

### Question 1

1.1) Doc-regno determines doc-firstname

Doc-regno determines doc-gender

Doc-regno determines doc-qualification

Doc-regno->doc-firstname,doc-gender,doc-qualification

Pat-id determines pat-givename

Pat-id determines pat-surname

Pat-id determines pat-DOB

Pat-id determines pat-Phone

Pat-id->pat-givename, pat-surname, pat-DOB,pat-phone

App-ID determines app-datetime

App-ID determines app-type

App-ID->app-datetime, app-type

The principle of determination is used in the definition of a central relational database concept called functional dependence. All the attributes that are functionally dependent on the other attribute are called functional dependence (FD)

Doc-firstname, doc-gender, doc-qualification, pat-givename, pat-surname, pat-DOB, pat-Phone

1.2) Candidate key – is a minimal or irreducible super key. A superkey that does not contain a subset of attributes that is itself a superkey.

Doc-regno uniquely identifies each doctor. Composite key of Doc-regno and Doc-firstname is a candidate key in that Doc-regno will also uniquely identify each doctor in the database

Composite key of pat-id and pat-givename is a candidate key. They both uniquely identify each patient in the database

App-ID and app-time are candidate key. They identify each appointment.

1.3) A table is in Boyce-Codd normal form(BCNF) when every determinant in the table is a candidate key

A table is in 3NF when it is in 2NF and there are no transitive dependencies.

When a table contains only one candidate key, the 3NF and BCNF are equivalent.

However, BCNF can be violated only when the table contains more than one candidate key

So far on the tables, we have identified candidate keys being more than one.

In Doctors table, candidate keys are doc-regno and doc-firstname,

In Patients table, candidate keys are pat-id, and pat-givename,

In appointment table candidate keys are app-id and app-type

This make the relation ABC in 3NF. Since there are no transitive dependencies