University of Exeter

College of Engineering, Mathematics and Physical Sciences

ECM2419 - Database Theory and Design

Pairwise Coursework

Hotel Booking Database Design & Implementation

Hand-in Date: Monday 03 December 2018 by 12.00noon
Submission: both paper and electronic version

This course work comprises 30% of the overall module assessment. This is a pairwise exercise, and your attention is drawn to Taught Faculty's guidelines on Cheating and Plagiarism[1].

[1] http://as.exeter.ac.uk/support/admin/taught/studying-rulesandregulations/academicmisconduct/

Objective

This course work is to perform (most parts of) the whole process of database system development, in particular to carry out the following phases:

1. User requirements specification[2]
   - Data requirements
   - Transaction requirements
2. Conceptual design
   - Draw an Entity-Relationship diagram in UML
3. Logical design
   - Transform the ER model into a relational model
   - Specify relational constraints (primary keys, foreign keys)
4. Physical design and implementation
   - Choose a DBMS (either Oracle or MySQL) in which to implement the system
   - Create tables in the database with SQL, and populate it with data.
   - Test and validate your database design by writing queries in SQL

PROBLEM STATEMENT

A UK hotel chain operates a number of hotels in the UK. This coursework is to design and implement a Hotel Booking Database which would support the basic booking process as follows and the queries listed in the table (in Section 'Submission'). You may add any reasonable assumptions which you think are appropriate for a real Hotel Booking database. To make a more realistic database system, you may reference the website of the UK's largest hotel chain Premier Inn to get some inspiration.

Step 1: Online Searching

A customer search online by filling a hotel booking request form as follows. Assume that the input destination is always a town name.

Hotel Booking Request	
Booking Details	
Destination (Town)	Bristol
Check-in Date	26-12-2018
Check-out Date	28-12-2018
Number of Rooms	2

[2] The User requirement specification is the preliminary stage to database design. You may self-read Connolly's book: Chapter 11 'Database Analysis and the DreamHome Case Study' to learn techniques for gathering information, though this coursework is a much simpler case. For good examples of documenting user requirements, you may reference Appendix A and Appendix B in the book, or the example solutions for last year's Library management database.

Room 1			
Number of Adults	**Number of Children**	**Room Type**	
2	0	Double	
Room 2			
Number of Adults	**Number of Children**	**Room Type**	
1	0	Single	

Step 2: Search Results

The system will list all available hotel rooms. If the customer is interested in one hotel, he/she may click 'more information' to get more detailed information about the hotel and the rooms.

Available Hotels				
Name	Finzels Reach	HayMarket	King Street	……
Address	Finzels Reach, Bristol	The Haymarket, Bristol	Llandoger Trow, King Street, Bristol	
Post Code	BS1 6BX	BS1 3LP	BS1 4ER	
Phone	0871 622 2428	0871 527 8156	0871 527 8158	
Public Rating	7.5	8.1	8.8	
Facilities	Free parking, free Wi-Fi, air conditioned, lift access, breakfast-only restaurant,	Chargeable parking, free Wi-Fi, air conditioned, restaurant	Free Wi-Fi, air conditioned, lift access, restaurant,	
Type (Room 1)	Double	Double	Double	
Price (Room 1)	75	82	120	
Type (Room 2)	Single	Single	Single	
Price (Room 2)	65	70	90	
Breakfast Price per person (£)	10	8.5	0	
Total price without breakfast (£)	280	304	420	
Total price with breakfast (£)	340	355	420	

Room price: Each hotel holds different prices for rooms. In the same hotel, the basic price is fixed for each room type. Each hotel has a certain grace period for promotion, while the discount amount depends on the room type. For example, if customers book earlier than 14 days, Hotel A would offer 30% off discount for single bedrooms, and 15% for double and family bedrooms.

Breakfast price: Each hotel has different breakfast prices. For the same hotel, the breakfast price per person is fixed, no matter which room he/she is in or what time he/she makes the booking.

Step 3: Reservation

When deciding which hotel to book, the customer makes the booking by offering more information, such as customer details. The customer may choose 'pay on arrival' or 'pay now'. If 'pay on arrival', the invoice will be generated when the customer checks out. If 'pay now', the invoice will be generated right after the payment by card.

Hotel Reservation			
Customer Details			
Title	**First Name**	**Last Name**	**Telephone**
Mr	Ian	Cooper	07454245098
Address	**Post Code**	**Card No.**	**Date of expiration**
8 Grove Road, Exeter	EX4 6PN	4546098711112340	10/2020
Email			
i.cooper@gmail.com			
Booking Details			
Booking Reference	224277048		
Booking Date	20-11-2018		
Hotel Name	Finzels Reach		
Address, Post Code	Finzels Reach, Bristol, BS1 6BX		
Check-in Date	26-12-2018		
Check-out Date	28-12-2018		
Total Nights	2		
Room 1			
Number of Adults	**Number of Children**	**Room Type**	**Lead guest**
2	0	Double	Ian Cooper
Room Price (£)	**Breakfast Price (£)**	**Quantity of Breakfast**	**Total (£)**
75	10	4	190
Room 2			
Number of Adults	**Number of Children**	**Room Type**	**Lead guest**
1	0	Single	Sarah Freeman
Room Price (£)	**Breakfast Price (£)**	**Quantity of Breakfast**	**Total (£)**
65	10	2	150
Payment			
Payment option	Pay on arrival		
Total (£)	340		
Special Instruction			
Arrive around 10pm.			

Step 4: Payment

During checking out, if the customer hasn't paid before arrival, he/she could choose to pay either with cash or by card. After successful payment, an invoice would be generated as follows.

Hotel Invoice			
		Invoice date	18-12-2018
Booking Details			
Customer Name	Mr Ian Cooper		
Hotel Name	Finzels Reach		
Address, Post Code	Finzels Reach, Bristol, BS1 6BX		
Booking Reference	**Check-In Date**	**Check-Out Date**	**Total Nights**
224277048	26-12-2018	28-12-2018	2
Description	**Quantity**	**Price (£)**	**Total (£)**
Room 204 (Double)	2	75	150
Room 205 (Single)	2	65	130
Breakfast	6	10	60
Payment Details			
Total (£)	340		
Payment Option	Pay on arrival, card		
Payment time	11:05am, 28-12-2018		
Card No.	4546098711112340		
Date of Expiration	10/2020		

Step 5: Cancellation and refund

All hotels share the same cancellation policy: A customer gets a full refund if he/she cancels the booking more than 1 day prior to the check-in date, otherwise no refund would be generated.

SUBMISSION

Please submit your coursework in both electronic version and paper (BART) format by **12pm, December 03, 2018, Monday**. Note that for up to 14 days after that deadline the mark should be capped at 40%.

Only one student in the pair need submit the coursework. To make things easier, the paper draft should be submitted by the same student who submitted electronically.

- In the paper version, only the report (Hotel_design.pdf) is needed to print.
- In the electronic version, choose 2018-12-03~ECM2419~Hongping Cai~Database when submitting to empslocal.ex.ac.uk/submit. Please put all the following files into one folder and compress it into a zip file for submission. Inside the folder, four files should be included.

File name	Description	Mks
Hotel_design.pdf	Write a report explaining both the requirements and your design of the Hotel Booking Database system. It mainly consists of three parts. A. User requirement specification. You should analyse the database requirements which at least consists of data requirements and transaction requirements. (10')	55

	B. Conceptual model design. The Entity-Relationship Diagram should comply fully with the requirements you derived during the analysis stage. Add attributes to each entity or relationship, according to your understanding of Hotel booking database. State any assumptions necessary to support your design. (25') C. Logical model design. Transform the above ER diagram into a relational model. (14') D. Physical model design (simplified). At this stage, you must document your design of derived data. (6') You may also consider de-normalization process to reduce the number of joins when performing a critical transaction, or use indexes, leading to better response time. If you use de-normalization or indexes, document it along with the reason for the choice. (optional, 0') The report should fully justify your choice of entities, relationships and entity attributes, primary keys, the cardinality of relationships in your design. Writing skills such as language, spelling, grammar and presentation will also be assessed.	
Hotel_init.sql	Write an SQL file that will create all the relations in the database, and populate it with sufficient data[3] to demonstrate your solutions to the queries below. You may make up any data that you see fit for this purpose. At the beginning of the SQL file, use a comment /* */ to identify which RDBMS (either Oracle or MySQL) you used to run the code.	8
Hotel_query.sql	Write an SQL file that will do the following queries: A. List all Bristol hotels with public rating higher than 8.5 and with free parking. B. List all available double rooms in all Bristol hotels on 26/12/2018, ordered by the price without breakfasts, offering basic room information and hotel information (Note: the price must be the price after discount, if any). C. Display Ian Cooper's booking information, and how much he has paid (suppose he has paid online right after booking). D. Find all the hotels whose double bedroom prices are higher than the average double bedroom price on 26/12/2018. (Note: the price must be the price after discount, if any). E. Produce a booking status report on all the rooms in the Finzels Reach Hotel on 26/12/2018. F. List how many rooms there are in the Finzels Reach Hotel for each room type (i.e., family, double, twin, single).	27

[3] It is a tedious job to generate all the data for such a database. To minimise your time on this process, you may consider only 2 or 3 hotels in Bristol (listed in Step2: search results). In each hotel, you may consider around 5 rooms some of which are booked between 25/12/2018 and 30/12/2018.

	G. Count how many adult guests will be staying in the Finzels Reach Hotel on 26/12/2018. H. List all the availability for the Room 204 in the Finzels Reach Hotel in from 25/12/2018 to 30/12/2018. On each day, list the booking customer's name if it is booked. I. List how many breakfasts have been ordered in the Finzels Reach hotel on 26/12/2018.	
Hotel_update.sql	Write an SQL file that will do the following: A. Update the public rating of the Finzels Reach Hotel to be 8.0. B. Joe Smiths booked a double bed in the Finzels Reach Hotel today, the check-in date is 26/12/2018, the check-out date is 29/12/2018, 1 adult and 1 child, with breakfast. He chose to 'pay on arrival'. C. Mr. Ian Cooper had a booking which has been paid online. Today he would like to cancel his booking by offering the booking ID. D. Today, the Finzels Reach Hotel would like to decrease the discount of all family rooms to 5%, keeping the same grace period as before. E. Because of refurbishment, all the rooms' state on the first floor (starting with digit 1) in the Finzels Reach Hotel are changed to 'unavailable' from 01/6/2019 to 10/6/2019.	10

Collaboration

This coursework is supposed to be approached as a group of two.
You will need to provide a cover page which details how you would like the final mark to be allocated to the developers, based upon your agreed input. If both parties took equal contribution, this would be 50:50 (which is the general expectation for this assignment). The maximum divergence that may be indicated on the cover-page is 60:40. Failure to submit this weighting will incur a penalty of 5 marks.

What about if my partner does not contribute?

If you have been paired with a student who is not contributing (e.g. not replying to emails and/or not meeting up for pair programming sessions) you should inform the module leader within one week of release of the CA (i.e. by midday on the **2 November**) to facilitate the possible splitting and reforming of pairs if necessary. As such, please ensure that you arrange to meet up and start the work immediately to ensure that you are partnered with a student who wants to actively contribute to the coursework.
You are supposed to work in pairs for this exercise, because being a good team player is one of the key skills you need in your future career. To make this assignment as fair as possible, you must be paired with someone unless you have a good reason (e.g., ILP). Only when you split with your partner and can't find a new partner by 2 November, will I consider tailoring an individual version.

End of Assignment