CPSC 2151

Lab 2

Due: At the end of the lab period

In this lab you will be working alone or with one partner to draw some UML diagrams. You will be creating these in Diagrams.net (formally Draw.io) and then putting them together in one document and submitting that document to Canvas for your group.

Class Diagrams

Consider the following classes and create class diagrams for them. For each class I provide you with some data we need to know, but not with the methods that would be needed. Consider which methods you would need for each class, including what data would be needed by the constructor. Resist to urge to make getters and setters for every piece of data. Consider what would actually be able to change over time. Additionally, I may not say whether or not a data field is required, so you may have to make that decision on your own. Read all three classes before starting.

Student

For a student we need to know their first and last name, and their preferred name if they have one. We also need to know their email address. We will only track the email address provided by the school, not any other email address the student may have. Each student also has a unique CID number. Students can have a cell phone number listed if they want to receive notifications and alerts from the university. Students also have a class standing (Freshman, Sophomore …). Finally, we need to track all the enrollments a student has, which may be 0 for students who have been admitted, but not registered for their first semester of class. A student's enrollments would include past semesters, the current semester, and future semesters they have registered for.

Course

For each course we need to know the major code (Example: CPSC) the course number (Example: 2150) and the course name (Example: Software Development Foundations). A course also has a defined number of credit hours. A course can have other courses be a pre-requisite or co-requisite course.

Enrollment

An enrollment is used to show that a student has taken a course. So we need to know the student and the course they took. Additionally, we need to know what semester they took the course (Fall, Spring, or Summer) and what year they took the course. We need to know the status of the course (completed, current enrollment, or future enrollment). If the semester has completed the student will have a grade assigned for the course (A, B, C, D, F, I, W, NA).

Activity Diagram

Complete the UML activity diagram for the `CalculateGPA` method for the `Student` class, which will return the GPA for the student. **Note:** this method should be represented on your class diagram as well.

When a student takes a class, they earn "points" based off of their grade and the number of credit hours for the course. Points for the letter grade are:

Grade	Points
A	4
B	3
C	2
D	1
F, I	0

These points are then multiplies by the number of credit hours for the course. For instance if a student gets an A in CPSC 2150 which is worth 3 credit hours they will get 4 x 3 = 12 points.

To find the GPA, you add up all the points for all the enrollments for the student, and then divide that by the total number of credit hours taken. Courses with a current or future enrollment are ignored. Courses with a grade of W or NA are ignored as well.

Remember, when drawing an activity diagram you do not need to have the activities or decisions written in code. You just need to show the entire process to solve for it. An "activity" in the diagram can be something that would take several lines of code, as long as that would not include any decisions. An Activity can be calling another method, even if that method would contain decisions. We would assume that method would have its own activity diagram. For this assignment though we are only making this diagram, so that will only be acceptable for calling the method of another class. This will prevent you from adding methods to the `Student` class that do all the actual work of calculating the GPA and having `CalculateGPA` call those methods.

Submission Document

When all 4 diagrams are finished in Diagrams.net, export them as images (png or jpeg) and insert those images into one document. Convert that document to a PDF to submit. If you do not follow these instructions we may not be able to view/open your submission and will be unable to grade it. Make sure we can read your diagrams! Do not make all the diagrams in one Diagrams.net file, if you do it will export as one image, which will have to be resized to fit on one page of the document, resulting in diagrams that are too small to read. Each diagram should get its own Diagrams.net file, and its own image in the final document. Include the name of all group members in the document. Do not submit the Diagrams.net files!

Submit on Canvas, not on Handin

Groups

You must work in a group for this assignment, and you must be in the lab to complete it. There is a maximum of 4 people in each group. Remember to include all group member names on the submissions.

Tips and other requirements
- First sketch out all the diagrams on paper. You may think you are finished with a diagram and then think of something you forgot once you have moved onto another diagram. Diagrams.net can take a little getting used to, so it's faster to sketch it out on paper, then make it in Diagrams.net when you are finished.
- Refer back to my slides on UML diagrams. Many developers believe that UML should just be used as a rough outline for communication, and they skip over some of the notation that is required for this course. Because of that many online sources may skip over some of the notation as well. **Note:** I don't necessarily think they are wrong, but I think there's a difference between knowing

the full notation and ignoring some of it when it's not important to the current conversation vs not using the full notation because you don't know it.
- Make sure to export each diagram as an image from Diagrams.net. PDFs can cut off part of the image when going from one page to another
- Make sure your diagrams are readable so it can be graded. This may mean picking a particular layout for the activity diagram so you can fit it in your final document. Since you sketched it out on paper first you should be able to think of how to arrange it before starting in Diagrams.net.
- The Canvas submission will only accept PDFs, so make sure you convert your document to a PDF to be able to submit.