Assignment 1

## POINTS: 100 total

Instructions for submitting your assignment:

1. Save this file and remember the location. Please recall the general assignment instructions about where to save the file if you are working on UML [vLabs](http://vlabs.uml.edu/). Use the **MIST** image, not the Learning Commons image (see Course Syllabus for instructions on UML vLabs).
2. Fill in the answers in the space provided.
3. Attach the updated file to your assignment submission.

You can find your graded results in your online Gradebook (My Grades). I typically have all assignments graded **within 1 week** after the assignment due date.

The assignment is to be completed and submitted individually by each student through Blackboard.

You can use **[draw.io](https://draw.io/)** to create the ER diagram using Crow’s foot notation for each of the questions. Export your diagram as a .png image file and insert it in your assignment report (MS Word document).

#### Instructions for draw.io (Preferred)

See the short YouTube tutorial videos in this [YouTube playlist](https://www.youtube.com/watch?v=lVJXbvhDBuI&list=PLu3CYfAZr97eM3j5A7JspbaJN9ZVb43t2) for getting started.

#### Instructions for LucidChart

NOTE: These instructions sometimes don’t work as expected in all cases, so I recommend using [draw.io](https://draw.io/) instead. But you can give it a try if you wish. Visit <https://www.lucidchart.com/pages/usecase/education> to sign up for an account on LucidChart.com. When creating an account on LucidChart.com, **please make sure to use your UML student (.edu) email ID** so that your email can be automatically verified during the upgrade to a free educational account.

For upgrading your account to a free educational account, follow these steps:

1. Sign up for a free Lucidchart account as shown above and log in to the account.
2. Visit [https://app.lucidchart.com/eduRequests?role=student#](https://app.lucidchart.com/eduRequests?role=student) to request an educational account.
3. Then, on the top right corner, click on your account email shown and then click on the **Account Settings** from the drop-down menu.
4. Send yourself a confirmation email
5. Click on the link received in the confirmation email
6. A page should pop up saying you have now been upgraded to an **Educational** account.
   1. Note: It may give an error at first, but you can copy the link into a different browser and refresh. This should work.
7. Go back to **Account Settings** and it should show under the left menu that you have 1GB of storage which indicates that your account has been upgraded to an Educational account.

If you do not get an educational account, despite using your .edu email account and following the above steps, then send an email to [support@lucidchart.com](mailto:Lucidchart%20%3Csupport%40lucidchart.com%3E) indicating that you have a .edu account, you are a UMass Lowell student and that you would like to request an educational account for your course. The support has a fairly quick turnaround time in my experience.

#### Instructions for MS Visio

Microsoft Visio is available on UML vLabs. Make sure to log in to the **MIST** vLabs image, not the Learning Commons image (see Course Syllabus for instructions on UML vLabs). Here is a short video on: [How To Use Visio 2016 For Conceptual Data Modeling and ER Diagram](https://youtu.be/GNSXoKKRX-E) (~ 7 min)

Q1. Create a Crow’s Foot notation ERD to support the following business operations:

* A friend of yours has opened Professional Electronics and Repairs (PEAR) to repairsmartphones, laptops, tablets, and MP3 players. She wants you to create a database to help her run her business.
* When a customer brings a device to PEAR for repair, data must be recorded about the **customer**, the device, and the repair. The customer’s name, address, and a contact phone number must be recorded (if the **customer has used** the shop before, the information already in the system for the customer is verified as being current). For the device to be repaired, the type of device, model, and serial number are recorded (or verified if the **device is already in the system**). Only customers who have brought devices into PEAR for repair will be included in this system.
* Since a customer might sell an older device to someone else who then brings the device to PEAR for repair, it is possible for a device to be brought in for repair by **more than one custome**r. However, **each repair is associated with only one customer**. When a customer brings in a device to be fixed, it is referred to as a repair request, or just **“repair**,” for short. Each repair request is given a reference number, which is recorded in the system along with the date of the request, and a description of the problem(s) that the customer wants fixed. It is possible for a device to be brought to the shop for repair many different times, and only devices that are brought in for repair are recorded in the system. Each repair request is for the repair of one and only one device. If a customer needs multiple devices fixed, then each device will require its own repair request.
* There are a limited number of repair services that PEAR can perform. For each repair service, there is a service ID number, description, and charge. “Charge” is how much the customer is charged for the shop to perform the service, including any parts used. The actual repair of a device is the performance of the services necessary to address the problems described by the customer. Completing a repair request may require the performance of many services. Each service can be performed many different times during the repair of different devices, but each service will be performed only once during a given repair request.
* All repairs eventually require the performance of at least one service, but which services will be required may not be known at the time the repair request is made. It is possible for services to be available at PEAR but that have never been required in performing any repair.
* Some services involve only labor activities and no parts are required, but most services require the replacement of one or more **part**s. The quantity of each part required in the performance of each service should also be recorded. For each part, the part number, part description, quantity in stock, and cost is recorded in the system. The cost indicated is the amount that PEAR pays for the part. Some parts may be used in more than one service, but each part is required for at least one service.

**Answer:**

