

TUTORIAL 5: Normalisation

Before they had their system properly designed, GCUTours got their 'IT Guy' to put together a database. After all, how hard could it be to put a few tables together?

IT Guy didn't really know about database design, so he made a bit of a mess of it. In this tutorial you will look at some of his work. You'll think about what he did wrong and about how to fix it.



Question 1

Here's IT Guy's first attempt at a table to store data about holiday **packages**, shown with some sample data:

Packages(packageID, location, name, description, price, departureDates)

packageID	location	name	description	price	departureDates
1	USA	Western Advent	A typical tour is c	£1,499.00	1/3/2008,5/6/2008,2/9/2008
2	Asia	Roof of the Worl	New this year is	£1,599.00	01/03/2008,05/06/2008
3	Europe	Alpine Action	There is adventu	£899.00	1/3/2008,2/9/2008,2/10/2008,3/11/2008

1. Write an SQL query which will find all holidays with a departure on 5th June 2008.
2. Try writing a query which will list all departure dates and locations – can you do it?
3. Summarise the problems that this table design can cause

IT Guy tried to design this table again:

Packages(packageID, location, name, description, price, departureDate1, departureDate2, departureDate3, departureDate4)

packageID	location	name	description	price	departureD1	departureD2	departureD3	departureD4
1	USA	Western Advent	A typical tour is c	£1,499.00	01/03/2008	05/06/2008	02/09/2008	
2	Asia	Roof of the Worl	New this year is	£1,599.00	01/03/2008	05/06/2008		
3	Europe	Alpine Action	There is adventu	£899.00	01/03/2008	02/09/2008	02/10/2008	03/11/2008

1. Write an SQL query which will find all holidays with a departure on 5th June 2008
2. In what ways is this better? Is it worse in any ways?
3. Write descriptions, in the TableName(fieldnames...) notation, of the tables required to get this into 1NF.

Question 2

IT Guy figured that he needed a table to store **bookings**, so he came up with this:

Bookings(departureDate, name, username, firstname, lastname, persons)

departureDate	name	username	firstname	lastname	persons
05/02/2008	Colorado Wint	ferdy	Ferdinand	Magellan	3
01/03/2008	Western Adve	mpolo	Marco	Polo	2
01/03/2008	Western Adve	vdagama	Vasco	daGama	4
05/06/2008	Borneo Explor	mpolo	Marco	Polo	1
05/06/2008	Western Adve	ferdy	Ferdinand	Magellan	5

1. What is the primary key of this table?
2. List the functional dependencies in this table.
3. Why is this table not in 2NF?
4. Write descriptions, in the **TableName(fieldnames...)** notation, of the tables required to get this into 2NF.

Question 3

IT Guy read something on a website about using ID fields as primary keys, and reckoned that all the problems with the Bookings table would be solved by adding a **bookingID** field to the table.

Bookings(bookingID, departureDate, name, username, firstname, lastname, persons)

bookingID	departureDate	name	username	firstname	lastname	persons
1	05/02/2008	Colorado Wint	ferdy	Ferdinand	Magellan	3
2	01/03/2008	Western Adve	mpolo	Marco	Polo	2
3	01/03/2008	Western Adve	vdagama	Vasco	daGama	4
4	05/06/2008	Borneo Explor	mpolo	Marco	Polo	1
5	05/06/2008	Western Adve	ferdy	Ferdinand	Magellan	5

1. List the functional dependencies in this table.
2. Is this table in 2NF? How do you know?
3. Why is this table not in 3NF?
4. Write descriptions, in the **TableName(fieldnames...)** notation, of the tables required to get this into 3NF.

Question 4

Here's another of IT Guy's attempts at fixing the table in Question 1. He really doesn't like adding more tables!

Packages(packageID, location, name, description, price, departureDate)

packageID	location	name	description	price	departureDate
1	USA	Western Advent	A typical tour is c	£1,499.00	01/03/2008
1	USA	Western Advent	A typical tour is c	£1,499.00	05/06/2008
1	USA	Western Advent	A typical tour is c	£1,499.00	02/09/2008
2	Asia	Roof of the Worl	New this year is	£1,599.00	01/03/2008
2	Asia	Roof of the Worl	New this year is	£1,599.00	05/06/2008
3	Europe	Alpine Action	There is adventu	£899.00	01/03/2008
3	Europe	Alpine Action	There is adventu	£899.00	02/09/2008
3	Europe	Alpine Action	There is adventu	£899.00	02/10/2008
3	Europe	Alpine Action	There is adventu	£899.00	03/11/2008

1. What is the primary key of this table?
2. Does this table fix any of the problems identified in Question 1? Does it create any new problems?
3. This table is still not in 1NF. Why?