CMPT291 - Introduction to File and Database Management
Lab 6


- Unless your lab instructor says otherwise, the due date for this lab is June 5th at 13:00. It is your responsibility to leave enough time to resolve unforeseen problems that may arise with the upload process.

- This lab is worth 5% of your final mark.

- Your submission must be a compressed archive (i.e. a TAR-GZ) file. No other format will be accepted. Your lab instructor will help you create this file.

- It is your responsibility to ensure your archive file extracts successfully on GitHub CodeSpaces, and that it includes the correct files and no additional files.

- The file names and formats must be exactly as described in this PDF.

- For questions that ask you to handwrite your answer, you must upload your legibly-written answer in JPG format **rotated to the correct orientation**. Each page must have your name on top and take up less than 300 KB of space. If you write your answer on paper, scan your page(s) via Microsoft Lens (works on both Apple and Android phones) or a similar scanning app.

- Your submission must be entirely your work. Your instructors reserve the right to ask you to explain your work in person at any time.

- Properly acknowledge (add a note and/or hyperlink and/or comment) any help or resource you used. This includes the software(s) you use to create pictures.

- It is your responsibility to periodically back up your files. Keep in mind that Gitub Codespaces are deleted every now and then.

- Failure to comply with any of the instructions will result in a mark of 0.

Lab 6

This lab is intended to make you feel comfortable with the basics of Entity-Relationship diagrams. The answer to all questions are hand-drawn. If you use a particular software, you must clearly indicate the software name and version. Your lab instructor may ask you to reproduce the pictures using that software.
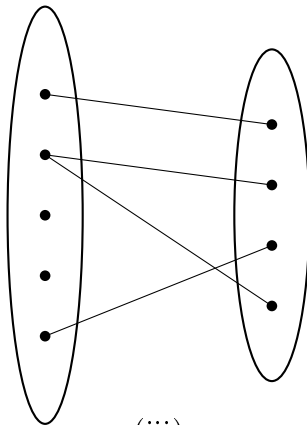
1. In each of the following diagrams the left ellipse represents the set A and the right B. The bullets represent elements, and the connections represent the binary relationship $\{R, R^\top\}$ where $R \subseteq A \times B$.
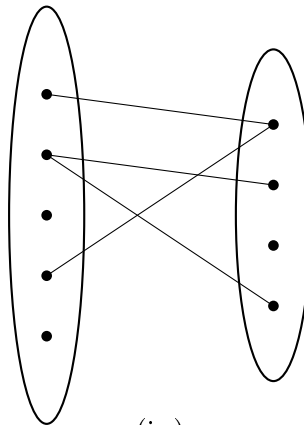

(i)   (ii)
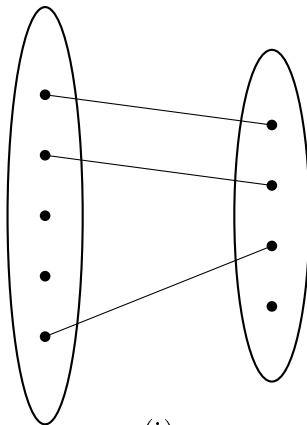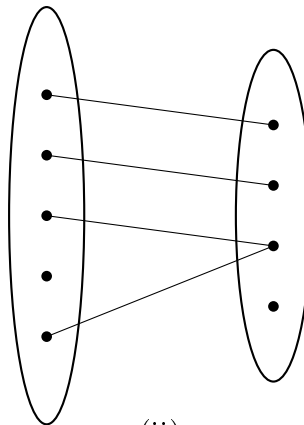
(iii)   (iv)

(a) For each of the diagrams draw an appropriate E-R diagram that captures the key and participation constraints. Your answer to this part must be well-labeled. You will lose marks if it is not clear which of the 4 scenarios are described by which of your E-R diagrams.

(b) Some people use adjectives like *one-to-one*, *one-to-many*, *many-to-one*, and *many-to-many* to describe different combinations of key and participation constraints [2]. Underneath each of the E-R diagrams you drew for the previous part write an appropriate adjective that best describes the relationship.

An important skill to develop is the ability to convert an English description of an organization into an E-R diagram. As a general guide, nouns tend to be entities and attributes, and verbs tend to be relationships [1]. For the following two questions, your task is to draw an Entity-Relationship (ER) Diagram to model this scenario. Your diagram should:

- Include all entities and their attributes.

- Clearly represent the relationships among the entities.

- Use arrows and thick lines to express cardinality constraints (do not use numbers or crow's foot notation).

- Include relationship attributes where appropriate.

2. A college campus student club needs to keep records about its members, events it holds, which members attend those events, and which members help to organize each event. The club needs to keep track of the name, email address, and major of each member. Each event is given a unique title and has a date and location where the event occurs. A member may attend many events, and an event may be attended by many members. An event is organized by one or more members, each of whom plays some role in organizing that event. A member may not help organizing events.

3. A public library system needs to manage information about its books, authors, and members. The system should support the following:

- Each book has a unique ISBN, a title, and a publication year.

- Each author has a unique ID, a name, and nationality.

- A book can have one or more authors, and an author can write many books.

- Each member has a unique ID, a name, and a contact number.

- A member can borrow many books, but a book can be borrowed by only one member at a time.

- For every borrowing activity, the system records the borrow date and due date.

Use the `tar` utility to archive and compress all your submission files. You must submit one tarball. In general, the name of your tarball should be `cmpt291_lab_N_X.tar.gz` where N is the lab number and X is your full initials. For example, for lab 1, Sam Porter Bridges would submit `cmpt291_lab_1_SPB.tar.gz` .

Submission: For this lab you must submit a tarball which includes:

1. `lab6E1.jpg`

2. `lab6E2.jpg`

3. `lab6E3.jpg`

References

[1] Jeffrey A. Hoffer, Ramesh Venkataraman, and Heikki Topi. Modern Database Management, global edition. 13th ed. London, England: Pearson Education, Aug. 2019. ISBN: 978-1-292-26335-9.

[2] Raghu Ramakrishnan and Johannes Gehrke. Database Management Systems. 3rd ed. New York, NY: McGraw-Hill, Sept. 2002.