Summary of the Assignment

This assignment has two parts. The first part involves analyzing and reporting about maintenance tasks as with your previous assignments. Before you move on to the second part of the assignment, you must complete and submit the first part of the assignment, and email the TA indicating that. Please send an email to the TA with the subject line "CSCI 578 Spring 2013 HW4 – Part One Completed". At that point, the TA will send you a list of KLAX maintenance tasks. You need to select two KLAX maintenance tasks to implement from the list. You will not get credit for completing the second part of the assignment if you do not complete the first part.

Part One

As before, you will analyze a different event-based application from the one you analyzed in the previous two assignments. You will still be asked to determine how to perform three maintenance tasks in that event-based (alternatively referred to as “message-based”) application. While performing these tasks, you will be expected to report the message-based dependencies either within a component or between components that you have examined in order to determine how to complete the task. For the first part of the assignments but not the second, you are not required to actually change the application’s code to complete this assignment; you are only required to note what parts of the application need to be changed to complete each maintenance task.

You will also need to explain why you ended up examining the dependencies you highlight. Given that you need to familiarize yourself sufficiently with the event-based application you are analyzing, you may find that you have also examined dependencies that, in the end, you determined to be irrelevant for the particular maintenance task you are performing. You should report these dependencies as well.

You will be assigned the maintenance tasks and the particular event-based application individually. Your application and/or tasks may be similar to some of your classmates', but they will not be identical, so it is critical that you work on this assignment on your own. To obtain the maintenance tasks and the application you will be working on, please send an email to the TA with the subject “CSCI 578 Spring 2013 HW4 – Task Request”. You can expect a response from the TA within a few hours.

The first tool you will be using for this assignment is called the Message Dependency Analyzer (MDA). MDA uses a data-flow analysis to determine dependencies induced by control flow between messages. The MDA tool will show you intra-component dependencies. As before, if you find MDA unsuitable for finding the dependencies you need to deal with your maintenance tasks, you may use another tool or methodology. However, you MUST attempt to use MDA first and provide a detailed justification of why you were unable to use it.

You are also required to keep track of how much time and effort you placed into determining how to perform each maintenance task. Below we provide guidelines for tracking this information. You need to record your time and effort accurately. You will not get credit if you try to decide which metric we will use when grading (e.g., minimizing or maximizing the time spent on the task) and then try to optimize your reported results to that metric; you will only get credit for your work if your results are accurate. We will correlate your effort data for homework assignments 2, 3, and 4 before providing a grade pertaining to the effort; this part of the grade will be counted into this assignment.
Structure of Your Report

System Assigned: <Name of system>
For each maintenance task, specify:
1) Task No:
2) Description of Task:
3) Components you examined:
   a) Names of the components you examined
   b) The reason you examined them
4) Message-based dependencies that are relevant to the maintenance task:
   a) For each component you examined, show the following information
      i) For each dependency within a component
         (1) Name of Class which contains the dependency:
            (a) Name and type of Consumed message
               (i) Names of consumed message’s attributes
               (ii) Name of the method or interface in which the message is consumed
            (b) Name and type of Published Message
               (i) Names of published message’s attributes
               (ii) Name of the method or interface in which the message is published
         (2) Why is this dependency relevant?
         (3) How did you find this dependency? Did you use the slicer, Eclipse, MDA or another methodology? Providing example output (e.g. program statements or graph diagrams) from your tools may help.
      ii) For each dependency between components
         (1) Name of the component which published the message(source)
            (i) Name of the message or event
            (ii) Names of published message’s attributes
            (iii) Name of the method of the source component in which the message is published
         (2) Name of the component which consumed the message(sink)
            (i) Name of the message or event
            (ii) Names of consumed message’s attributes
            (iii) Name of the method of the sink component in which the message is consumed
         (3) Why is this dependency relevant?
         (4) How did you find this dependency? Did you use the slicer, Eclipse, MDA or another methodology? Providing example output (e.g. program statements or graph diagrams) from your tools may help.
   5) Message-based dependencies that you examined in addition to the relevant dependencies:
      a) Use the same format as in 4)
   6) Explanation of how the code would need to be modified in order to complete the maintenance task
      a) Questions that may need to be answered
         i) What message-based dependencies may need to be modified, added, or removed?
         ii) What methods need to be modified, added, or removed?
         iii) What variables or objects may need to be modified, added, or removed?
      b) Please explain why any methods, variables, objects, etc. are relevant to the maintenance task at hand.
   7) Description of the time and effort required to perform the task
      a) How much time and effort did it take to learn the tools that you used?
         i) For each tool
            (1) Name of the tool you used
            (2) Time and effort in hours to learn – for accuracy, please keep track of and report fractions of an hour
      b) What made learning MDA particularly challenging?
      c) How difficult was it to find the message-based dependencies that are relevant to the task? For example, a component may be relatively small allowing you to quickly determine dependencies simply through code reading.
         (1) More specific issues that you can discuss
            (a) How long did it take to find the message-based dependencies for this task?
            (b) How long did it take to determine if the message-based dependencies that you found were relevant?
            (c) How long did it take to determine the parts of the task that did NOT involve message-based dependencies?
d) How important were the message-based dependencies that are relevant to the task? For example, determining how to modify a particular object in a component may be more challenging than actually determining the appropriate dependency that may need to be altered.
   i) Issues to consider regarding this question
      (1) Did the message-based dependency actually inform you exactly which parts of a component need to be modified? In other words, did tracking the dependency actually help you identify which specific statements, methods, variables, or objects needed to be modified?
      (2) Did the task actually require modifying, adding, or removing one or more message-based dependencies?

Part Two
In addition to actually implementing your two selected KLAX maintenance tasks, you need to provide a report that is similar to the report in part one and in your previous assignments. If you select one of the tasks on which you already worked, and for which you provided information previously, you may reuse those answers if you think they are correct; otherwise, be sure to correct them as appropriate. In addition to the report as outlined below, be sure to submit a zip file with the complete code so that we can run it.

Structure of Your Report
For each KLAX maintenance task, specify:
1) Task No:
2) Description of Task:
3) Components you examined:
   a) Names of the components you examined
   b) The reason you examined them
4) Message-based dependencies that are relevant to the maintenance task:
   a) For each component you examined, show the following information
      i) For each dependency within a component
         (1) Name of Class which contains the dependency:
            a) Name and type of Consumed message
               i) Names of consumed message’s attributes
               ii) Name of the method or interface in which the message is consumed
            b) Name and type of Published Message
               i) Names of published message’s attributes
               ii) Name of the method or interface in which the message is published
         (2) Why is this dependency relevant?
         (3) How did you find this dependency? Did you use the slicer, Eclipse, MDA or another methodology? Providing example output (e.g., program statements or graph diagrams) from your tools may help.
      ii) For each dependency between components
         (1) Name of the component which published the message(source)
            i) Name of the message or event
            ii) Names of published message’s attributes
            iii) Name of the method of the source component in which the message is published
         (2) Name of the component which consumed the message(sink)
            i) Name of the message or event
            ii) Names of consumed message’s attributes
            iii) Name of the method of the sink component in which the message is consumed
         (3) Why is this dependency relevant?
         (4) How did you find this dependency? Did you use the slicer, Eclipse, MDA or another methodology? Providing example output (e.g., program statements or graph diagrams) from your tools may help.
5) Explanation of how you modified the code in order to complete the maintenance task
   a) Questions that may need to be answered
      i) What message-based dependencies may need to be modified, added, or removed?
      ii) What methods need to be modified, added, or removed?
      iii) What variables or objects may need to be modified, added, or removed?
   b) Please explain why any methods, variables, objects, etc. are relevant to the maintenance task at hand.