This assignment is intended to be done by your team of two to three students. You may collaborate on answers to all four questions, or divide the work for the team. In any case, the team should review the submission before it is turned in.

1. Provide definitions for each of the following terms. Remember to cite sources, even if the source is the textbook. You may want to look for OO books (including the textbook) on the CU Libraries link to O'Reilly-Safari e-books, under the Sciences tab here: https://libguides.colorado.edu/strategies/ebooks, please note that Wikipedia is not usable as a primary source.

- abstraction
- encapsulation
- polymorphism
- cohesion
- coupling
- identity

Besides the definition, discuss how the term applies to the object-oriented notion of a class. Provide examples of both good and bad uses of these terms in the design of a class or a set of classes (can be code, psuedo-code, a text, or a graphic example).

2. A company has asked us to design a customer loyalty system. The system will allow customers to join or leave, track the money customers who participate spend each month, allow mass e-mailing of sale information to customers, and provide individual customers with discount coupons based on their monthly spend of certain amounts with the company. Using a level of abstraction, develop a design for this system using the functional decomposition approach (similar to that shown in slide 11 of lecture 4). You can assume the existence of a database that contains all the information you need for your system. For your answer, first describe the functional decomposition approach, discuss what assumptions you are making concerning this problem (any information that was not directly provided to you), and then present your design (in a text description, pseudo-code, or graphically).

3. Now develop a design for the same customer loyalty system described in question 2 using the object-oriented approach, keeping in mind the points discussed on slides 30-32 of lecture 4. Identify the classes you would include in your design and their responsibilities. (As before, you can assume the existence of a database and that you will be able to create objects based on the information stored in that database.) Then, identify what objects you would instantiate and in what order and how they would work together and communicate with each other to fulfill the responsibilities associated with the customer loyalty system.

4. In lecture 5, we present "design by contract" in OOAD as an implicit contract. What is the contract? What good happens if we follow the contract? What bad happens if we break it? How could we make the contract explicit? (Cite any sources supporting your answers.)

Grading Rubric:

Homework/Project 0 is worth 25 points – 10 points for question 1, 5 points each for questions 2-4. There is no extra credit element for this assignment.

Questions will be graded on the quality (not quantity) of the answer. Remember for question 1 we need definitions, examples, and citations. A solid answer will get full points, missing elements or poor quality answers will cost -2 points each, missing answers completely will be -5 to -10 points.

Submissions:

Questions must be submitted to the Canvas assignment link via a PDF file and must include all names of team members. Only one submission is required for the whole team.

Homework/Project 0 is Due at 12 Noon on Wednesday 9/2.

Assignments will be accepted late for four days. There is no late penalty within 4 hours of the due date/time. In the next 44 hours, the penalty for a late submission is 5%. In the next 48 hours, the late penalty increases to 15% of the grade. After this point, assignments will not be accepted.

Use e-mail or Piazza to reach the class staff regarding homework/project questions, or if you have issues in completing the assignment for any reason.