

## Homework 3

1.264, Fall 2006

UML model for the aircraft engine maintenance service provider

Due: Tuesday, October 3, 2006

### A. UML models

Install Visual Paradigm-Community Edition before starting this part of the homework. The Web site, recitation and office hours provide support for installing it and using it.

Based on your requirements narrative from homework 2, create UML diagrams as follows:

1. Use case diagram. Create a diagram for the use cases associated with items B.2 through B.8 from homework 2.
  - a. Draw a set of cases corresponding to each principal item B.2 through B.8.
  - b. Indicate the actors involved.
  - c. Use the 'includes' relationship to relate the sub-cases to the principal cases.  
*You should have made some decisions on how to handle these cases in homework 2. If you change your mind, update your homework 2 solution using 'track changes' mode in MS Word, but don't resubmit it on the MIT Server (yet).*
2. Sequence diagram. Create a diagram capturing the sequence of messages between the customer, order, order detail (line items), chemical product (inventory), carrier and quantity limits for your system. Use the exercise we did in class as an example. Model:
  - a. Whether your warehouse has sufficient product quantities to fulfill the order in this diagram
  - b. Carrier or customer constraints on which chemical groups can be shipped
  - c. Quantity limits due to safety issues.  
*You should have made some decisions on how to handle these issues in homework 2. If you change your mind, update your homework 2 solution using 'track changes' mode in MS Word, but don't resubmit it (yet).*
3. Activity diagram. Create an activity diagram showing the process for validating an order. Focus on the issues of choosing a mode and carrier that can serve the customer, and on checking that the quantity can be carried by the chosen means. Model the logic of what happens if an infeasible choice is made. *You should have made some decisions on how to handle these issues in homework 2. If you change your mind, update your homework 2 solution using 'track changes' mode in MS Word, but don't resubmit it (yet).*
4. State diagram. Create a state machine diagram showing the possible states that an order can have. Focus on how you handle back orders, split shipments (one order in two or more shipments), and combined shipments (one shipment with two or more orders). You do not have to model order states with invalid payment, changes or cancellations. *You*

*should have made some decisions on how to handle these issues in homework 2. If you change your mind, update your homework 2 solution using 'track changes' mode in MS Word, but don't resubmit it (yet).*

Make sure your diagrams are consistent with each other and with your narrative requirements. You will duplicate the handling of issues or cases in more than one diagram, in part because the system is small and in part so you can see which diagram styles you prefer.

Make sure that you handle the overall process your Web site must implement: customer creation, customer login, customer creation of an order with all checks: back order, valid mode and carrier, valid quantities, split shipment rules, etc. Think about how customers will browse your product catalog and build an order: can they click on hyperlinks; do they enter chemical numbers or names directly, etc.? Do you check what chemical types they can handle and not display others? When does the customer choose a mode and carrier? What does your system do if a chemical cannot be shipped by that mode or carrier?

You do not need to handle certain cases: invalid payment or other payment problems, invalid login, password resets,

## **B. Assignment**

**For homework 2 the TAs matched you with another group of students who will be your customer. You must meet with them at least once to discuss requirements. (You will also play the customer role for another group.)**

Hand in the UML diagrams electronically .

- a. Please make each model fit on one page if possible, no more than two pages otherwise.
- b. Put all your models in a single Visual Paradigm project.