

Test 1: Object-Oriented Basics (Problem Statements, Requirements, and Use Cases)

1. How does each of the following object-oriented notations fit into the idea of the software life-cycle as discussed in class (15 points)?
 - a.) Problem Statement
 - b.) Use Cases
 - c.) Class Diagram/Object Model
2. Which of the above 2 notations are directly related? How? (5 points)
3. Name two concepts in Object-Oriented technologies. Define the concept and explain its importance in terms of software development. (10 points)
4. Read the following Problem Statement and answer the questions.

An Automated Teller Machine (ATM) is a machine that offers service to users who either hold a bank account (as in NationsBank Account Holders) or hold a credit card account (as in MBNA). Users of the ATM can access the ATM by inserting an ATM card and a 6 digit pin. The user can withdraw or deposit money or check the status of their accounts. The ATM gathers account information from a remote bank-supplied database. When a withdrawal or deposit is requested, the ATM amends this database to reflect the transaction. The ATM has a user interface contains an alpha-numeric keyboard and a 19" black and white monitor. The entire machine is about 6 feet high. The ATM can only service one user at a time.

- a.) Who or what are the actors to the system? (15 points)
- b.) What can you add to make this problem statement more complete and why? (10 points)
- c.) Prepare a detailed scenario of a user conducting a withdrawal. (15 points)
- d.) Prepare an appropriate Use Case Diagram for this Problem Statement. (30 points)
 - Correctly use one instance of <<is a>> and one instance <<includes>>
 - Be as complete as you feel necessary but must be accurate/correct

Other Problem Statements to Convert to Use Cases (**NOT PART OF THIS TEST SAMPLE**)

1. Read the following Problem Statement and answer the questions.

Mobile customers that have multiple email accounts are disappointed when they have to manually log into each account separately. What the mobile users need is a software application that connects to all e-mail accounts and aggregates the new e-mail into one account. The user will be able to log into the new software and program each new e-mail connection. The software will update a database at the mobile service provider that stores all active e-mail addresses for the mobile user. When a user turns on the phone, the new software will check all active e-mail addresses and give a pop-up preview of new messages from all included e-mail accounts. The new software should automatically sort the e-mail for display based on the time the message was received. The user will be able to set several preferences. The user will have the option to set a sort-by flag (i.e. by receive time, by size, by sender). The user can also set the option of how often the pop-up preview will be displayed.

- a.) Who or what are the actors to the system?
- b.) What can you add to make this problem statement more complete and why?
- c.) Prepare a detailed scenario of a user setting up his phone for this capability.
- d.) Prepare an appropriate Use Case Diagram for this Problem Statement.
 - Correctly use one instance of <<is a>> and one instance <<includes>>
 - Be as complete as you feel necessary but must be accurate/correct

2. When purchasing airline tickets, customers sometimes travel in multiple person parties (i.e. business companions, husband/wife, children). At times, a problem occurs when adjacent seats are not available at the time of purchase. In some cases, it is an absolute must that children sit next to their parents. In other cases, business companions and husband/wife combinations have a strong desire to have adjacent seats for work-related reasons. In addition, customers who purchase preferred seats (i.e. either window or aisle) have a right to keep their preferred seat types. Many times, this type of arrangement must be done during the 10-15 minutes prior to the plane departing. The proposed software application is an addition to the current passenger in-seat television monitor to allow customers to type in their category (i.e. business companion, existing purchaser, husband/wife, children/parent) once they enter the plane. In addition, the customer should be able to type in his/her preferences. The customer should have a specific user interface on their touch-controlled video display to allow data entry. Once all the customers enter their preferences, the screen should lock. Once all screens are locked, then the flight attendant display will show the shuffling process. At the conclusion of the shuffling process, the flight attendant should receive a printout that shows the movements that must occur. The flight attendant should have controls to override significant conflicts.

- a.) Who or what are the actors to the system?
- b.) What can you add to make this problem statement more complete and why? (10 points)
- c.) Prepare a detailed scenario of the software accepting a passengers information.
- d.) Prepare an appropriate Use Case Diagram for this Problem Statement.
 - Correctly use one instance of <<is a>> and one instance <<includes>>
 - Be as complete as you feel necessary but must be accurate/correct

Sample Solutions:

