COSC 344
Assignment 1

This is a group assignment that requires you to join one team to work on it. Each team should have one team leader, and will have 3 or 4 members including the team leader. This assignment is worth 10% of your final mark.

Due date for assignment 1

Friday, 28 July 2017 at 4 PM

Penalty applies for late submissions (10% per working day). If your team does not complete it on time, the team leader should email me (haibo@cs.otago.ac.nz) after making your late submission so that I can collect it for marking.

Assignment Description
Select an application domain or mini-world that your team is interested. It can be a hobby, a personal interest, or something similar. Pick something fun. The COMPANY and SALES databases used in lectures and labs are not acceptable. You can view the SALES database from http://www.cs.otago.ac.nz/cosc344/resources/sales_db.pdf.

There is no need to model everything in the selected mini-world. In the ER diagram, there should be 6 to 8 entity types (no more and no less) and a similar number of relationships. In general the ER diagram should

- have at least one weak entity type;
- have at least one 1:1, 1:N and M:N relationship between entity types. In some cases, you may not have both 1:1 and 1:N relationships. That is acceptable as long as you have at least one M:N relationship and at least one either 1:1 or 1:N relationship;
- include attributes with several data types: integer and/or reals, character strings, etc.;
- have at least one *date* data type;
- have at least one derived attribute, and at least one composite attribute.

Write a description of the mini-world, list the entities and attributes, define the data type for each attribute, describe the relationship, and give the ER diagram. There is a sample attached. Please follow the structure given in the sample to work on this assignment. Try to model a miniworld that has a big difference with the provided sample. If what you modeled is very similar to the sample, you will lose some marks. Please show some novelty in your design.

The ER diagram must be neat and well organised. Make sure you include the keys, cardinality of relationships, participation, etc. If an entity type has multiple key attributes, you just need to show one in the ER diagram. You are recommended to create the ER diagram using the program 'dia' (instructions on how to use 'dia' are given in the labnote for week 2). However, you can use any tool (e.g. MS word, MS powerpoint, etc) to create the ER diagram.

Teamwork Model
I suggest you to take the following steps to work on this assignment. The dates in square brackets are the suggested due date for each step.

1. The team has a meeting to choose the mini-world, determine the entities, relationships to be modeled. The team leader coordinates the allocation of the modeling tasks, and make sure the task allocation is fair to every team member.

Requirements: each member should model at least one entity type together with its associated attributes, and at least one relationship. [July 19]

2. Each team member works on the assigned tasks independently. [July 21]
3. The team has another meeting to discuss the work done by each member. This is the time where you can get feedback from other team members. If there is any error on modeling, it should be corrected. Make sure all requirements are met. The team leader coordinates the task allocation for writing the assignment report, and make sure the allocation is fair to every member. [July 22]
4. Each member works on allocated tasks for writing report. [July 26]
5. The team leader merges all sections of the report into one document, and send it to all members for final checking. [July 27]
6. The team leader submits a pdf version of the assignment report. [July 28]

[Important] It might happen that you finish your part quickly, and would like to have a try to model the other parts allocated to other members. You can do it, but keep it just for yourself. You can give comments on the work done by other members at the meetings, but **never** give what you did to any other team member. If a member simply takes what was done by other members, it is plagiarism and not acceptable.

Teamwork Summary

At the end of the report you could include a summary of the teamwork, showing whether each member has contributed equally, and which parts have been discussed at meetings, etc. You can add any comment on the teamwork in your team.

Assignment submission

The assignment MUST be submitted electronically by the team leader. Create a folder named `asgn1_groupX`, where X is the team number. Put your assignment report in it. Change into the directory that contains this folder, and submit your assignment using the following COSC344 submit script:

```
$ submit344 asgn1_groupX
```

The script displays its progress so you can see that it has worked. You can resubmit before the due date if you wish -- your last submission is the one that will be marked.

If you encountered the following error when submitting the assignment `bash: submit344: command not found`, it is because the path for the submit344 script has not been exported to the $PATH environmental variable, you can run the following command in the shell to add the path to $PATH.

```
export PATH=$PATH:/home/cshome/coursework/bin
```

COSC344 Assignment 1 (Sample)

Team: X
Leader: [put leader name here]
Members: [put names of all members here]

1. Mini-world Description

We select the COMPANY mini-world for our assignments. The COMPANY database keeps track of a company's employees, departments, and projects. The part of the company that will be modeled in our assignment is described as follows:

- The company is organized into departments. Each department has a unique name, a unique number, and a particular employee who manages the department. We keep track of the start date when that employee began managing the department. A department may have several locations.
- A department controls a number of projects, each of which has a unique name, a unique number, and a single location.
- We store each employee's name, Social Security number, address, salary, gender, and birth date. An employee is assigned to one department, but may work on several projects, which are not necessarily controlled by the same department. We keep track of the current number of hours per week that an employee works on each project. We also keep track of the direct supervisor of each employee (who is another employee).
- We want to keep track of the dependents of each employee for insurance purposes. We keep each dependent's first name, sex, birth date, and relationship to the employee.

Haibo Zhang 12/7/17 3:08 PM
Comment [1]: Bob

Haibo Zhang 12/7/17 3:08 PM
Comment [2]: Alice

Haibo Zhang 12/7/17 3:08 PM
Comment [3]: John

Haibo Zhang 12/7/17 3:08 PM
Comment [4]: Robert

2. Entities and Attributes

- EMPLOYEE
  - Name: composite (Fname, Minit, Lname), single-valued, string
  - Bdate: simple, single-valued, date
  - Address: simple, single-valued, string
  - Salary: simple, single-valued, real
  - SSN: simple, single-valued, string key attribute
- DEPARTMENT
  - Name: simple, single-valued, string
  - Number: simple, single-valued, integer, key attribute
  - Locations: simple, multi-valued, string
  - Number_of_employees: derived, single-valued, integer
- PROJECT
  - Name: simple, single-valued, string
  - Number: simple, single-valued, integer, Key attribute
  - Locations: simple, single-valued, string

Haibo Zhang 12/7/17 3:10 PM
Comment [5]: Bob

Haibo Zhang 12/7/17 3:11 PM
Comment [6]: Alice

Haibo Zhang 12/7/17 3:11 PM
Comment [7]: John

- DEPENDENT (week entity)
  - Name: simple, single-valued, string, partial key attribute
  - Sex: simple, single-valued, char type with values of either 'M' or 'F'
  - Birth_date: simple, single-valued, date
  - Relationship: simple, single-valued, string

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Comment [8]: Robert

3. Relationships

- WORKS_FOR
  - N:1 relationship
  - An employee can only work for one department, but a department can have many employees.
  - EMPLOYEE is total participation; DEPARTMENT is total participation.
- MANGES
  - 1:1 relationship
  - One employee can only manage one department, and one department can only be managed by one employee.
  - Has an attribute *Start_date* of date type for keeping track of the starting time for managing the department.
  - EMPLOYEE is partial participation; DEPARTMENT is total participation.

Haibo Zhang 12/7/17 3:11 PM
Comment [9]: Bob

- WORKS_ON
  - M:N relationship
  - One employee can work on multiple projects, and each project can have multiple employees worked on it.
  - Has an attribute *Hours* of real type for keeping track of the number of hours that the employee works on the project per week.
  - EMPLOYEE is total participation; PROJECT is total participation.

Haibo Zhang 12/7/17 3:11 PM
Comment [10]: Alice

- SUPERVISION
  - 1:1 relationship
  - Each employee can only have one supervisor, and each supervisor can only supervise one employee.
  - Both are partial participation.
- CONTROLS
  - 1:N relationship
  - Each department can have multiple projects, but each project can only be host by one department.
  - DEPARTMENT is partial participation; PROJECT is total participation.

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Comment [11]: John

- DEPENDENTS_OF
  - 1:N relationship
  - Each employee can have multiple dependents, and each dependent is the dependent of one employee.
  - EMPLOYEE is partial participation; DEPENDENT is total participation.

Haibo Zhang 12/7/17 3:12 PM
Comment [12]: Robert

4. ER-diagram

Note: if an entity type has multiple key attributes, you just need to show one.

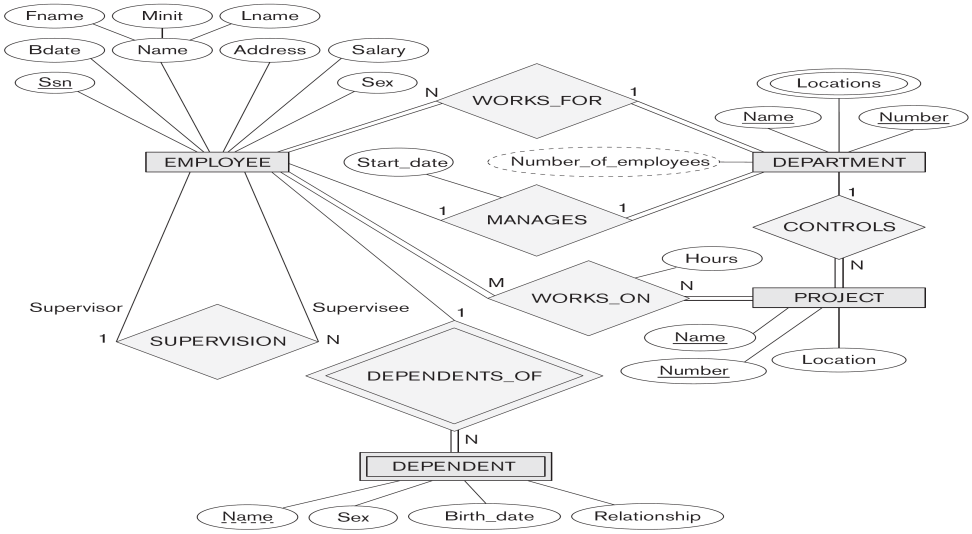

Figure 7.2
An ER schema diagram for the COMPANY database. The diagrammatic notation is introduced gradually throughout this chapter and is summarized in Figure 7.14.

5. Teamwork Summary

Here are some samples that can be put in this section. However, you can add any comment on the teamwork in your team.

- All tasks were properly allocated and had been discussed among team members, and consensus was reached.
- The PROJECT entity type, the attributes of this entity type, and the WORKS_ON relationship were modeled by Alice. This part was not discussed among team members as Alice did not finish it by the due time.
- Bob did not attend any meeting, and did not make any contribution. The tasks allocated to him was done by Alice and John.