

Assignment: The entity-relationship data model

COMPSCI 2DB3: Databases–Winter 2023

Deadline: January 29, 2023

Department of Computing and Software
McMaster University

Please read the *Course Outline* for the general policies related to assignments.

**Plagiarism is a serious academic offense and will be handled accordingly.
All suspicions will be reported to the Office of Academic Integrity
(in accordance with the Academic Integrity Policy).**

This assignment is an *individual* assignment: do not submit work of others. All parts of your submission *must* be your own work and be based on your own ideas and conclusions. Only *discuss or share* any parts of your submissions with your TA or instructor. You are *responsible for protecting* your work: you are strongly advised to password-protect and lock your electronic devices (e.g., laptop) and to not share your logins with partners or friends! If you *submit* work, then you are certifying that you have completed the work for that assignment by yourself. By submitting work, you agree to automated and manual plagiarism checking of all submitted work.

Late submission policy. Late submissions will receive a late penalty of 20% on the score per day late (with a five hour grace period on the first day, e.g., to deal with technical issues) and submissions five days (or more) past the due date are not accepted. In case of technical issues while submitting, contact the instructor *before* the deadline.

Description

A local community group is brainstorming with local artists to support artistry and share artwork with the community in a novel way via an art library that enables the local community to learn about the artists, borrow their art, and support their art (as part of the library subscription fees will return to the artists).

The main component of the art library will be the *art catalogue* that maintains information on the art pieces that can be borrowed from the library. In addition, the art catalogue information will be used to promote art pieces and artists via the library website.

Central to the art catalogue are *art pieces*. Each art piece has a unique *main artist and title* (hence, two distinct artists can both make distinct art pieces named “tomorrow”). Besides the main artist, multiple other artists can contribute to the art piece. In that case, a strict order of the individual contributions needs to be maintained (e.g., main artist, second contributor, third contributor, and so on). Typically, art pieces also have a time and place of creation (for now, the library expects to only hold newly created pieces for which these details are always available). For display purposes, the art library will maintain the physical dimensions (e.g., size of a painting) of each art piece.

For some types of art pieces, other details are maintained. Initially, the library will be working with talented painters, sculptors, and photographers. For both paintings and photo prints, the library will catalogue the category (e.g., still life, portrait, landscape, and so on) and the coloring (e.g., natural colors or a black-and-white color tone), and the type of support material (e.g., canvas or wood) on which the painting was made or photo was printed. For paintings, the library will in addition catalogue the type of paint used (e.g., oil-based or water-based). For sculptures, the library will catalogue its weight, whether it can be displayed indoor or outdoor, and the main material used. Finally, each photo print will be related

to details on the original photo the print was based on (e.g., the art piece is a reprint on canvas made in 2022 by *Freda*, based on a photo made by the photographer *Xanthe* in 1983). In the catalogue, photos (the original negatives or the original digital photo file) are non-physical art pieces: they cannot be borrowed from the library and do not have physical dimensions, but do have titles, an artist that created them, other contributors, and a time and place of creation.

For each artist, the library maintains a *profile page* that is used to highlight the artist and via which one can find all art pieces of that artist in the catalogue. Each artist profile displays their name, their current location (e.g., Hamilton if that is the location of their main atelier), and their age. In addition, the artist can add links to external resources such as personal websites, Instagram pages, YouTube channels, and so on.

Art pieces can be grouped together, e.g., they can be part of the same collection(s), or they can be part of a group of art pieces made within a collaboration. Each such a group has a title, type, and description. Several groups can have the same title, types, and/or descriptions.

Finally, the library will have members that can borrow art pieces. The library plans to a pre-existing system to manage memberships and payment details. This system will assign a unique *member id* to each member. That system will not manage the borrowed and reserved art pieces, however. Each borrowed work is associated with an art piece, the member that borrowed it, and the time period during which the work is borrowed. Each reserved work is associated with an art piece, the member that wants to borrow it, and the time when the reservation was placed (reserving art pieces works on a first-come first-serve basis). Members can borrow the same art piece multiple times and members can indefinitely renew their borrow period *unless* other members have reserved the piece (each renew is registered as a separate borrow).

Assignment

The goal of the assignment is to present the above requirements for an information system into an ER (entity-relationship) diagram. To do so, you have to write a report in which you translate the above requirements into an ER (entity-relationship) diagram. Your submission:

1. must be a PDF file;
2. must *not* be hand-written: prepare your report in \LaTeX or in a word processor such as Microsoft Word (that can print or exported to PDF).
3. must include an analysis of the requirements of the information system: which parts of the above description are important, which parts did you ignore, which constraints did the requirements provide, which of these constraints did you incorporate in the ER diagram, and which constraints did you exclude (and motivate why they are excluded);
4. must provide a readable and complete presentation of your ER-diagram (that matches your analysis, any discrepancies between your analysis and the resulting ER-diagram should be explained); and
5. must have ER-diagrams that are drawn using software (hand-drawn and scanned submissions will not be graded); big diagrams can be incorporated in the report in several parts (it should be clear how the parts fit together, however).

Submissions that do not follow the above requirements will get a grade of zero.

Grading

While evaluating your work, we will look at:

Completeness. Does your diagram contain all entities, attributes, relationships, and (if possible) constraints described in the description

Correctness. Does your diagram use the correct notation and do you take the right design decisions? Are all included constraints correct? Do all excluded constraints have a proper motivation?

Presentation. Is the diagram and the report readable? Is the report presentable as a stand-alone report to an external party (e.g., the local community and artists that want to start an art library)?

The presented report will account for 10% of the maximum grade; the required entities, attributes, and relationship will account for 60% of the maximum grade; and the required constraints (e.g., keys, relationship participation) will account for 30% of the maximum grade. Every error and inconsistency in your ER-diagram notation will result in a reduction of the overall grade (with the lowest possible grade being zero).

Remarks on drawing ER-diagrams

There are plenty of modeling and drawing programs that support the creation of beautiful ER-diagrams. Examples include Microsoft Visio, Dia, and yEd. Most programs will use a notation that is slightly different from the textbook and the slides, however. You are allowed to use such a different notation, but if you do so: make clear what notation you exactly use (e.g., specify what each type of arrow that you draw means) and stick to a single notation.

The diagrams part of the course slides are drawn directly in \LaTeX using TikZ, but we do not recommend that tool without prior \LaTeX experience. We have provided some material to get started with \LaTeX and TikZ examples on the course website for those interested.