

Lab 10 – Normalization 2

(2NF, 3NF)

Objective:

Students will learn:

- To continue the **normalization** of user views from **1NF** to **2NF** and **3NF**
- How to identify and remove **partial dependencies**
- How to identify and remove **transitive dependencies**

Submission:

You only need to submit the final part of this lab, Your name and student ID MUST be in the WORD file or you will receive a mark of zero.

Definitions:

Definition: A relation is in 1NF if it contains no multi-valued dependencies (also known as repeating groups).

Definition: A relation is in 2NF if it is in 1NF and it contains no Partial Dependencies.

Definition: A Partial Dependency occurs when a non-key attribute(s) is dependent on (or is determined by) a part of a composite primary key.

Definition: A relation is in 3NF if it is in 2NF and it contains no Transitive Dependencies.

Definition: A Transitive Dependency occurs when a non-key attribute (s) is dependent on (or is determined by) another non-key attribute.

Instructions:

Part A (FINDING Second Normal Form (2NF))

Note: A relation that has only a simple primary key cannot have any partial dependencies!

1. Examine the following report:

Premiere Corporation

Customer Orders

Customer Number	Name	Order Number	Order Date	Sales Rep	Rep Last Name
124	Sally Adams	12489	2016-09-02	03	Jones
		12500	2016-09-05		
256	Ann Samuels	12495	2016-09-04	06	Smith
311	Don Charles	12491	2016-09-02	12	Diaz
315	Tom Daniels	12494	2016-09-04	06	Smith
522	Mary Nelson	12498	2016-09-05	12	Diaz
		12504	2016-09-05		

Step 1:

Create the UNF relation by creating a relation composed of all the attributes found in the User View. Don't forget to **underline the primary key** and **place brackets** around any multi-valued dependencies (also known as **repeating groups**) you may find.

UNF:

UNF: Customer [(PK **CustNo**, CustName, RepNo, RepName), OrderNo, OrderDate]

Step 2:

Create the 1NF relations by resolving the multi-valued dependencies (also known as repeating groups):

1NF

Now you are ready to create the 2NF relations by resolving the partial dependencies from the 1NF relations.

Your 1NF solution should look something like this:

1NF: Customer [PK CustNo, CustName, RepNo, RepName]
Cust_Order [PK OrderNo, OrderDate, FK CustNo]

Note: if you did not get a similar solution, please talk to your instructor about it now! It is very important to get the correct UNF and 1NF relations.

Step 3:

The process for taking a relation from 1NF to 2NF involves resolving the partial dependencies. We see that from our definition of 2NF (page 1) a partial Dependency is when a non-key attribute is determined by a part of the primary key. We also read in the note (page 1) that we cannot have partial dependencies when there is a one-part Primary Key).

1NF: Customer [PK CustNo, CustName, RepNo, RepName]
Cust_Order [PK OrderNo, OrderDate, FK CustNo]

Now examine the CustOrder relation. Does it have a composite primary key (a key made up of more than 1 field) ? _____

Identify the key attributes. OrderNo, CustNo

Identify the non-key attributes. OrderDate,

Are any of the non-key attributes determined by ONE of the key attributes?

Which non-key attributes are determined by only one of the PK attributes?

_____.

We must create new relations for the partial dependencies.

Write the 3 possible PK's:

[CustNo ,

[OrderNo ,

[CustNo, OrderNo ,

Place all non-key attributes on the appropriate table (hint: choose the table with the least parts.

2NF:

CUSTOMER [CustNo,

ORDER [OrderNo

CUSTORDER [CustNo, OrderNo,

1NF: Customer [CK CustNo, CustName, RepNo, RepName]
Cust_Order [CK OrderNo, OrderDate, FK CustNo]

2NF:

Customer [CustNo, CustName, RepNo, RepName]

CustOrder [CustNo, OrderNo]

Order [OrderNo, Orderdate]

Part B (FINDING Third Normal Form (3NF))

We now have a set of 2NF relations from our User View. Your 2NF solution should look something like this:

2NF:

Customer [CustNo, CustName, RepNo, RepName]

CustOrder [CustNo, OrderNo]

Order [OrderNo, Orderdate]

If you did not correctly identify the order relation, please ask your instructor about this process now!

We are now ready to identify any transitive dependencies we may have.

Note: A relation that has no transitive dependencies is already in 3NF!

1. Examine each of the 2NF relations and determine the following:

Customer relation: Key attributes _____

Non-key attributes: _____

CustOrder relation Key attributes _____

Non-key attributes _____

Order relation **Key attributes** _____

Non-key attributes: _____

Note: if a relation contains less than 2 non-key attributes, there cannot be any transitive dependencies. Therefore, the CustOrder and Order relations cannot contain any transitive dependencies! Simply copy those relations to the 3NF solution.

Examine non-key attributes of the Customer relation. Do any of the non-key attributes determine any of the other non-key attributes? _____

If you answered yes, you are right. Fill in the blanks:

_____ is determined by _____

2. We must create a new relation for the transitive dependency. We do this by moving the non-key attributes involved in the transitive dependency to a new relation. The primary key of the new relation will be the non-key attribute that determines the other non-key attributes involved in the transitive dependency.

Write the DBDL for the new relation:

REP [_____]

3NF:

ORDER [OrderNo, Orderdate]

REP []

3NF: Customer [PK **CustNo**, CustName, FK RepNo]
 Cust_Order [PK **OrderNo**, OrderDate, FK CustNo]
 Reps [PK **RepNo**, RepName]

2NF:

Customer [CustNo, CustName, RepNo, RepName]

CustOrder [CustNo, OrderNo]

Order [OrderNo, Orderdate]

Lab 10 Submission from this page:

Submit a Word document of the following 3 questions.

Question 1

For the following User View, determine the 1, 2 and 3NF The UNF relation has been provided.

Premiere Corporation**Order Detail Report**

Order Number	Order Date	Cust Number	Cust Last Name	Part Number	Part Desc	Qty Ordered	Quoted Price
12489	2016-09-02 124	124	Adams	AX12	Iron	11	14.95
12491	2016-09-02 311	311	Charles	BT04	GasGrill	3	440.00
				BZ66	Washer	1	399.99
				CX11	MiniBlender	1	11.98
12494	2016-09-04	315	Daniels	CB03	Bike	4	279.96
12495	2016-09-04	256	Samuels	CX11	MiniBlender	2	23.96
12498	2016-09-05	522	Nelson	AZ52	Dartboard	2	12.96
				BA74	Basketbal	4	24.96
12500	2016-09-05	124	Adams	BT04	GasGrill	1	149.99
12504	2016-09-05	522	Nelson	CZ81	Treadmill	2	325.98

UNF:

Order [PK OrderNo, Orderdate, CustNo, CustLname, (PartNo, PartDesc, QtyOrd, Price)]

1NF:

2NF:

3NF:

Question 2

For the following User View, determine the UNF, 1, 2 and 3NF

Movie rental report

FULL NAMES	PHYSICAL ADDRESS	MOVIES RENTED	SALUTATION
Janet Jones	First Street Plot No 4	Pirates of the Caribbean, Clash of the Titans	Ms.
Robert Phil	3 rd Street 34	Forgetting Sarah Marshal, Daddy's Little Girls	Mr.
Robert Phil	5 th Avenue	Clash of the Titans	Mr.

UNF: Full Name	Physical Movie Rented	Salutation	Address
Janet Jones | Pirates of the Caribbean | Ms. | First Street Plot 4
Janet Jones | Clash of the Titans | Ms. | First Street Plot 4
1NF: Robert Phil | Forgetting Sarah Marshall | Mr. | 3rd Street 34
Robert Phil | Daddy's Little Girls | Mr. | 3rd Street 34
Robert Phil | Clash of the Titans | Mr. | 5th Avenue

2NF:

3NF: