

CMPS115 Winter 2004 HW 1 Problem 1 (UML Structure)

Question 1:

1a) Draw a UML class diagram of a book, where a book is modeled as containing one or more "pieces." A piece is either an atomic section (containing actual text, but you can ignore that) or a compound piece containing a number of pieces. (Some books consist of simply a set of chapters, sometimes chapters have sections, and sometimes chapters are contained in parts.) Elements of the book contain the following attributes:

- a book includes a publisher, publication date, and an ISBN
- a piece includes a title and a number.

1b) Draw a UML diagram of how Polygon, Point and Circle classes are structured together with a Style class, where:

- A *Polygon* is an ordered collection of 3 or more *Points* (note that *Point* is a value object, like a *Date* – there can be many *Point* objects representing the same real-world location; you don't try to share a *Point*)
- A *Circle* has a single *Point* (the center) and a public attribute of a radius.
- Any instance of *Point* may be in either a *Polygon* or a *Circle* but not both
- Every *Polygon* or *Circle* is associated with exactly one *Style*
- An instance of *Style* may be shared by many *Polygons* and *Circles*
- Deleting a *Polygon* would cause its associated *Points* to be deleted but **not** the associated *Style*.
- A *Style* has two public attributes, color and isFilled.

CMPS115 Winter 2004 HW 1 Problem 2 (UML Sequence)

Question 2. Consider building the specifications for an ATM machine. Here is a narrative Use Case to use as the requirements:

"An ATM machine is to be set up outside a bank. Customers must be able to walk up to it and insert their ATM card to begin the transaction. Upon successfully entering their PIN code, they are presented with a menu of options. They should be able to deposit money in various accounts and withdraw money from various accounts (that's if the machine has enough cash to handle their request). They should be able to transfer money from their savings account to their checking account. When they are finished, their ATM card should be returned to them."

2a) Write a Sequence Diagram for withdrawing cash from one's checking account. The Sequence Diagram can only use the Objects here under (but not necessarily all). You might also have to change the order of the Objects that you decide to use. You name the methods (clearly!)

2b) Write a Sequence Diagram for transferring funds from one's savings account to one's checking account. The Sequence Diagram can only use the Objects here under (but not necessarily all). You might also have to change the order of the Objects that you decide to use.

Note: between a) and b) all of the Objects in the Figure should be utilized.

Note: the "RequestMoreCash" object represents the ATM's not having enough Cash on hand to fulfill a user request and having to be refilled with fresh \$20 bills.

