

//Written explanation for Q1-Q3

To convert any relation into 1NF, split any non-atomic values

JUST let "appointment date" be one column and "time" be one column to convert it

Q1

INSERT Anomalies: can not add a "appointment data" without "time".

DELETE Anomalies: IF we remove "S1032" then P110, "John Walker" will be removed as well.

UPDATE Anomalies: IF we change the patient name "Ian MacKay", we will need to update two rows.

Q2

A	B	C	D	E	F	G
staffNo	dentistName	PatientNo	patientName	appointment date	atime	surgery

$A \rightarrow B$

$C \rightarrow D$

$\{C, E, F\} \rightarrow \{G, A\}$

$\{E, F, G\} \rightarrow \{A, C\}$

Q3

PatientNo	appointment date	atime	surgery	staffNo.
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staffNo	dentistName
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PatientNo.	patientName.
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$\{C, E, F\}$  as primary key

```
DROP TABLE IF EXISTS Staff;
DROP TABLE IF EXISTS Patient;
DROP TABLE IF EXISTS Arrangement;
```

```
CREATE TABLE Staff(
    staffNo VARCHAR[50],
    dentistName VARCHAR[50],
    CONSTRAINT pk_st
        PRIMARY KEY(staffNo)
);
CREATE TABLE Patient(
    patientNo VARCHAR[50],
    patientName VARCHAR[50],
    CONSTRAINT pk_pa
        PRIMARY KEY(patientNo)
);
CREATE TABLE Arrangement(
    patientNo VARCHAR[50],
    appointment_date DATE,
    atime TIME,
    surgery VARCHAR[10],
    staffNo VARCHAR[50],
    CONSTRAINT pk_a
        PRIMARY KEY(patientNo,appointment_date,atime),
    CONSTRAINT fk_a_pa
        FOREIGN KEY(patientNo) REFERENCES Patient(patientNo),
    CONSTRAINT fk_a_st
        FOREIGN key(staffNo) REFERENCES Staff(staffNo)
);
```

```
INSERT INTO Staff
VALUES ("S1011","Tony Smith"),
      ("S1024","Helen PEARSON"),
      ("S1032","Robin Plevin");
```

```
INSERT INTO Patient
VALUES("P100","Gillian White"),
      ("P105","Jill Bell"),
      ("P108","Ian MacKay"),
      ("P110","John Walker");
```

```
INSERT INTO Arrangement
VALUES("P100","12-Aug-03","10.00","S10","S1011"),
      ("P105","13-Aug-03","12.00","S15","S1011"),
```

```
("P105","14-Oct-03","16.30","S15","S1032"),  
("P108","12-Sept-03","10.00","S10","S1024"),  
("P108","14-Sept-03","10.00","S10","S1024"),  
("P110","15-Oct-03","18.00","S13","S1032");
```