**CZ2007 Assignment 2: Normalized Database Schema**

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For this assignment, we refer to the ER diagram attached in the appendix. Note that we shall adopt the ER approach in our approach towards the subclasses.

**Person(personID, name, city, schools, state, address, zip, phone, email)**

Keys: personID

Primary Keys: personID

FDs: personID → name, city, schools, state, address, zip, phone, email

address → zip, state, city

Normalisation: The relation is **NOT** in 3NF since the left-hand side of the second FD, address is not a superkey.

Minimal Basis:

personID → name, schools, address, phone, email

address → zip, state, city

3NF Decomposition:

**Person\_R1(personID, name, schools, address, phone, email)**

**Person\_R2(address, zip, state, city)**

The relations are now in 3NF after decomposition.

**Stakeholder(personID, domain)**

Keys: personID

Primary Keys: personID

FDs: personID → domain

Normalisation: The relation is in 3NF. No decomposition is necessary.

**Professor(personID, expertiseField)**

Keys: personID

Primary Keys: personID

FDs: personID → expertiseField

Normalisation: The relation is in 3NF. No decomposition is necessary.

**Student(personID, studentID, admissionDate, major, minor)**

Keys: personID, studentID

Primary Keys: personID

FDs: personID → studentID, admissionDate, major, minor

studentID → personID, admissionDate, major, minor

Normalisation: The relation is in 3NF. No decomposition is necessary.

**Staff(personID, staffID, dateHired, position)**

Keys: personID, staffID

Primary Keys: personID

FDs: personID → staffID, dateHired, position

staffID → personID, dateHired, position

Normalisation: The relation is in 3NF. No decomposition is necessary.

**Undergraduate(personID)**

Keys: personID

Primary Keys: personID

FDs: N/A

Normalisation: The relation is in 3NF. No decomposition is necessary.

**Graduate(personID)**

Keys: personID

Primary Keys: personID

FDs: N/A

Normalisation: The relation is in 3NF. No decomposition is necessary.

**Technical\_Staff(personID, Lab-name, Lab-school)**

Keys: personID

Primary Keys: personID

FDs: personID → Lab-name, Lab-school

Normalisation: The relation is in 3NF. No decomposition is necessary.

**Admin\_Staff(personID, office, officePhone, portfolio)**

Keys: personID

Primary Keys: personID

FDs: personID → office, officePhone, portfolio

officePhone → office

Normalisation: The relation is **NOT** in 3NF since the left-hand side of the second FD, officePhone is not a superkey.

Minimal Basis:

personID → officePhone, portfolio

officePhone → office

3NF Decomposition:

**Admin\_Staff\_R1(personID, officePhone, portfolio)**

**Admin\_Staff\_R2(officePhone, office)**

The relations are now in 3NF after decomposition.

**Lab(name, school, location)**

Keys: name + school, location

Primary Keys: name + school

FDs: name, school → location

location → name, school *(knowing the location would also allow us to identify the lab’s name and school)*

Normalisation: The relation is in 3NF. No decomposition is necessary.

**Research\_Lab(name, school, researchArea)**

Keys: name + school

Primary Keys: name + school

FDs: name, school → researchArea

Normalisation: The relation is in 3NF. No decomposition is necessary.

**Teaching\_Lab(name, school, labType)**

Keys: name + school

Primary Keys: name + school

FDs: name, school → labType

Normalisation: The relation is in 3NF. No decomposition is necessary.

**Timetable(datetime, venue, classType)**

Keys: datetime + venue

Primary Keys: datetime + venue

FDs: datetime, venue → classType

Normalisation: The relation is in 3NF. No decomposition is necessary.

**Course(courseCode)**

Keys: courseCode

Primary Keys: courseCode

FDs: N/A

Normalisation: The relation is in 3NF. No decomposition is necessary.

**Comment/Suggestion(topic, date, stakeholder-personID, status)**

Keys: topic + date + stakeholder-personID

Primary Keys: topic + date + stakeholder-personID

FDs: topic, date, stakeholder-personID → status

Normalisation: The relation is in 3NF. No decomposition is necessary.

**Experiment(datetime, undergraduate-personID, lab-name, lab-school)**

Keys: datetime + undergraduate-personID + lab-name + lab-school

Primary Keys: datetime + undergraduate-personID + lab-name + lab-school

FDs: N/A

Normalisation: The relation is in 3NF. No decomposition is necessary.

**Equipment(ID, name, lab-name, lab-school, modelNo, datePurchased)**

Keys: ID + name + lab-name + lab-school

Primary Keys: ID + name + lab-name + lab-school

FDs: ID, name, lab-name, lab-school → modelNo, datePurchased

Normalisation: The relation is in 3NF. No decomposition is necessary.

**teach(datetime, venue, coursecode, professor-personID)**

Keys: datetime + venue + coursecode + professor-personID

Primary Keys: datetime + venue + coursecode + professor-personID

FDs: N/A

Normalisation: The relation is in 3NF. No decomposition is necessary.

**take(coursecode, personID)**

Keys: coursecode + personID

Primary Keys: coursecode + personID

FDs: N/A

Normalisation: The relation is in 3NF. No decomposition is necessary.

**part\_of(coursecode, datetime, personID, lab-name, lab-school)**

Keys: coursecode + datetime + personID + lab-name + lab-school

Primary Keys: coursecode + datetime + personID + lab-name + lab-school

FDs: N/A

Normalisation: The relation is in 3NF. No decomposition is necessary.

**assign\_Graduate\_Research\_Lab(personID, lab-name, lab-school)**

Keys: personID + lab-name + lab-school

Primary Keys: personID + lab-name + lab-school

FDs: N/A

Normalisation: The relation is in 3NF. No decomposition is necessary.

**assign\_Comment/Suggestion\_Admin\_Staff(Admin\_Staff-personID, Stakeholder-personID, topic, date)**

Keys: Admin\_Staff-personID + Stakeholder-personID + topic + date

Primary Keys: Admin\_Staff-personID + Stakeholder-personID + topic + date

FDs: N/A

Normalisation: The relation is in 3NF. No decomposition is necessary.

**supervised\_by(Professor-personID, Undergraduate-personID, topic)**

Keys: Professor-personID + Undergraduate-personID

Primary Keys: Professor-personID + Undergraduate-personID

FDs: Professor-personID + Undergraduate-personID → topic

Normalisation: The relation is in 3NF. No decomposition is necessary.

**Appendix: ER Diagram**