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| **CS1400 Lab #10**  **Class Diagrams**  **Version 1.0**  **Introduction**  In this assignment you will learn about **Class Diagrams**. Class Diagrams are part of a graphical language used to convey object-oriented design information, called the Unified Modeling Language, or **UML**. Class Diagrams are used to specify the state and behaviors of a class, and to show the static relationships between classes.  **Example**  Consider a class named Box, which models a A Token Machinecardboard box, that you might use to ship something via FedEx. If you were to buy a box to ship something in, what states of the box would be important to you? Probably the dimensions of the box, and perhaps its volume. The states of the class become its data members. In a well-designed class, the class provides methods (behaviors) to give us access to the variables (states) of the class. In this case, we will define methods to get and set the dimensions, and one to calculate and return the volume of the box.  Figure - Box Object  We can represent a class by drawing a UML Class Diagram. A UML Class Diagram is drawn as a rectangle, and has four basic parts:   1. The top section of the diagram contains the class name. It is usually written in bold text.  * The second section of the diagram contains the ***states,*** fields or data members of the class. * The third section of the diagram contains the ***properties*** or member properties of the class. * The bottom section of the diagram contains the **behaviors** or member methods of the class. * The Figure below, shows the UML Class Diagram for the Box class.     Figure 2UML Class Diagram & Description  Notice that the declaration of:   * 1. The state, field, variable or data member has three parts. * data’s visibility (access modifier), * data’s name, and * data’s data type.   1. The member property has five parts. * properties visibility (access modifier), * properties identifier/name, * properties :g (getter), :s (setter), * properties data type.   1. The declaration of a behavior or member method is similar. It has: * method's visibility, * method's identifier/name, * method’s parameters data type, * method's return data type.     Note that the rules for drawing a UML Class Diagram are quite strict. Software developers use UML Class Diagrams to convey important design information. If the diagram is not correct, then the wrong information may be conveyed. NOTE, that the properties and methods do not have bodies, as that is NOT the purpose of a UML Class Diagram.  Figure - UML Diagram for Box  **Reference**  Martin Fowler, *UML Distilled, Third Edition*, Addison-Wesley 2004, pages 35-52.  **Programming Problem**  http://debryro.tc.uvu.edu/1400/labs/lab10/tokens.jpgIt will be helpful if you read the Chapter 7 on ***Objects and Classes*** and the slides for this week. For this assignment think about the states, properties and behaviors for a token dispensing machine that you might find in a carwash or in an arcade. To simplify the problem, this token dispensing machine only takes quarters, no other coin denominations or bills are allowed. When you put a quarter in the machine, you always get one token in return. Now, design a class that represents this token dispensing machine. Create a UML Class Diagram using standard UML notation as explained in this lab. You may NOT hand draw your diagram, you must use any drawing software. I often use PowerPoint to make a simple UML Class Diagram. You must be able to convert your Class Diagram into a PDF file or a standard image file (jpg, png, etc) for submission. A PDF file is preferred.   Figure - TokenMachine Object  **File(s) to Submit:**  Place your UML Class Diagram in a zip file and name the zip file **Lab\_10\_your-initials\_V1.0.zip**. For example, I would name my file **Lab\_10\_DAF\_V1.0.zip**. Submit this assignment as Lab #10 on Canvas. Do not submit any other files.  **Grading Guidelines**   |  |  | | --- | --- | | **Description** | **Points possible** | | Assignment meets Grading Guidelines:  o Your UML Class Diagram contains a declaration that this is your own work. o Assignment has been properly submitted to Canvas |  | | You have a ***correctly*** and ***accurately*** drawn the UML Class Diagram that models a Token Dispensing device. |  | | Total | 10 | |