_type
264     | foreign key (invoice_payment_method_type) references payment_methods (payment_method_type),
265
266     constraint fk_invoice_invoice_status
267     | foreign key (invoice_status) references invoice_status_lookup(invoice_status)
268 )

198 --guests
199 create table guests (
200     guest_id varchar(10) not null,
201     guest_guest_rating_id varchar(10) null,
202     guest_firstname varchar (50) not null,
203     guest_lastname varchar (50) not null,
204     guest_DOB date not null,
205     guest_email varchar (50) not null,
206     guest_phone_number varchar (20) not null,
207     guest_address varchar (50) not null,
208     guest_city varchar (10) not null,
209     guest_country varchar (10) not null,
210
211     constraint pk_guest_guest_id primary key (guest_id),
212     constraint u_guest_guest_email unique (guest_email),
213     constraint fk_guest_guest_rating_id
214     | foreign key (guest_guest_rating_id) references guest_ratings (guest_rating_id)
215
216 )
```

Up/Down SQL Script

```
351 --up data
352
353 --departments
354 INSERT [dbo].[departments] ([department_name]) VALUES ('Housekeeping')
355 INSERT [dbo].[departments] ([department_name]) VALUES ('Front Office')
356 INSERT [dbo].[departments] ([department_name]) VALUES ('Accounting')
357 INSERT [dbo].[departments] ([department_name]) VALUES ('Food')
358 GO
359
360 --roles
361 INSERT [dbo].[roles] ([role_title],[role_description]) VALUES ('Housekeeping Supervisor','Keep a look on housekeeping staffs and make sure every room is cleaned before and after checkout')
362 INSERT [dbo].[roles] ([role_title],[role_description]) VALUES ('Front Desk Manager','Handles all front desk job like check-in, check-out, and guest services')
363 INSERT [dbo].[roles] ([role_title],[role_description]) VALUES ('Accountant','Process invoices, ensure timely payments of staffs and maintain financial records')
364 INSERT [dbo].[roles] ([role_title],[role_description]) VALUES ('Restaurant Manager','Responsible for day to day operations, monitor food quality, guest service')
365 INSERT [dbo].[roles] ([role_title],[role_description]) VALUES ('Housekeeper','Cleaning and sanitizing each used room')
366 GO
367
368 --staff
369 INSERT [dbo].[staffs] ([staff_id],[staff_role_title], [staff_department_name], [staff_firstname], [staff_lastname], [staff_DOB], [staff_phone_number], [staff_email], [staff_gender], [staff_hire_date])
370 INSERT [dbo].[staffs] ([staff_id],[staff_role_title], [staff_department_name], [staff_firstname], [staff_lastname], [staff_DOB], [staff_phone_number], [staff_email], [staff_gender], [staff_hire_date])
371 INSERT [dbo].[staffs] ([staff_id],[staff_role_title], [staff_department_name], [staff_firstname], [staff_lastname], [staff_DOB], [staff_phone_number], [staff_email], [staff_gender], [staff_hire_date])
372 INSERT [dbo].[staffs] ([staff_id],[staff_role_title], [staff_department_name], [staff_firstname], [staff_lastname], [staff_DOB], [staff_phone_number], [staff_email], [staff_gender], [staff_hire_date])
373
374 --roomtypes
375 INSERT INTO [dbo].[roomtypes] ([roomtype_name], [roomtype_price], [roomtype_max_occupancy], [roomtype_description]) VALUES ('Standard', 100.00, 2, 'Cozy room with basic amenities suitable for couple')
376 INSERT INTO [dbo].[roomtypes] ([roomtype_name], [roomtype_price], [roomtype_max_occupancy], [roomtype_description]) VALUES ('Deluxe', 150.00, 4, 'Spacious room with additional amenities suitable for family')
377 INSERT INTO [dbo].[roomtypes] ([roomtype_name], [roomtype_price], [roomtype_max_occupancy], [roomtype_description]) VALUES ('Suite', 250.00, 2, 'Luxurious suite with separate living area and premium amenities')
378 INSERT INTO [dbo].[roomtypes] ([roomtype_name], [roomtype_price], [roomtype_max_occupancy], [roomtype_description]) VALUES ('Penthouse', 500.00, 6, 'Exclusive penthouse with panoramic views and top-notch amenities')
```

Application Overview

←

Checkin Form

✓

Guest Name:

Emily Brown

Booking Number:

B10004

* Room Number:

D101

* Room Type:

Deluxe

Checkin Date:

4/23/2024

06

:05

* Room Status:

Occupied



←

Check-out

✓

Guest Name:

Emily Brown

Room Number:

D101

Invoice Status:

Paid

Checkout Date:

4/25/2024

11

:03

Room Status:

Vacant

Initial
State

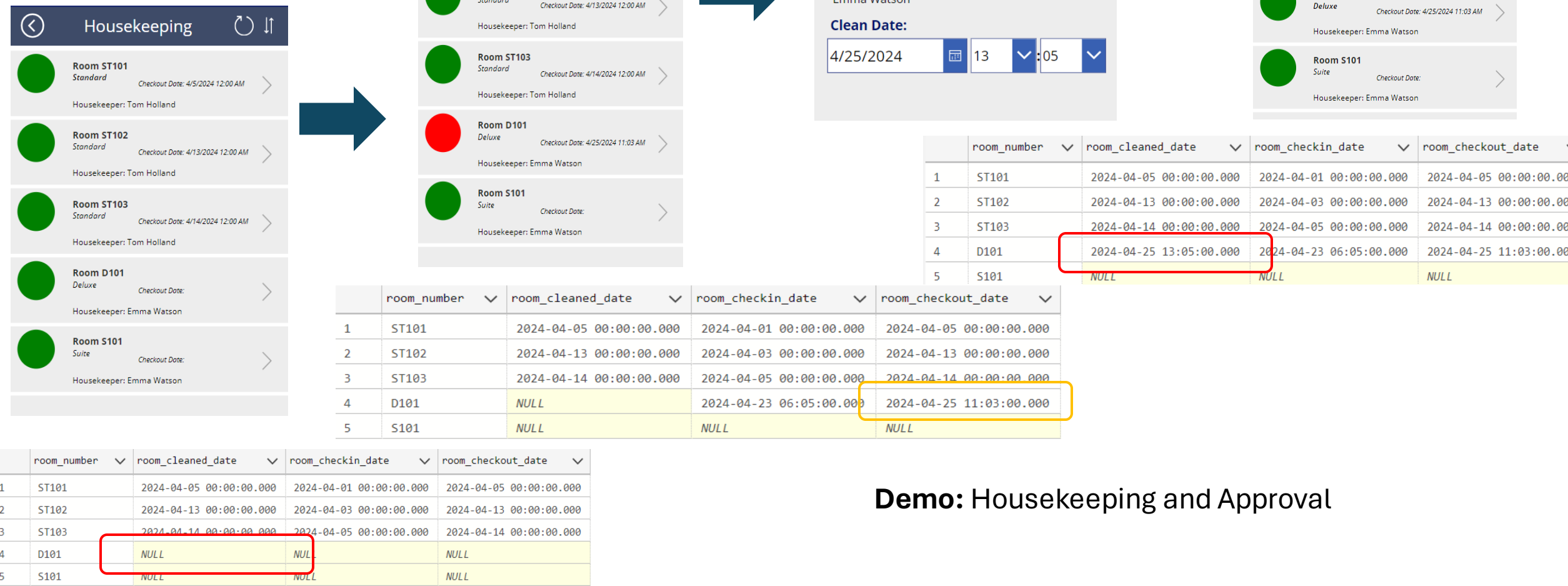
	room_number	room_cleaned_date	room_checkin_date	room_checkout_date
1	ST101	2024-04-05 00:00:00.000	2024-04-01 00:00:00.000	2024-04-05 00:00:00.000
2	ST102	2024-04-13 00:00:00.000	2024-04-03 00:00:00.000	2024-04-13 00:00:00.000
3	ST103	2024-04-14 00:00:00.000	2024-04-05 00:00:00.000	2024-04-14 00:00:00.000
4	D101	NULL	2024-04-23 06:05:00.000	NULL
5	S101	NULL	NULL	NULL

	room_number	room_cleaned_date	room_checkin_date	room_checkout_date
1	ST101	2024-04-05 00:00:00.000	2024-04-01 00:00:00.000	2024-04-05 00:00:00.000
2	ST102	2024-04-13 00:00:00.000	2024-04-03 00:00:00.000	2024-04-13 00:00:00.000
3	ST103	2024-04-14 00:00:00.000	2024-04-05 00:00:00.000	2024-04-14 00:00:00.000
4	D101	NULL	2024-04-23 06:05:00.000	2024-04-25 11:03:00.000
5	S101	NULL	NULL	NULL

	room_number	room_cleaned_date	room_checkin_date	room_checkout_date
1	ST101	2024-04-05 00:00:00.000	2024-04-01 00:00:00.000	2024-04-05 00:00:00.000
2	ST102	2024-04-13 00:00:00.000	2024-04-03 00:00:00.000	2024-04-13 00:00:00.000
3	ST103	2024-04-14 00:00:00.000	2024-04-05 00:00:00.000	2024-04-14 00:00:00.000
4	D101	NULL	NULL	NULL
5	S101	NULL	NULL	NULL

Demo: Check in and Checkout a room

Application Overview



Demo: Housekeeping and Approval

Application Overview

Employee Directory

Search items

Chris Evans

ID: E111 Hire Date: 4/5/2022

Job Title: Accountant

Emma Watson

ID: E114 Hire Date: 3/10/2021

Job Title: Housekeeper

Scarlett Johansson

ID: E112 Hire Date: 5/20/2023

Job Title: Housekeeping Supervisor

Tom Holland

ID: E113 Hire Date: 2/18/2021

Job Title: Housekeeper



Employee Form

* First Name:

Jane

* Last Name:

Carol

* Staff ID:

E115

* DOB:

4/1/2024

* Gender:

Female

* Email:

janecarol001@gmail.com

* Phone Number:

12352346345734

* Hire Date:



Employee Directory

Search items

Chris Evans

ID: E111 Hire Date: 4/5/2022

Job Title: Accountant

Emma Watson

ID: E114 Hire Date: 3/10/2021

Job Title: Housekeeper

Jane Carol

ID: E115 Hire Date: 4/24/2024

Job Title: Housekeeper

Scarlett Johansson

ID: E112 Hire Date: 5/20/2023

Job Title: Housekeeping Supervisor

Tom Holland

ID: E113 Hire Date: 2/18/2021

Job Title: Housekeeper



	staff_id	staff_role_title	staff_department_name	staff_firstname	staff_lastname	staff_DOB
1	E111	Accountant	Accounting	Chris	Evans	1981-06-13
2	E112	Housekeeping Supervisor	Housekeeping	Scarlett	Johansson	1984-11-22
3	E113	Housekeeper	Housekeeping	Tom	Holland	2001-01-15
4	E114	Housekeeper	Housekeeping	Emma	Watson	1990-04-15
5	E115	Housekeeper	Housekeeping	Jane	Carol	2024-04-01

staff_id	staff_role_title	staff_department_name	staff_firstname	staff_lastname	staff_DOB
E111	Accountant	Accounting	Chris	Evans	1981-06-13
E112	Housekeeping Supervisor	Housekeeping	Scarlett	Johansson	1984-11-22
E113	Housekeeper	Housekeeping	Tom	Holland	2001-01-15
E114	Housekeeper	Housekeeping	Emma	Watson	1990-04-15

Demo: Add new employee

Application Overview

Invoices

Search invoice id

I10004

Sarah Jones

\$8.99

Invoice for Mini Bar Alcohol

Pay by: Cash

Due Date: 4/8/2024

Status: Paid

I10005

John Smith

\$ 900

Invoice for room ST103

Pay by: Credit Card

Due Date: 4/5/2024

Status: Paid

I10006

John Smith

\$17.98

Invoice for Mini Bar Alcohol

Pay by: Cash

Due Date: 4/10/2024

Status: Paid

I10007

Emily Brown

\$ 1350

Invoice for room D101

Pay by: Online Transfer

Due Date: 4/20/2024

Status: Paid

I10008

Ted Turner

\$ 1750

Invoice for room S101

Pay by: Credit Card

Due Date: 4/21/2024

Status: Not paid yet

Need to Be Paid

Invoice ID:

I10008

Item charge:

\$ 0

Room Charge:

\$ 1750

Invoice due date:

4/21/2024

Guest Name:

Ted Turner

Payment Method:

Credit Card

Invoice Status:

Pending

Invoices

Search invoice id

I10004

Sarah Jones

\$8.99

Invoice for Mini Bar Alcohol

Pay by: Cash

Due Date: 4/8/2024

Status: Paid

I10005

John Smith

\$ 900

Invoice for room ST103

Pay by: Credit Card

Due Date: 4/5/2024

Status: Paid

I10006

John Smith

\$17.98

Invoice for Mini Bar Alcohol

Pay by: Cash

Due Date: 4/10/2024

Status: Paid

I10007

Emily Brown

\$ 1350

Invoice for room D101

Pay by: Online Transfer

Due Date: 4/20/2024

Status: Paid

I10008

Ted Turner

\$ 1750

Invoice for room S101

Pay by: Credit Card

Due Date: 4/21/2024

Status: Pending

invoice_id

invoice_guest_id

invoice_payment_method_type

invoice_status

1

I10001

G20001

Credit Card

Paid

2

I10002

G20001

Cash

Paid

3

I10003

G20002

Online Transfer

Paid

4

I10004

G20002

Cash

Paid

5

I10005

G20003

Credit Card

Paid

6

I10006

G20003

Cash

Paid

7

I10007

G20004

Online Transfer

Paid

8

I10008

G20005

Credit Card

Not paid yet

invoice_id

invoice_guest_id

invoice_payment_method_type

invoice_status

1

I10001

G20001

Credit Card

Paid

2

I10002

G20001

Cash

Paid

3

I10003

G20002

Online Transfer

Paid

4

I10004

G20002

Cash

Paid

5

I10005

G20003

Credit Card

Paid

6

I10006

G20003

Cash

Paid

7

I10007

G20004

Online Transfer

Paid

8

I10008

G20005

Credit Card

Pending

Demo: update payment status

User Story

- As a receptionist, I should be able to **check in new guests with their basic details** so that I don't need to **keep a record on my register**.

- As a manager, I should be able to **check the cleanliness status** of rooms so that I can **approve them as cleaned**.

- As a manager, I want to record new employee information and assign a supervisor after hiring, so that I can access this information whenever required.

- As a housekeeper, I should be able to **view the status of each room** , so that I can easily identify which **rooms have not been cleaned and are currently unoccupied**.

- As an accountant, I should be able to **view invoice details** so that I can **update the status once guests have paid the due amount**.

- As the CEO of the hotel, I should be able to **view the business performance**, where I can quickly see how much money we're **making from each room and each day**.

Potential Enhancements & Areas for Improvement



Integration of Online Booking

Integrate the system with external platforms to centralize all reservation data regardless of the channel used for booking.

User Story:

As a Guest, I should be able to **select and specify my room and service preferences** to book the room online so that the hotel can **prepare my room according to my needs** before my arrival.

Feedback and Ratings

Create a new functionality for collecting real-time feedback from guests during check-out or throughout their stay.

User Story:

As a Hotel Manager, I should be able to **collect real-time feedback from guests** so that we can immediately **address any issues and improve our services**.

Staff Performance metrics

Track and report on staff performance, including feedback from guests and efficiency in completing assigned tasks.

User Story:

As a manager, I should be able to track **staff performance**, integrating feedback from guests so that we can reward **high performers and identify areas for staff training and development**.

Teamwork Breakdown

Teera Yong

- Contributed to project proposal writing on 02/26/2024
- Completed the conceptual model on 02/26/2024
- Completed the data logic model on 04/03/2024
- Completed up/down script on 04/10/2024
- Completed PowerApp on 04/29/2024

Ashish Kushwaha

- Contributed to project proposal writing 02/26/2024
- Created user stories to help designing the database 02/20/2024
- Helped Teera in the conceptual model 02/26/2024
- Created the INSERT statements for the UP/DOWN script 04/10/2024
- Identified potential enhancements and areas of improvements in the database 04/15/2024

Roshini Rangani

- Contributed to project proposal writing 02/26/2024
- Helped Teera for conceptual and logical data model entities attributes and relations 02/26/2024
- Helped Teera in up/down script 04/10/2024
- created presentation to help us navigate through the complex details of our project 04/30/2024

Mohith Reddy

- contributed to project proposal writing 02/26/2024
- Helped Teera in logical data model sorted out the relationships between the entities and attributes 02/26/2024
- Helped Ashish in the UP/DOWN script 04/10/2024
- Helped Roshini in presentation adding the required data into presentation and in the summary documentation

Feedback and Future Directions

Ashish Kushwaha



I thoroughly enjoyed both the offline and online lectures of this DBMS course. As someone who was initially unfamiliar with database management systems, I now feel confident in my abilities to manage databases, design database structures, and perform data manipulation. The assignments varied in difficulty, which effectively prepared us for a wide range of real-world scenarios. I particularly appreciated how Professor Crimmer incorporated examples from his own professional experience, providing valuable insights into potential challenges and applications we might encounter in our future careers. His real-world examples were not only enlightening but also inspiring.

Teera Yong



Before taking this class, I didn't have any database experience. But, through the guidance by Joe, lecture video, class activities, and HW problems, I have learned quite a lot about database and related applications. I find class activities and HW problems are particularly very useful in reinforcing learning about the chapters. Meanwhile, I also found a big challenge in the project especially working as a group. This is because we have to work on conceptual model, data model, up/down script, and PowerApp, and all these are interconnected. Whenever, there is a significant change in anyone of these, we have to update the rests as well, and hence it can be very complicated to coordinate the work within a group. A smaller group size of 2 and smaller project would be more manageable.

Roshini Rangani



I began this course with a basic knowledge of creating tables and inserting data into databases. Over the past few months, thanks to your comprehensive lectures, textbook quizzes, and videos, I've expanded my skills to include SQL scripting, database normalization, triggers, and Power Apps development. The group project proved challenging within the 2–3-month timeframe, as it demanded significant coordination. For future courses, smaller groups might facilitate better cooperation and efficiency.

Mohith Reddy



Honestly, coming into this class with zero knowledge about databases, I was a bit nervous. But thanks to your teaching style and the engaging activities, I feel like I've learned a lot such as learning about data insertion, up/down functions, ER diagrams, and PowerApps. The hands-on activities really solidified the concepts for me, especially when it came to working through different functions and understanding assignments. Your explanations were clear and made even the most complex topics seem manageable. Plus, I appreciated the focus on practical applications like ER diagrams and PowerApps. It helped me see how databases are used in real-world scenarios.