**Tutorial 1**

**GC 312**

**Problem 1:**

Consider the following information about a university database:

· Professors have an SSN, a name, an age, a rank, and a research specialty.

· Projects have a project number, a sponsor name, a starting date, an ending date, and a budget.

· Graduate students have SSN, a name, an age, and a degree program (e.g., M.S. Or Ph.D.).

· Each project is managed by one professor (known as the project’s principal investigator).

· Each project is worked on by one or more professors (known as the project’s co-investigators).

· Professors can manage and/or work on multiple projects.

· Each project is worked on by one or more graduate students (known as the project’s research assistants).

· When graduate students work on a project, a professor must supervise their work on the project.

Graduate students can work on multiple projects, in which case they will have a (potentially different) supervisor for each one.

· Departments have a department number, a department name, and a main office.

· Departments have a professor (known as the chairman) who runs the department.

· Professors work in one or more departments and for each department that they work in, a time percentage is associated with their job.

· Graduate students have one major department in which they are working on their degree.

Create an ER/EER diagram that fulfils the above requirements and motivate your suggestions.

**Problem 2:**

Translate the following EER diagram to a relational schema.



**Problem 3:**

The club *Travel-Often-And-A-Lot* organises shorter and longer tours for its members. Help them make a model of their mini world.

*Travel-Often-And-A-Lot* has members. Each member is represented by her/his full name, address, and birth date.

Some members belong to the board of *Travel-Often-And-A-Lot.* Some members are organizers (of tours).

Organizers must be stored with their cell phone number so that they can be reached anytime.

Organizers organize tours. Sometimes a tour is organized by several organizers.

Each tour is denoted by a name, e.g. “Museums of Paris, 2004” or “Iceland, 2005”. Tours can take place multiple times. “Museums of Paris, 2004”, for instances, takes place twice: May 22nd to May 29th, 2004 and June 5th to June 12th,

2004.

The cost of a tour depends on the date, e.g. “Museums of Paris, 2004” was cheaper in May than in June.

Each *travel* – such as “Museums of Paris, 2004” at June 5th to June 12th, 2004 – is lead by one organizer.

Members participate in travels.

*Travel-Often-And-A-Lot* wants to keep track of the payments made by its members. A payment can e.g. be the annual club fee, a donation, ***etc.*** but also the payment for a travel.

*Mind the subtle distinction between* tour *and* travel*.*

Draw the EER-diagram for this mini world description. State any additional assumptions that you make.

**Problem 4:**

The following EER diagram describes a riding club. The ternary relationship *participates-in with* should be read as “A junior member *participates in* a riding lesson *with* a school horse”.

a) Translate the given EER-diagram into relational tables.

Mark primary keys with a single underline, foreign keys with a dash underline and a pointer to which other attribute the foreign key refers.



**Problem 5:**

Symphonic Band is an orchestra that plays different types of concerts. The orchestra’s popularity is growing fast and they are starting to have problems to keep track of the musicians that should play in each concert as well as the musical works that are most suitable for the concert.

Help the orchestra to create a database model, as a first step to implement a database, so that the orchestra can keep track of both musicians and musical works. The database model must represent the following points:

* The orchestra plays three types of concerts: church concerts, private parties, and outdoor concerts.
* The orchestra plays three types of music: classical, popular, and American folk. The orchestra always plays classical music in their church concerts. The orchestra always plays American folk on private parties. Finally, the orchestra plays a blend of the three types of music when playing outdoors.
* It should be possible to find in the database the music works that are suitable for each type of concert so that the repertoire can be easily planned well in advance.
* For each musical work, the database should store which musical setting (i.e.The instruments) are required to play the work.
* The database should store information for each coming concert. The information should include the place, date and time of the concert as well as the type of concert and the repertoire that will be played.
* For each musician in the orchestra, the database should store his/her name, the instrument that he/she plays, and in which of the coming concerts he/she will participate.

Draw an EER diagram for the orchestra’s database.