THE WELLMEADOWS HOSPITAL CASE STUDY

Team Members

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Question:

This case study describes a small hospital called Wellmeadows, which is located in Edinburgh. The Wellmeadows Hospital specializes in the provision of health care for elderly people. Listed below is a description of the data recorded, maintained, and accessed by the hospital staff to support the management and day-to-day operations of the Wellmeadows Hospital.

Data Requirements

1. Wards

The Wellmeadows Hospital has 17 wards with a total of 240 beds available for short- and long-stay patients, and an outpatient clinic. Each ward is uniquely identified by a number (for example, ward 11) and also a ward name (for example, Orthopaedic), location (for example, E Block), total number of beds, and telephone extension number (for example, Extn 7711).

2. Staff

The Wellmeadows Hospital has a **Medical Director**, who has overall responsibility for the management of the hospital. The Medical Director maintains control over the use of the hospital resources (including staff, beds, and supplies) in the provision of cost-effective treatment for all patients.

The Wellmeadows Hospital has a **Personnel Officer** who is responsible for ensuring that the appropriate number and type of staff are allocated to each ward and the out-patient clinic.

The *information stored on each member of staff* includes a staff number, name (first and last), full address, telephone number, date of birth, sex, National Insurance number (NIN), position held, current salary, and salary scale. It also includes each member's qualifications (which includes date of qualification, type, and name of institution), and work experience details (which includes the name of the organization, position, and start and finish dates).

The *type of employment contract* for each member of staff is also recorded, including the number of hours worked per week, whether the member of staff is on a permanent or temporary contract, and the type of salary payment (weekly/monthly).

Each ward and the outpatient clinic have a member of staff with the position of **Charge Nurse**. The Charge Nurse is responsible for overseeing the day-to-day operation of the ward/clinic. The Charge Nurse is allocated a budget to run the ward and must ensure that all resources (staff, beds, and supplies) are used effectively in the care of patients. The Medical Director works closely with the Charge Nurses to ensure the efficient running of the hospital. A Charge Nurse is

responsible for setting up a weekly staff rota, and must ensure that the ward/clinic has the correct number and type of staff on duty at any time during the day or night. In a given week, each member of staff is assigned to work an early, late, or night shift. As well as the Charge Nurse, each ward is allocated senior and junior nurses, doctors and auxiliaries. Specialist staff (for example, consultants, physiotherapists) are allocated to several wards or the clinic.

3. Patients

When a patient is first referred to the hospital he or she is allocated a unique patient number. At this time, additional details of the patient are also recorded including the name (first and last name), address, telephone number, date of birth, sex, marital status, date registered with the hospital, and the details of the patient's next-of-kin.

4. Patient's next-of-kin.

The details of a patient's next-of-kin are recorded, which includes the next-of-kin's full name, relationship to the patient, address, and telephone number.

5. Local doctors

Patients are normally referred to the hospital by their local doctor. The details of local doctors are held, including their full name, clinic number, address, and telephone number. The clinic number is unique throughout the United Kingdom.

6. Patient appointments

When a patient is referred by his or her doctor to attend the Wellmeadows Hospital, the patient is given an appointment for an examination by a hospital consultant. Each appointment is given a unique appointment number. The details of each patient's appointment are recorded and include the name and staff number of the consultant undertaking the examination, the date and time of the appointment, and the examination room (for example, Room E252). As a result of the examination, the patient is either recommended to attend the outpatient clinic or is placed on a waiting list until a bed can be found in an appropriate ward.

7. Outpatients

The details of out-patients are stored and include the patient number, name (first and last name), address, telephone number, date of birth, sex, and the date and time of the appointment at the outpatient clinic.

8. In-patients

The Charge Nurse and other senior medical staff are responsible for the allocation of beds to patients on the waiting list. The details of patients currently placed in a ward and those on the waiting list for a place on a ward are recorded. This includes the patient number, name (first and last name), address, telephone number, date of birth, sex, marital status, the details of the patient's next-of-kin, the date placed on the waiting list, the ward required, expected duration of stay (in days), date placed in the ward, date expected to leave the ward, and the actual date the patient left the ward, when known. When a patient enters the ward, he or she is allocated a bed with a unique bed number.

9. Patient medication

When a patient is prescribed medication, the details are recorded. This includes the patient's name and number, drug number and name, units per day, method of administration (for example, oral, intravenous (IV)), start and finish date. The medication (pharmaceutical supplies) given to each patient is monitored.

10. Surgical and non-surgical supplies

The Wellmeadows Hospital maintains a central stock of surgical (for example, syringes, sterile dressings) and non-surgical (for example, plastic bags, aprons) supplies. The details of surgical and non-surgical supplies include the item number and name, item description, quantity in stock, reorder level, and cost per unit. The item number uniquely identifies each type of surgical or non-surgical supply. The supplies used by each ward are monitored.

11. Pharmaceutical supplies

The hospital also maintains a stock of pharmaceutical supplies (for example, antibiotics, painkillers). The details of pharmaceutical supplies include drug number and name, description, dosage, method of administration, quantity in stock, reorder level, and cost per unit. The drug number uniquely identifies each type of pharmaceutical supply. The pharmaceutical supplies used by each ward are monitored.

12. Ward requisitions

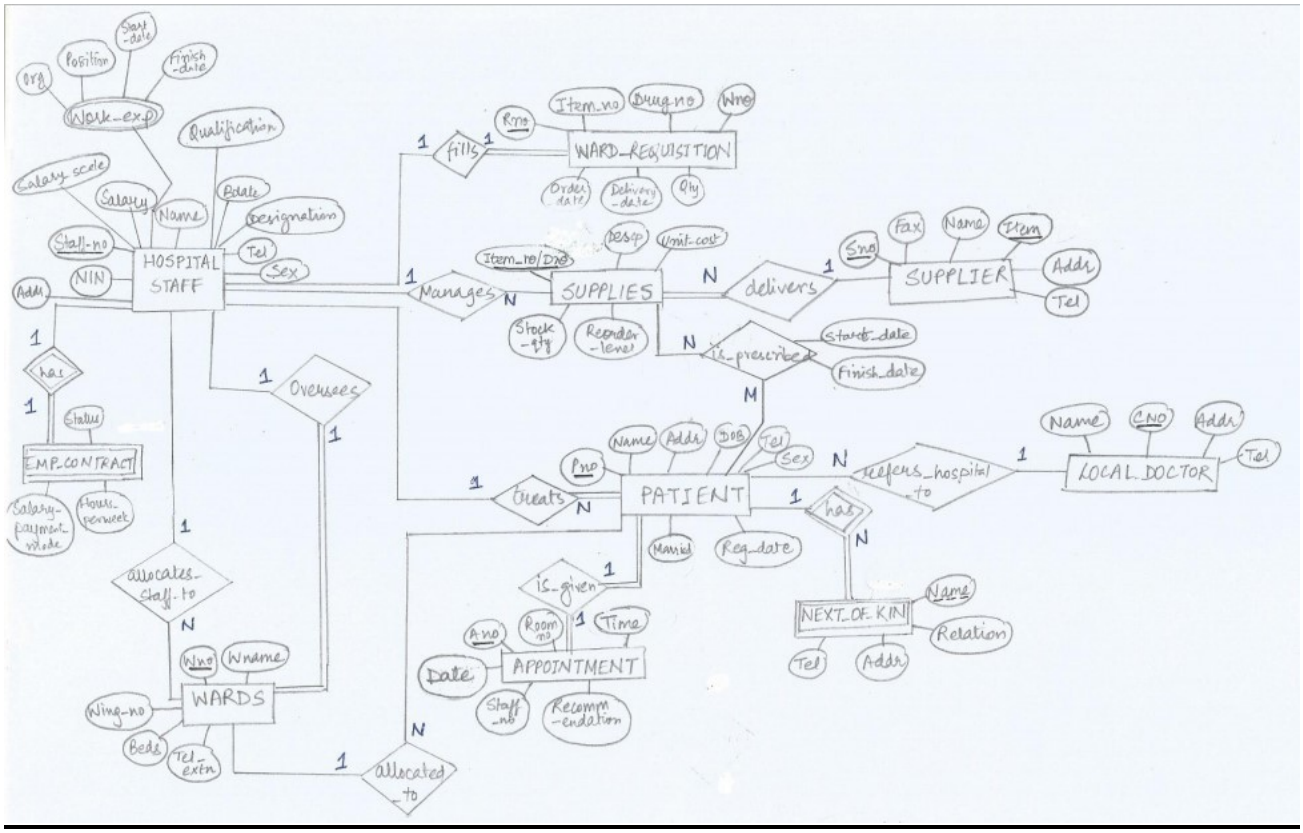
When required, the Charge Nurse may obtain surgical, non-surgical, and pharmaceutical supplies from the central stock of supplies held by the hospital. This is achieved by ordering supplies for the ward using a requisition form. The information detailed on a requisition form includes a unique requisition number, the name of the member of staff placing the requisition, and the number and name of the ward. Also included is the item or drug number, name, description, dosage and method of administration (for drugs only), cost per unit, quantity required, and date ordered. When the requisitioned supplies are delivered to the ward, the form must be signed and dated by the Charge Nurse who initiated the order.

13. Suppliers

The details of the suppliers of the surgical, non-surgical, and pharmaceutical items are stored. This information includes the supplier's name and number, address, telephone, and fax numbers. The supplier number is unique to each supplier.

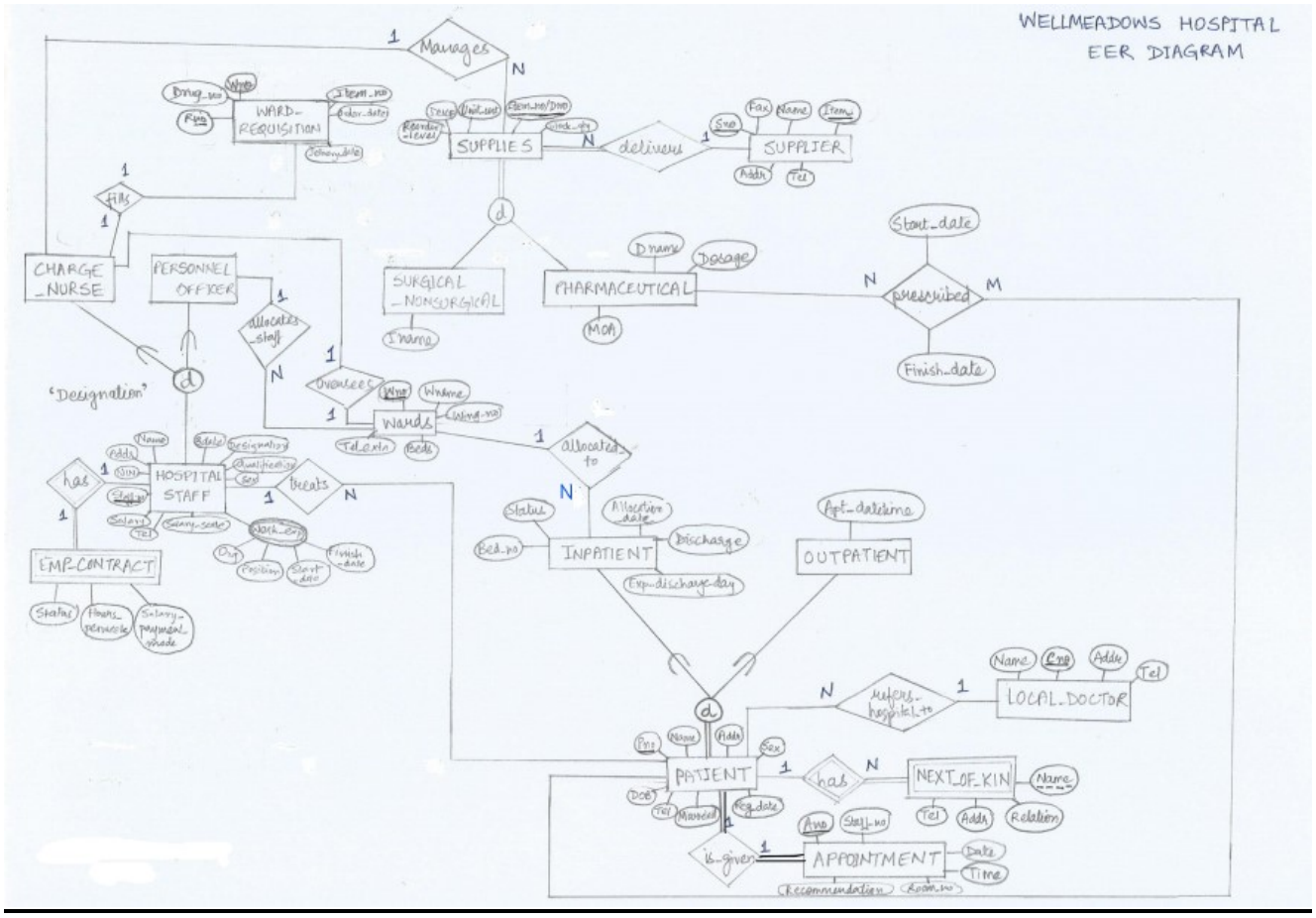
WELLMEADOWS HOSPITAL

ER DIAGRAM



WELLMEADOWS HOSPITAL

EER DIAGRAM



WELLMEADOWS HOSPITAL

RELATIONAL SCHEMA

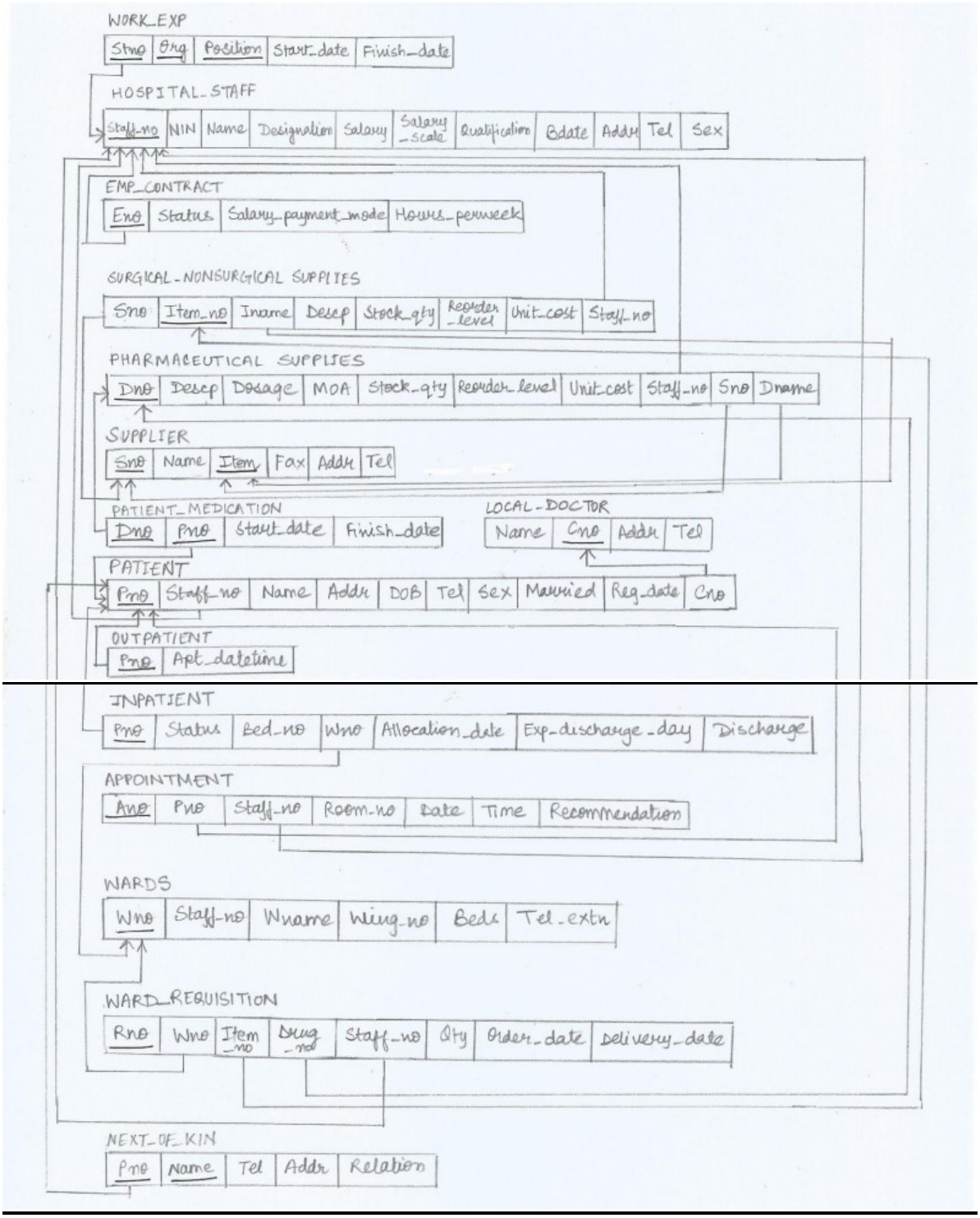


TABLE CREATION AND POPULATION

STAFF

```
Create table Staff(
staff_no     varchar(10)    not null,
nin          int            not null,
name         varchar(20)    not null,
designation  varchar(15)    not null,
salary       decimal(10,3) not null,
salary_scale char(2)    not null,
qualification varchar(20),
bdate        date,
addr         varchar(20),
tel           char(11),
sex           char(1),
primary key (staff_no));

desc Staff;

INSERT INTO Staff VALUES('md001', 1135, 'Shebin Smith', 'Med Director ',70000,'S1','Pg in Health Care',  DATE '1980-01-09', 'Houston, TX', '09186259017','M');
INSERT INTO Staff VALUES('h001', 3006, 'Austin thomas', 'HOD',60000,'S2','MS',  DATE '1973-04-23', ', Houston, TX', '07219421740','M');
INSERT INTO Staff VALUES('pr001', 1057, 'Helen Pearson', 'Prsnl Officer ',40000,'S4','MS',  DATE '1978-02-21', 'Bellaire, TX', '06266729887','F');
INSERT INTO Staff VALUES('spl001', 3008, 'Robin Plevin', 'Specialist',50000,'S3','MD',  DATE '1980-07-02', 'Houston, TX', '07703598588','M');
INSERT INTO Staff VALUES('spl002', 3102, 'Marry Williams', 'Specialist',50000,'S3','MBBS',  DATE '1970-01-19', ', Houston, TX', '08105499319','F');
INSERT INTO Staff VALUES('Cn001', 1120, 'Chris Lee', 'Charge Nurse',25000,'S6','Master in Nursing',  DATE '1989-01-20', 'Houston, TX', '08572733103','M');
INSERT INTO Staff VALUES('Cn002', 1910, 'Rebekah Jones', 'Charge Nurse',25000,'S6','Master in Nursing',  DATE '1985-08-01', 'Bellaire, TX', '06602930292','F');
INSERT INTO Staff VALUES('Jd001', 3006, 'Michel Johnson', 'Junior Doctor',35000,'S5','MBBS',  DATE '1989-04-23', ', Houston, TX', '07194217400','M');

select * from Staff;
```

```
Table created.
```

TABLE STAFF

Column	Null?	Type
STAFF_NO	NOT NULL	VARCHAR2(10)
NIN	NOT NULL	NUMBER
NAME	NOT NULL	VARCHAR2(20)
DESIGNATION	NOT NULL	VARCHAR2(15)
SALARY	NOT NULL	NUMBER(10,3)
SALARY_SCALE	NOT NULL	CHAR(2)
QUALIFICATION	-	VARCHAR2(20)
BDATE	-	DATE
ADDR	-	VARCHAR2(20)
TEL	-	CHAR(11)
SEX	-	CHAR(1)

Download CSV

11 rows selected.

```
1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.
```

STAFF_NO	NIN	NAME	DESIGNATION	SALARY	SALARY_SCALE	QUALIFICATION	BDATE	ADDR	TEL	SEX
md001	1135	Shebin Smith	Med Director	70000	S1	Pg in Health Care	09-JAN-80	Houston, TX	09186259017	M
h001	3006	Austin thomas	HOD	60000	S2	MS	23-APR-73	, Houston, TX	07219421740	M
pr001	1057	Helen Pearson	Prsnl Officer	40000	S4	MS	21-FEB-78	Bellaire, TX	06266729887	F
spl001	3008	Robin Plevin	Specialist	50000	S3	MD	02-JUL-80	Houston, TX	07703598588	M
spl002	3102	Marry Williams	Specialist	50000	S3	MBBS	19-JAN-70	, Houston, TX	08105499319	F
Cn001	1120	Chris Lee	Charge Nurse	25000	S6	Master in Nursing	20-JAN-89	Houston, TX	08572733103	M
Cn002	1910	Rebekah Jones	Charge Nurse	25000	S6	Master in Nursing	01-AUG-85	Bellaire, TX	06602930292	F
Jd001	3006	Michel Johnson	Junior Doctor	35000	S5	MBBS	23-APR-89	, Houston, TX	07194217400	M

Download CSV

8 rows selected.

WORK EXPERIENCE

```
1  Create table work_exp(
2  stno         varchar(10)  not null,
3  org          varchar(30)  not null,
4  position     varchar(15)  not null,
5  start_date   date,
6  finish_date  date,
7  primary key(stno, org, position),
8  foreign key(stno) references Staff(staff_no)) ;
9
10
11 INSERT INTO work_exp VALUES('md001','Johns Hopkins Hospital ', 'HOD',DATE '2008-01-01', DATE'2012-10-04');
12 INSERT INTO work_exp VALUES('h001','Sheba Medical Center','specialist',DATE '2003-08-01', DATE'2013-10-14');
13 INSERT INTO work_exp VALUES('pr001','Mayo clinic' ,'Senior doctor',DATE '2005-01-21', DATE'2012-1-30');
14 INSERT INTO work_exp VALUES('spl001','Fortis hospital', 'Senior doctor', DATE '2010-06-02', DATE '2015-09-07');
15 INSERT INTO work_exp VALUES('spl001','Cleveland Clinic ','specialist', DATE '2017-01-01', DATE'2019-12-05');
16 INSERT INTO work_exp VALUES('spl002', 'Kameda medical center','junior doctor', DATE '1994-07-06',DATE '2000-12-05');
17 INSERT INTO work_exp VALUES('Cn001', 'AIIMS','Senior nurse',DATE '2018-01-06',DATE '2020-12-05');
18 INSERT INTO work_exp VALUES('Cn002', 'Kameda medical center','senior nurse', DATE '2015-03-09',DATE '2018-12-05');
19 INSERT INTO work_exp VALUES('Jd001', 'Gleneagles Hospital', 'Junior Doctor',  DATE '2015-06-01', DATE '2019-01-09');
20
21 desc work_exp;
22 select * from work_exp;
```

```
Table created.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.
```

TABLE WORK_EXP

Column	Null?	Type
STNO	NOT NULL	VARCHAR2(10)
ORG	NOT NULL	VARCHAR2(30)
POSITION	NOT NULL	VARCHAR2(15)
START_DATE	-	DATE
FINISH_DATE	-	DATE

Download CSV

5 rows selected.

STNO	ORG	POSITION	START_DATE	FINISH_DATE
md001	Johns Hopkins Hospital	HOD	01-JAN-08	04-OCT-12
h001	Sheba Medical Center	specialist	01-AUG-03	14-OCT-13
pr001	Mayo clinic	Senior doctor	21-JAN-05	30-JAN-12
spl001	Fortis hospital	Senior doctor	02-JUN-10	07-SEP-15
spl001	Cleveland Clinic	specialist	01-JAN-17	05-DEC-19
spl002	Kameda medical center	junior doctor	06-JUL-94	05-DEC-00
Cn001	AIIMS	Senior nurse	06-JAN-18	05-DEC-20
Cn002	Kameda medical center	senior nurse	09-MAR-15	05-DEC-18
Jd001	Gleneagles Hospital	Junior Doctor	01-JUN-15	09-JAN-19

Download CSV

9 rows selected.

EMPLOYEE CONTRACT

```
1  Create table emp_contract(
2  eno             varchar(10)  not null,
3  status          varchar(10)  not null,
4  salary_pay_mode varchar(10)  not null,
5  hours_perweek   decimal(3,1) not null,
6  primary key(eno),
7  foreign key(eno) references staff(staff_no));
8
9  desc emp_contract;
10 INSERT INTO emp_contract VALUES('h001','Permanent', 'online',36);
11 INSERT INTO emp_contract VALUES('pr001','Permanent', 'online',38);
12 INSERT INTO emp_contract VALUES('spl001','temporary','cheque',39);
13 INSERT INTO emp_contract VALUES('spl002', 'Permanent','online',36);
14 INSERT INTO emp_contract VALUES('Cn001', 'temporary','cash',42);
15 INSERT INTO emp_contract VALUES('Cn002', 'permanent','cheque',40);
16 INSERT INTO emp_contract VALUES('Jd001', 'temporary','cash',48);
17
18 select * from emp_contract;
19
```

Table created.

TABLE EMP_CONTRACT

Column	Null?	Type
ENO	NOT NULL	VARCHAR2(10)
STATUS	NOT NULL	VARCHAR2(10)
SALARY_PAY_MODE	NOT NULL	VARCHAR2(10)
HOURS_PERWEEK	NOT NULL	NUMBER(3,1)

Download CSV
4 rows selected.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

ENO	STATUS	SALARY_PAY_MODE	HOURS_PERWEEK
h001	Permanent	online	36
pr001	Permanent	online	38
spl001	temporary	cheque	39
spl002	Permanent	online	36
Cn001	temporary	cash	42
Cn002	permanent	cheque	40
Jd001	temporary	cash	48

Download CSV
7 rows selected.

SUPPLIER

```
Create table supplier(
sno                varchar(10)   not null,
name              varchar(20)   not null,
item               varchar(20)   not null,
fax                  char(11)      not null,
addr             varchar(20),
tel              char(11),
primary key(sno,item));

desc supplier;


INSERT INTO supplier VALUES('S02','Patrick Jones','Acetaminophen', '08061513020','Bellaire,TX','08061513020');
INSERT INTO supplier VALUES('S02','Patrick Jones','Nebulizers', '08072513720','Bellaire,TX','08072513720');
INSERT INTO supplier VALUES('S07','Mathew Walker',' Antiemetics', '09108751300','Bellaire,TX','09108751300');
INSERT INTO supplier VALUES('S16','Stuart Kingston','IV stand', '09899944310','Houston,TX','09899944310');
INSERT INTO supplier VALUES('S01','Dan Scott','Needle Holders', '09205464773','Houston,TX','09205464773');
INSERT INTO supplier VALUES('S25','Daisy Marsha','oxygen masks','08130227245','Houston,TX','08130227245');
INSERT INTO supplier VALUES('S03','Ruth Brenda','Syringes', '09818636072','Bellaire,TX','09818636072');
INSERT INTO supplier VALUES('S09','Dorothy Tiffany','glyceryl trinitrate','09082127245','Houston,TX','09082127245');

select * from  supplier;
```

```
Table created.
```

TABLE SUPPLIER

Column	Null?	Type
SNO	NOT NULL	VARCHAR2(10)
NAME	NOT NULL	VARCHAR2(20)
ITEM	NOT NULL	VARCHAR2(20)
FAX	NOT NULL	CHAR(11)
ADDR	-	VARCHAR2(20)
TEL	-	CHAR(11)

Download CSV

```
6 rows selected.


1 row(s) inserted.


1 row(s) inserted.


1 row(s) inserted.
```

```
1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.
```

SNO	NAME	ITEM	FAX	ADDR	TEL
S02	Patrick Jones	Acetaminophen	08061513020	Bellaire,TX	08061513020
S02	Patrick Jones	Nebulizers	08072513720	Bellaire,TX	08072513720
S07	Mathew Walker	Antiemetics	09108751300	Bellaire,TX	09108751300
S16	Stuart Kingston	IV stand	09899944310	Houston,TX	09899944310
S01	Dan Scott	Needle Holders	09205464773	Houston,TX	09205464773
S25	Daisy Marsha	oxygen masks	08130227245	Houston,TX	08130227245
S03	Ruth Brenda	Syringes	09818636072	Bellaire,TX	09818636072
S09	Dorothy Tiffany	glyceryl trinitrate	09082127245	Houston,TX	09082127245

Download CSV

8 rows selected.

SURGICAL AND NON-SURGICAL SUPPLY -> S_SUPPLY

```
Create table s_supply(
sno             varchar(10)   not null,
item_no         varchar(10)   not null,
Iname           varchar(20)   not null,
description     varchar(30),
stock_qty       int,
reorder_level   int,
unit_cost       decimal(10,3),
staff_no        varchar(10)    not null,
primary key(item_no),
foreign key(staff_no) references staff(staff_no),
foreign key(sno,iname) references supplier(sno,item));

desc s_supply;

INSERT INTO s_supply VALUES('S16','I009','IV stand','To hold fluid bags',120,2,500,'Cn001');
INSERT INTO s_supply VALUES('S02','I007','Nebulizers','device to inhale medication',70,4,800,'Cn001');
INSERT INTO s_supply VALUES('S01','I015','Needle Holders','To hold a suturing needle',400,3,250,'Cn002');
INSERT INTO s_supply VALUES('S25','I005', 'oxygen masks','Discard wound dressing',800,4,190,'Cn001');
INSERT INTO s_supply VALUES('S03','I011','Syringes','To inject fluid',1000,6,50,'Cn002');


Select * from s_supply;

```

```
Table created.


TABLE S_SUPPLY
```

Column	Null?	Type
SNO	NOT NULL	VARCHAR2(10)
ITEM_NO	NOT NULL	VARCHAR2(10)
INAME	NOT NULL	VARCHAR2(20)
DESCRIPTION	-	VARCHAR2(30)
STOCK_QTY	-	NUMBER
REORDER_LEVEL	-	NUMBER
UNIT_COST	-	NUMBER(10,3)
STAFF_NO	NOT NULL	VARCHAR2(10)

```
Download CSV
8 rows selected.


1 row(s) inserted.


1 row(s) inserted.
```

```
1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.
```

SNO	ITEM_NO	INAME	DESCRIPTION	STOCK_QTY	REORDER_LEVEL	UNIT_COST	STAFF_NO
S16	I009	IV stand	To hold fluid bags	120	2	500	Cn001
S02	I007	Nebulizers	device to inhale medication	70	4	800	Cn001
S01	I015	Needle Holders	To hold a suturing needle	400	3	250	Cn002
S25	I005	oxygen masks	Discard wound dressing	800	4	190	Cn001
S03	I011	Syringes	To inject fluid	1000	6	50	Cn002

Download CSV

5 rows selected.

PHARMACEUTICAL SUPPLY – > P_SUPPLY

```sql
Create table p_supply(
dno             varchar(10)   not null,
dname           varchar(20)   not null,
description     varchar(30),
dosage          varchar(10),
MOA             varchar(15),
stock_qty       int,
reorder_level   int,
unit_cost       decimal(10,3),
staff_no        varchar(10)    not null,
sno             varchar(10)    not null,
primary key(dno),
foreign key(staff_no) references staff(staff_no),
foreign key(sno,dname) references supplier(sno,item));


desc p_supply;

INSERT INTO p_supply VALUES('D002','Acetaminophen','Pain avoidance','500 mg','Orally',600,3,50.6,'Cn001','S02');
INSERT INTO p_supply VALUES('D012',' Antiemetics','in treatment of nausea','500 mg','rectally',600,2,500.6,'Cn001','S07');
INSERT INTO p_supply VALUES('D090','glyceryl trinitrate','in treatment of acute angina','250 mg','Sublingual',600,5,90.6,'Cn002','S09');


Select * from p_supply;

```

Table created.

TABLE P_SUPPLY

Column	Null?	Type
DNO	NOT NULL	VARCHAR2(10)
DNAME	NOT NULL	VARCHAR2(20)
DESCRIPTION	-	VARCHAR2(30)
DOSAGE	-	VARCHAR2(10)
MOA	-	VARCHAR2(15)
STOCK_QTY	-	NUMBER
REORDER_LEVEL	-	NUMBER
UNIT_COST	-	NUMBER(10,3)
STAFF_NO	NOT NULL	VARCHAR2(10)
SNO	NOT NULL	VARCHAR2(10)

Download CSV
10 rows selected.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

DNO	DNAME	DESCRIPTION	DOSAGE	MOA	STOCK_QTY	REORDER_LEVEL	UNIT_COST	STAFF_NO	SNO
D002	Acetaminophen	Pain avoidance	500 mg	Orally	600	3	50.6	Cn001	S02
D012	Antiemetics	in treatment of nausea	500 mg	rectally	600	2	500.6	Cn001	S07
D090	glyceryl trinitrate	in treatment of acute angina	250 mg	Sublingual	600	5	90.6	Cn002	S09

Download CSV
3 rows selected.

LOCAL DOCTOR

```
1  Create table local_doctor(
2  name    varchar(20)      not null,
3  Cno     varchar(10)      not null,
4  addr    varchar(30),
5  tel     char(11),
6  primary key(Cno));
7
8  desc local_doctor;
9
10 INSERT INTO local_doctor VALUES('Jack Pearson','C007','Houston,TX','7080690034');
11 INSERT INTO local_doctor VALUES('Salim Mohammad','C017','Houston,TX','6590123490');
12 INSERT INTO local_doctor VALUES('Randall Johnes','C012','Bellaire,TX','7084511223');
13 INSERT INTO local_doctor VALUES('Kevin Clif','C060','Bellaire,TX','8080690034');
14
15 select * from local_doctor;
16
```

Table created.

TABLE LOCAL_DOCTOR

Column	Null?	Type
NAME	NOT NULL	VARCHAR2(20)
CNO	NOT NULL	VARCHAR2(10)
ADDR	-	VARCHAR2(30)
TEL	-	CHAR(11)

Download CSV

4 rows selected.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

NAME	CNO	ADDR	TEL
Jack Pearson	C007	Houston,TX	7080690034
Salim Mohammad	C017	Houston,TX	6590123490
Randall Johnes	C012	Bellaire,TX	7084511223
Kevin Clif	C060	Bellaire,TX	8080690034

Download CSV

4 rows selected.

PATIENT

```
Create table patient(
pno      varchar(10)       not null,
staff_no varchar(10)       not null,
name     varchar(20)       not null,
addr     varchar(30),
dob      date,
tel      char(11),
sex      char(1),
married  char(1),
reg_date date,
Cno      varchar(10)      not null,
primary key(pno),
foreign key(staff_no) references staff(staff_no),
foreign key(Cno)      references local_doctor(Cno));

desc patient;

INSERT INTO patient VALUES('P001','spl001','Willson Moore','Houston,TX',DATE '1980-12-12','809077665','M','Y',DATE'2010-09-08','C017');
INSERT INTO patient VALUES('P009','spl001','Kate Brown','Bellaire,TX',DATE '1980-09-11','778877665','F','N',DATE'2010-09-13','C012');
INSERT INTO patient VALUES('P090','spl002','Mandy M','Houston,TX',DATE '1999-09-01','8090887165','F','N',DATE'2009-11-08','C017');
INSERT INTO patient VALUES('P008','Jd001','Berth Holl','Bellaire,TX',DATE '1978-01-01','777077665','M','Y',DATE'2001-02-01','C007');
INSERT INTO patient VALUES('P006','spl002','Adison M','Houston,TX',DATE '1985-05-09','671090668','F','Y',DATE'2009-01-08','C060');
INSERT INTO patient VALUES('P020','Jd001','Harry Jobson','Houston,TX',DATE '1984-04-12','908077665','M','N',DATE'2008-09-08','C017');

select * from patient;
```

Table created.

TABLE PATIENT

Column	Null?	Type
PNO	NOT NULL	VARCHAR2(10)
STAFF_NO	NOT NULL	VARCHAR2(10)
NAME	NOT NULL	VARCHAR2(20)
ADDR	-	VARCHAR2(30)
DOB	-	DATE
TEL	-	CHAR(11)
SEX	-	CHAR(1)
MARRIED	-	CHAR(1)
REG_DATE	-	DATE
CNO	NOT NULL	VARCHAR2(10)

Download CSV
10 rows selected.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

PNO	STAFF_NO	NAME	ADDR	DOB	TEL	SEX	MARRIED	REG_DATE	CNO
P001	spl001	Willson Moore	Houston,TX	12-DEC-80	809077665	M	Y	08-SEP-10	C017
P009	spl001	Kate Brown	Bellaire,TX	11-SEP-80	778877665	F	N	13-SEP-10	C012
P090	spl002	Mandy M	Houston,TX	01-SEP-99	8090887165	F	N	08-NOV-09	C017
P008	Jd001	Berth Holl	Bellaire,TX	01-JAN-78	777077665	M	Y	01-FEB-01	C007
P006	spl002	Adison M	Houston,TX	09-MAY-85	671090668	F	Y	08-JAN-09	C060
P020	Jd001	Harry Jobson	Houston,TX	12-APR-84	908077665	M	N	08-SEP-08	C017

Download CSV
6 rows selected.

PATIENT MEDICATION

```
1  Create table patient_medication(
2  dno         varchar(10)   not null,
3  pno         varchar(10)   not null,
4  start_date  date,
5  finish_date date,
6  primary key(dno,pno),
7  foreign key(dno) references p_supply(dno),
8  foreign key(pno) references patient(pno));
9
10 desc patient_medication;
11
12 INSERT INTO patient_medication VALUES('D002','P020',DATE'2010-09-09',DATE'2010-11-09');
13 INSERT INTO patient_medication VALUES('D002','P006',DATE'2010-09-11',DATE'2010-12-11');
14 INSERT INTO patient_medication VALUES('D012','P008',DATE'2009-01-01',DATE'2010-02-01');
15 INSERT INTO patient_medication VALUES('D012','P090',DATE'2009-07-15',DATE'2010-07-15');
16 INSERT INTO patient_medication VALUES('D090','P001',DATE'2010-05-20',DATE'2010-07-20');
17 INSERT INTO patient_medication VALUES('D090','P009',DATE'2007-01-01',DATE'2010-01-01');
18
19 select * from patient_medication;
20
```

```
Table created.
```

TABLE PATIENT_MEDICATION

Column	Null?	Type
DNO	NOT NULL	VARCHAR2(10)
PNO	NOT NULL	VARCHAR2(10)
START_DATE	-	DATE
FINISH_DATE	-	DATE

Download CSV

```
4 rows selected.


1 row(s) inserted.


1 row(s) inserted.


1 row(s) inserted.


1 row(s) inserted.


1 row(s) inserted.
```

```
1 row(s) inserted.
```

DNO	PNO	START_DATE	FINISH_DATE
D002	P020	09-SEP-10	09-NOV-10
D002	P006	11-SEP-10	11-DEC-10
D012	P008	01-JAN-09	01-FEB-10
D012	P090	15-JUL-09	15-JUL-10
D090	P001	20-MAY-10	20-JUL-10
D090	P009	01-JAN-07	01-JAN-10

Download CSV

6 rows selected.

WARDS

```
1  Create table wards(
2  Wno         varchar(5)     not null,
3  staff_no    varchar(10)    not null,
4  wname       varchar(10)    not null,
5  wing_no  int,
6  beds        int,
7  tele_exe    varchar(10),
8  primary key(Wno),
9  foreign key(staff_no) references staff(staff_no));
10
11 desc wards;
12
13 INSERT INTO wards VALUES('W001','pr001','Orthopedic',11,14,'7701');
14 INSERT INTO wards VALUES('W005','pr001','Emergency',10,15,'7705');
15 INSERT INTO wards VALUES('W010','pr001','EMU',07,14,'7710');
16 INSERT INTO wards VALUES('W011','pr001','Adult',18,14,'7711');
17
18 select * from wards;
```

Table created.

TABLE WARDS

Column	Null?	Type
WNO	NOT NULL	VARCHAR2(5)
STAFF_NO	NOT NULL	VARCHAR2(10)
WNAME	NOT NULL	VARCHAR2(10)
WING_NO	-	NUMBER
BEDS	-	NUMBER
TELE_EXE	-	VARCHAR2(10)

Download CSV

6 rows selected.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

WNO	STAFF_NO	WNAME	WING_NO	BEDS	TELE_EXE
W001	pr001	Orthopedic	11	14	7701
W005	pr001	Emergency	10	15	7705
W010	pr001	EMU	7	14	7710
W011	pr001	Adult	18	14	7711

Download CSV

4 rows selected.

OUT-PATIENT

```
1  Create table out_patient(
2  pno           varchar(10)       not null,
3  apt_datetime  timestamp,
4  primary key(pno),
5  foreign key(pno) references patient(pno));
6
7  desc out_patient;
8
9  INSERT INTO out_patient VALUES('P001',timestamp'2010-09-08 03:30:00');
10 INSERT INTO out_patient VALUES('P009',timestamp'2010-09-13 05:00:00');
11
12
13 select * from out_patient;
14
```

```
Table created.


TABLE OUT_PATIENT
```

Column	Null?	Type
PNO	NOT NULL	VARCHAR2(10)
APT_DATETIME	-	TIMESTAMP(6)

```
Download CSV
2 rows selected.


1 row(s) inserted.


1 row(s) inserted.
```

PNO	APT_DATETIME
P001	08-SEP-10 03.30.00.000000 AM
P009	13-SEP-10 05.00.00.000000 AM

```
Download CSV
2 rows selected.
```

IN-PATIENT

```
Create table in_patient(
pno                          varchar(10)       not null,
status                       varchar(10),
bed_no                      int,
wno                           varchar(5)     not null,
alloc_date                 date,
exp_discharge_day   date,
discharge_date     date,
primary key(pno),
foreign key(pno) references patient(pno),
foreign key(wno) references wards(Wno));

desc  in_patient;

INSERT INTO in_patient VALUES('P090','Recovering',56,'W011',DATE'2009-11-18',DATE'2010-01-01',DATE'2010-01-08');
INSERT INTO in_patient VALUES('P008','Mild',71,'W005',DATE'2008-06-12',DATE'2008-12-01',DATE'2008-12-12');
INSERT INTO in_patient VALUES('P006','Chronic',123,'W010',DATE'2010-07-17',DATE'2010-11-01',DATE'2010-12-01');
INSERT INTO in_patient VALUES('P020','Recovering',179,'W001',DATE'2006-10-18',DATE'2008-12-01',DATE'2010-01-17');

select * from in_patient;
```

```
Table created.
```

TABLE IN_PATIENT

Column	Null?	Type
PNO	NOT NULL	VARCHAR2(10)
STATUS	-	VARCHAR2(10)
BED_NO	-	NUMBER
WNO	NOT NULL	VARCHAR2(5)
ALLOC_DATE	-	DATE
EXP_DISCHARGE_DAY	-	DATE
DISCHARGE_DATE	-	DATE

Download CSV

```
7 rows selected.


1 row(s) inserted.


1 row(s) inserted.


1 row(s) inserted.
```

```
1 row(s) inserted.
```

PNO	STATUS	BED_NO	WNO	ALLOC_DATE	EXP_DISCHARGE_DAY	DISCHARGE_DATE
P090	Recovering	56	W011	18-NOV-09	01-JAN-10	08-JAN-10
P008	Mild	71	W005	12-JUN-08	01-DEC-08	12-DEC-08
P006	Chronic	123	W010	17-JUL-10	01-NOV-10	01-DEC-10
P020	Recovering	179	W001	18-OCT-06	01-DEC-08	17-JAN-10

Download CSV

4 rows selected.

NEXT-OF-KIN

```
1  Create table next_of_kin(
2  pno             varchar(10)       not null,
3  name           varchar(15)       not null,
4  tel               char(11),
5  addr            varchar(30),
6  relation       varchar(10),
7  primary key(pno,name),
8  foreign key(pno) references patient(pno));
9
10 desc next_of_kin;
11
12 INSERT INTO next_of_kin VALUES('P001','Robert Moore','08796459099','Houston,TX','Brother');
13 INSERT INTO next_of_kin VALUES('P009','Toby Red', '0964900919','Bellaire,TX','Father');
14 INSERT INTO next_of_kin VALUES('P090','Bella R','0908221678','Houston,TX','Sister');
15 INSERT INTO next_of_kin VALUES('P008','Serena Holl','08669521340','Bellaire,TX','Wife');
16 INSERT INTO next_of_kin VALUES('P006','Frell M','07767689905','Houston,TX','Husband');
17 INSERT INTO next_of_kin VALUES('P020','Lara Jo','09011451182','Houston,TX','Mother');
18
19 select * from next_of_kin;
```

```
Table created.
```

TABLE NEXT_OF_KIN

Column	Null?	Type
PNO	NOT NULL	VARCHAR2(10)
NAME	NOT NULL	VARCHAR2(15)
TEL	-	CHAR(11)
ADDR	-	VARCHAR2(30)
RELATION	-	VARCHAR2(10)

Download CSV

5 rows selected.

```
1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.
```

```
1 row(s) inserted.


1 row(s) inserted.
```

PNO	NAME	TEL	ADDR	RELATION
P001	Robert Moore	08796459099	Houston,TX	Brother
P009	Toby Red	0964900919	Bellaire,TX	Father
P090	Bella R	0908221678	Houston,TX	Sister
P008	Serena Holl	08669521340	Bellaire,TX	Wife
P006	Frell M	07767689905	Houston,TX	Husband
P020	Lara Jo	09011451182	Houston,TX	Mother

Download CSV

6 rows selected.

APPOINTMENT

```
1  Create table appointment(
2  Ano                  varchar(10)          not null,
3  pno                  varchar(10)    not null,
4  staff_no             varchar(10)    not null,
5  room_no              int,
6  app_date             date,
7  app_time             timestamp,
8  recommendation varchar(20),
9  primary key(Ano),
10 foreign key(pno) references patient(pno),
11 foreign key(staff_no) references staff(staff_no));
12
13 desc appointment;
14
15
16 INSERT INTO appointment VALUES('A0001','P001','spl001','040',DATE'2010-09-08',timestamp'2010-09-08 03:30:00','Outpatient case');
17 INSERT INTO appointment VALUES('A0002','P009','spl001','047',DATE'2010-09-13',timestamp'2010-09-13 05:00:00','Outpatient case');
18 INSERT INTO appointment VALUES('A0003','P090','spl002','050',DATE'2009-11-08',timestamp'2009-11-08 07:30:00','Inpatient case');
19 INSERT INTO appointment VALUES('A0004','P008','Jd001','075',DATE'2012-02-01',timestamp'2012-02-01 09:20:00','Inpatient case');
20 INSERT INTO appointment VALUES('A0005','P006','spl002','081',DATE'2019-01-08',timestamp'2019-01-08 04:15:00','Inpatient case');
21 INSERT INTO appointment VALUES('A0006','P020','Jd001','007',DATE'2018-09-08',timestamp'2018-09-08 06:30:00','Inpatient case');
22
23
24 select * from appointment;
```

Table created.

TABLE APPOINTMENT

Column	Null?	Type
ANO	NOT NULL	VARCHAR2(10)
PNO	NOT NULL	VARCHAR2(10)
STAFF_NO	NOT NULL	VARCHAR2(10)
ROOM_NO	-	NUMBER
APP_DATE	-	DATE
APP_TIME	-	TIMESTAMP(6)
RECOMMENDATION	-	VARCHAR2(20)

Download CSV

7 rows selected.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

ANO	PNO	STAFF_NO	ROOM_NO	APP_DATE	APP_TIME	RECOMMENDATION
A0001	P001	spl001	40	08-SEP-10	08-SEP-10 03.30.00.000000 AM	Outpatient case
A0002	P009	spl001	47	13-SEP-10	13-SEP-10 05.00.00.000000 AM	Outpatient case
A0003	P090	spl002	50	08-NOV-09	08-NOV-09 07.30.00.000000 AM	Inpatient case
A0004	P008	Jd001	75	01-FEB-12	01-FEB-12 09.20.00.000000 AM	Inpatient case
A0005	P006	spl002	81	08-JAN-19	08-JAN-19 04.15.00.000000 AM	Inpatient case
A0006	P020	Jd001	7	08-SEP-18	08-SEP-18 06.30.00.000000 AM	Inpatient case

Download CSV

WARD REQUISITION

```
1  Create table ward_requisition(
2  Rno                varchar(10)   not null,
3  Wno              varchar(5)    not null,
4  item_no         varchar(10)   not null,
5  dno                varchar(10)   not null,
6  staff_no         varchar(10)   not null,
7  qty                  int,
8  order_date    date,
9  delivery_date date,
10 primary key(Rno),
11 foreign key(staff_no) references staff(staff_no),
12 foreign key(Wno) references wards(Wno),
13 foreign key(item_no) references s_supply(item_no),
14 foreign key(dno) references p_supply(dno));
15
16 desc ward_requisition;
17
18 INSERT INTO ward_requisition VALUES('R001','W001','I009','D002','Cn001',17,DATE'2010-09-08',DATE'2010-09-28');
19 INSERT INTO ward_requisition VALUES('R002','W005','I007','D012','Cn001',11,DATE'2011-09-07',DATE'2011-09-24');
20 INSERT INTO ward_requisition VALUES('R003','W010','I015','D090','Cn002',17,DATE'2012-04-15',DATE'2012-05-01');
21 INSERT INTO ward_requisition VALUES('R004','W011','I011','D002','Cn001',17,DATE'2011-01-08',DATE'2011-02-12');
22
23 select * from  ward_requisition;
```

```
Table created.
```

TABLE WARD_REQUISITION

Column	Null?	Type
RNO	NOT NULL	VARCHAR2(10)
WNO	NOT NULL	VARCHAR2(5)
ITEM_NO	NOT NULL	VARCHAR2(10)
DNO	NOT NULL	VARCHAR2(10)
STAFF_NO	NOT NULL	VARCHAR2(10)
QTY	-	NUMBER
ORDER_DATE	-	DATE
DELIVERY_DATE	-	DATE

Download CSV

```
8 rows selected.


1 row(s) inserted.


1 row(s) inserted.
```

```
1 row(s) inserted.


1 row(s) inserted.
```

RNO	WNO	ITEM_NO	DNO	STAFF_NO	QTY	ORDER_DATE	DELIVERY_DATE
R001	W001	I009	D002	Cn001	17	08-SEP-10	28-SEP-10
R002	W005	I007	D012	Cn001	11	07-SEP-11	24-SEP-11
R003	W010	I015	D090	Cn002	17	15-APR-12	01-MAY-12
R004	W011	I011	D002	Cn001	17	08-JAN-11	12-FEB-11

Download CSV

4 rows selected.

SQL QUERIES

1. Give medication details for the patient with id='P001'

```
1  select p.dno,p.dname,p.dosage
2  from  patient_medication m, p_supply p
3  where m.dno=p.dno and pno='P001';
```

DNO	DNAME	DOSAGE
D090	glyceryl trinitrate	250 mg

Download CSV

2. Produce a report listing details of patient referred to the out patient clinic

```
1  select *
2  from patient p join out_patient o on p.pno=o.pno
3  where p.pno In (select A.pno
4                  from appointment A
5                  where A.recommendation='Outpatient case');
6
```

PNO	STAFF_NO	NAME	ADDR	DOB	TEL	SEX	MARRIED	REG_DATE	CNO	PNO	APT_DATETIME
P001	spl001	Willson Moore	Houston,TX	12-DEC-80	809077665	M	Y	08-SEP-10	C017	P001	08-SEP-10 03.30.00.000000 AM
P009	spl001	Kate Brown	Bellaire,TX	11-SEP-80	778877665	F	N	13-SEP-10	C012	P009	13-SEP-10 05.00.00.000000 AM

Download CSV

2 rows selected.

3. Give the name and clinic no. of the local doctor who refers the patient having recovery chances.

```
select p.pno patient_id,p.name patient_name,l.name doctor,l.cno
from patient p join local_doctor l on p.cno=l.cno
where p.pno In (select I.pno from in_patient I where I.status='Recovering');
```

PATIENT_ID	PATIENT_NAME	DOCTOR	CNO
P090	Mandy M	Salim Mohammad	C017
P020	Harry Jobson	Salim Mohammad	C017

Download CSV

4. Give the name and id of the staff member who treated patient classified as outpatient.

```
1  select s.staff_no,s.name
2  from staff s join patient p on s.staff_no= p.staff_no
3  where p.pno In (select a.pno from appointment a
4                  where a.recommendation='Outpatient case');
5
```

STAFF_NO	NAME
spl001	Robin Plevin
spl001	Robin Plevin

Download CSV
2 rows selected.

5. Display the costliest pharmaceutical drug.

```
1  select dno,dname
2  from p_supply
3  where unit_cost IN (SELECT max(unit_cost) FROM P_SUPPLY);
4
```

DNO	DNAME
D012	Antiemetics

Download CSV

WELLMEADOWS HOSPITAL

RELATIONAL QUERIES

Q.1 Select Staff no. and Staff name of hospital staff whose employee contract is 'temporary'.

$R1 \leftarrow$ ~~HOSP~~ STAFF $\bowtie_{(Staff\_no = Eno)}$ EMP_CONTRACT

$R2 \leftarrow \pi_{(Staff\_no, Name)}\left(\sigma_{Status = 'temporary'}(R1)\right)$

Q.2 As of date '8-JAN-2010' display details of inpatients not yet discharged.

$R1 \leftarrow \pi_{Pno, Status, Bedno, Wno}(INPATIENT)$

$R2 \leftarrow \left(\sigma_{Discharge > '8-JAN-2010'}(R1)\right) \cup \left(\sigma_{Discharge = NULL}(R1)\right)$

Q.3 Display Supplier no., Name, Fax, Address, Tel details of all suppliers.

$RESULT \leftarrow \pi_{Sno, Name, Fax, Addr, Tel}(SUPPLIER)$

Q.4 Display ward no., Staff no and name of staff who manages the ward.

$R4 \leftarrow WARDS \bowtie_{(WARDS.Staff\_no = STAFF.Staff\_no)} STAFF$

$RES \leftarrow \Pi_{Wno,\ WARDS.Staff\_no,\ STAFF.Name}(R4)$

Q.5 Data for how many relatives of any particular patient is stored in your database?

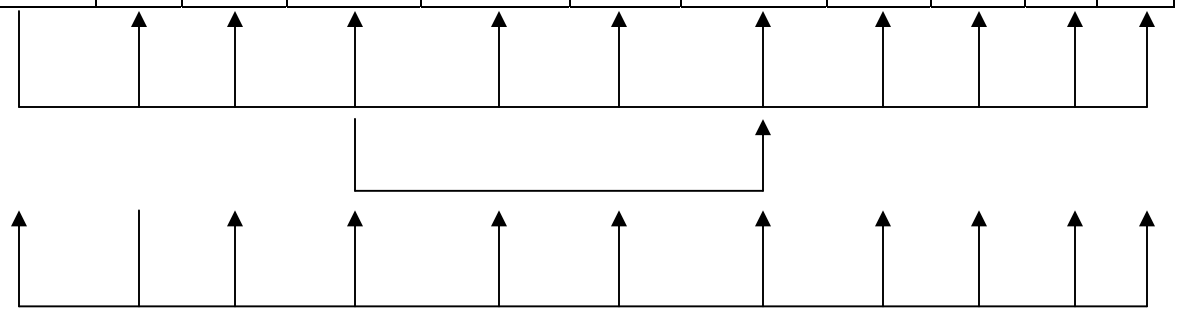
$RES \leftarrow \rho_{Pno,\ Total\_relatives}(Pno\ \Im\ COUNT\ Pno\ (NEXT\_OF\_KIN))$

WELLMEADOWS HOSPITAL- NORMALIZATION

All tables are in 1NF, 2NF, 3NF and BCNF except for the table:

HOSPITAL_STAFF

Staff_no	NIN	Name	Desig -nation	Quali- fication	Salary	Salary_ scale	Bdate	Addr	Tel	Sex



Primary Key- Staff_no
Candidate Key – NIN

Functional Dependencies:
FD1- Staff_no→ NIN, Name, Designation, Qualification, Salary, Salary_scale, Bdate, Addr, Tel, Sex
FD2 - NIN→ Staff_no, Name, Designation, Qualification, Salary, Salary_scale, Bdate, Addr, Tel, Sex
FD3- Designation→Salary_scale

1NF- Yes
2NF- Yes
3NF- No – FD3 is the violator

Decomposing HOSPITAL_STAFF into HOSPITAL_STAFF and SALARY_SCALE:-

HOSPITAL_STAFF

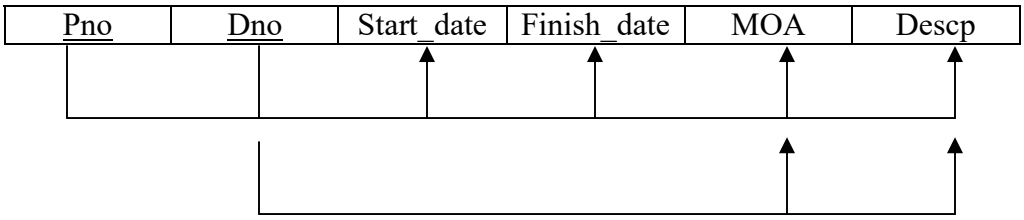
Staff_no	NIN	Name	Desig -nation	Quali- fication	Salary	Bdate	Addr	Tel	Sex

SALARY_SCALE

Designation	Salary_scale

Example Normalization

MEDICATION



Primary Key- Pno, Dno

Functional Dependencies:
FD1- {Pno, Dno}→ Start_date, Finish_date, MOA, Descp
FD2- Dno→ Descp, MOA

1NF- Yes
2NF- No – FD2 is the violator

Decomposing MEDICATION into MEDICATION and DRUGS

MEDICATION

Pno	Dno	Start_date	Finish_date

DRUGS

Dno	MOA	Descp