

**CSCI 2141****W2013****Assignment 3, Due 9:35 am, February 20, 2013****Groups of up to 3 students permitted.**

**Submission instructions:** Submit an electronic copy of your assignment (SCAN your work as a PDF if needs be, scanner located by tech support on 1<sup>st</sup> floor). Email your assignment to the TA, Savneet Arora ([sarora@cs.dal.ca](mailto:sarora@cs.dal.ca)). In the subject line, use the following template: 2141 Assignment-3 (Banner ID(s))

In the following questions, the primary key fields are underlined. {attribute, attribute} indicates a repeating group of attributes. If you need to make assumptions about business rules, please note the assumptions made. In most cases, you are given a table design and asked to make the changes necessary to normalize the tables to a certain level.

1. A table design is shown which violates 1NF. Give a design which will store the same information but which is in 1NF.

Person(personid, personname, {carid, carname})

2. A table design is shown which violates 1NF. Project(projid, other proj. fields, {empid, other emp. Fields}). Give two answers to the problem, one assuming that the relationship between employees and projects is many-to-one, and the other assuming the relationship is many-to-many.

3. A table design is shown which violates 2NF. Give a design which will store the same information but which is in 2NF.

Transaction(personid, timestamp, personname)

4. A table design is shown which violates 2NF. Give a design which will store the same information but which is in 2NF.

Consignment(consignmentid, itemid, itemcolor, itemprice)

5. A table design is shown which violates 2NF. Appointment(service provider, client, client diagnosis, date, time). Observe that this may also have problems with the key fields, depending on what assumptions you make. If you detect problems, make and state your assumptions and define the keys accordingly.

6. A table design is shown which violates 3NF. Assume that department determines boss. Give a design which will store the same information but which is in 3NF.

Employee(SSN, empname, deptid, bossid)

7. A table design is shown which violates 3NF. Assume that ownerid determines ownername and owneraddress. Give a design which will store the same information but which is in 3NF.

Vehicle(VIN, ownerid, ownername, owneraddress)

8. A table design is which violates 3NF. Give a design which will store the same information but which is in 3NF.

Tour(tourpackage, destination, departure date, return date, guide name, guide nationality).

9. A table design is shown which violates BCNF. Assume that each player can play many sports and vice-versa. Also assume that each coach coaches only one sport. Give a design which will store the same information but which is in BCNF.

Player-Sport(playerid, sportid, coachid)

8. A table design is shown which violates BCNF. Assume that a project may take place at more than one location at a time, but at any one location there is only one project going on at a time. Give a design which will store the same information but which is in BCNF.

Employee-Project(empid, projid, locid)

9. A table design is shown which violates BCNF. The first task here is dreaming up a business assumption that would cause this to violate BCNF. State the assumption and then fix the table.

Sale(item class code, salesrep id, date, price, custid).

10. A table design is shown which is not necessarily in 4NF. State explicitly the assumption that would make this violate 4NF and fix the table.

Publications(pubid, readers, advertisers, other pub attributes).

11. Consider the following table. Following the steps of normalization (beginning with determining the functional dependencies), do what is necessary to take it to 1NF to 2NF and to 3NF. Once in 3NF, discuss whether or not it is also in BCNF, 4NF, and 5NF. If it is not, make the necessary changes. Assume that Dept# and Cust# construct the primary key in our initial table.

**Unnormalized Table**

Dept #	Dept Name	Location	Mgr Name	Mgr ID No.	Tel Extn.	Cust #	Cust Name	Date of Complaint	Nature of Complaint
11232	Soap Division	Cincinnati	Mary Samuel	S11	7711	P10451	Robert Drumtree	1998-01-12	Poor Service
						P10480	Steven Parks	1998-01-14	Discourteous Attendant

12. See Sales Order form below. Design the database to support it and bring the tables to 3NF. At each step of the way, describe any repetition of data, delete anomalies, insert anomalies, and update anomalies that remain.

### Sales Order

*Fiction Company*  
 202 N. Main  
 Mahattan, KS 66502

<b>CustomerNumber:</b>	1001	<b>Sales Order Number:</b>	405
<b>Customer Name:</b>	ABC Company	<b>Sales Order Date:</b>	2/1/2000
<b>Customer Address:</b>	100 Points Manhattan, KS 66502	<b>Clerk Number:</b>	210
		<b>Clerk Name:</b>	Martin Lawrence

Item Ordered	Description	Quantity	Unit Price	Total
800	widgit small	40	60.00	2,400.00
801	tingimajigger	20	20.00	400.00
805	thingibob	10	100.00	1,000.00
<b>Order Total</b>				3,800.00

Fields in the original data table will be as follows:

SalesOrderNo, Date, CustomerNo, CustomerName, CustomerAdd, ClerkNo,  
 ClerkName, ItemNo, Description, Qty, UnitPrice