Assignment 3 – **NORMALIZATION**

1. Normalize the following. Refer: [Normalization - 1NF, 2NF, 3NF and 4NF]

Cust Name	Item	Shipping Address	Newsletter	Supplier	Supplier Phone	Price
Alan Smith	Xbox One	35 Palm St, Miami	Xbox News	Microsoft	(800) BUY-XBOX	250
Roger Banks	PlayStation 4	47 Campus Rd, Boston	PlayStation News	Sony	(800) BUY-SONY	300
Evan Wilson	Xbox One, PS Vita	28 Rock Av, Denver	Xbox News, PlayStation News	Wholesale	Toll Free	450
Alan Smith	PlayStation 4	47 Campus Rd, Boston	PlayStation News	Sony	(800) BUY-SONY	300

2. Normalize the following.

staffNo	dentistName	patNo	patName	appointment date	appointment time	surgeryNo
S1011	Tony Smith	P100	Gillian White	12-Sep-13	10.00	S15
S1011	Tony Smith	P105	Jill Bell	12-Sep-13	12.00	S15
S1024	Helen Pearson	P108	Ian MacKay	12-Sep-13	10.00	S10
S1024	Helen Pearson	P108	Ian MacKay	14-Sep-13	14.00	S10
S1032	Robin Plevin	P105	Jill Bell	14-Sep-13	16.30	S15
S1032	Robin Plevin	P110	John Walker	15-Sep-13	18.00	S13

Figure 14.19 Table displaying sample dentist/patient appointment data.

3. Do normalization on DreamHome Lease

A collection of (simplified) *DreamHome* leases is shown in Figure 14.9. The lease on top is for a client called John Kay who is leasing a property in Glasgow, which is owned by Tina Murphy. For this worked example, we assume that a client rents a given property only once and cannot rent more than one property at any one time.

Figure 14.9 Collection of (simplified) *DreamHome* leases.

Sample data is taken from two leases for two different clients called John Kay and Aline Stewart and is transformed into table format with rows and columns, as shown in Figure 14.10. This is an example of an unnormalized table.

ClientRental

clientNo	cName	propertyNo	pAddress	rentStart	rentFinish	rent	ownerNo	oName
CR76	John Kay	PG4	6 Lawrence St, Glasgow	1-Jul-12	31-Aug-13	350	CO40	Tina Murphy
		PG16	5 Novar Dr, Glasgow	1-Sep-13	1-Sep-14	50	CO93	Tony Shaw
CR56	Aline Stewart	PG4	6 Lawrence St, Glasgow	1-Sep-11	10-June-12	350	CO40	Tina Murphy
		PG36	2 Manor Rd, Glasgow	10-Oct-12	1-Dec-13	375	CO93	Tony Shaw
		PG16	5 Novar Dr, Glasgow	1-Nov-14	10-Aug-15	450	CO93	Tony Shaw

Figure 14.10 ClientRental unnormalized table.

4. Gather reports and forms related to your project. Make up the unnormalized table. Design your project using bottom-up approach. (Normalization)
5. Validate your project ERD using the normalization techniques. If you store multiple entities in one table and one of them is updated frequently, create a separate table for the entity that doesn't directly depend on the PK.

Example

Car toll system

UNNORMALIZED - All user data from the form, report, ... in table format

DriverNo	Dname	LicenseNo	LType	Bill1	Bill2	Bill1
1	John	A123	C	15, Road1	3, Road15	30, Road31
2	Tom	A124	A	5, Road3		
3	Alex	B123	B	15, Road1		
4	Sarah	C123	B	10, Road1	6, Road9	

1NF - No repeating groups (flatten it or create more rows)

DriverNo	Dname	LicenseNo	LType	Bill
1	John	A123	C	15, Road1
2	Tom	A124	A	5, Road3
3	Alex	B123	B	15, Road1
4	Sarah	C123	B	10, Road1
1	John	A123	C	3, Road15
1	John	A123	C	30, Road31

DriverNo	Dname	LicenseNo	LType	Bill Amount	Bill Road
1	John	A123	C	15	Road1
2	Tom	A124	A	5	Road3
3	Alex	B123	B	15	Road1
4	Sarah	C123	B	10	Road1
1	John	A123	C	3	Road15
1	John	A123	C	30	Road31
4	Sarah	C123	B	6	Road9

2NF - No duplicates (eliminating functional dependency). Equavalient to establishing one-to-many relationship.

DriverNo	Dname	LicenseNo	LType	*DriverNo*	Bill Amount	Bill Road
1	John	A123	C	1	15	Road1

2	Tom	A124	A	2	5	Road3
3	Alex	B123	B	3	15	Road1
4	Sarah	C123	B	4	10	Road1
				1	3	Road15
				1	30	Road31
				4	6	Road9

3NF - No multiple entites in one table (eliminating transitive dependency)

Driver table

DriverNo	**Dname**	***LicenseNo***
1	John	A123
2	Tom	A124
3	Alex	B123
4	Sarah	C123

Driving license table

LicenseNo	**LType**
A123	C
A124	A
B123	B
C123	B

Billing table

DriverNo	**Bill Amount**	**Bill Road**
1	15	Road1
2	5	Road3
3	15	Road1
4	10	Road1
1	3	Road15
1	30	Road31
4	6	Road9