

Homework 5

50 Points

Assigned 12NO01

Due 26NO01

- All work is completed individually.
- All diagrams must be drawn using Visio.
- Homework set is 2 pages.
- Point distribution is described for each problem.

Packages

1. A. (6 points) Given the attached class diagram for a car radio, redraw using packages. Include relevant visibility for classes, as well as relationships between packages.

B. (4 points) Give a textual description of the package diagram.

C. (2.5 points) Give a textual justification to the grouping of classes in the package diagram.

Activity Diagram

2. (5 pts) Draw an activity diagram at a high level of abstraction for an operation that calculates the average of an array of n real numbers. That is, the operation that calculates the average may be drawn as a single activity state (lozenge). Include pre- and post-conditions.
3. (7.5 pts) Draw an activity diagram at a pseudo-code level of abstraction for an operation that calculates the average of an array of n real numbers. Include pre- and post-conditions.

Component and Deployment Diagram

4. (25 pts) You have been contracted by HomeAutomata to design a new automated home system. The company executives require a system that performs the following functions:
 - activates the porch light when it is dark out;
 - activates the entrance hallway light when the front door is opened and it is dark inside the house;
 - activates individual room lights when motion is detected in the room and it is dark inside the house;
 - communicates with security systems provided by other vendors;
 - has three modes:
 - Normal: performs all of the above functions. In addition, adjusts the thermostat based upon time of day (see exam problems 6-10)
 - Vacation: performs all of the above functions. In addition, adjusts the thermostat to 45 degrees F and remembers common light usage patterns and replays those patterns when it is dark outside
 - Off: disables the system

As an experienced consultant, you are asked to show the hardware and software deployment for the system. That is, draw a deployment diagram (12.5 pts) overlaid with a component diagram (12.5 pts). Assume that there exists centralized control for the overall system, and local control of subsystems (e.g., a thermostat controls the heating and cooling, but a central control sends a signal to the thermostat indicating Normal, Vacation, or Off mode). The diagram should have no more than fifty components and nodes combined. Use iconic representation when possible. Show all relationships between both components and nodes.

