Einführung in die Softwaretechnik 2018
Sheet 05

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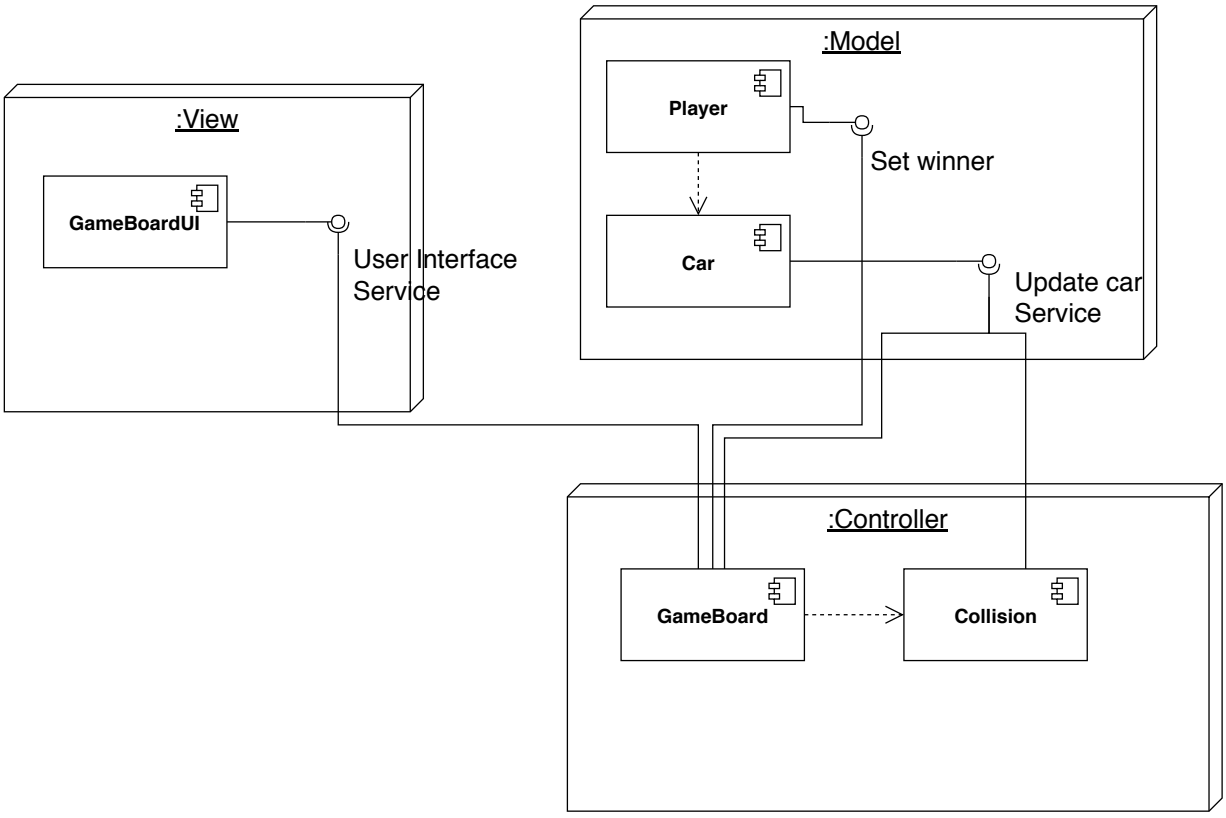
1. Explain the difference between a 3-layered architectural style and a 3-tier architecture.

   A 3-layered architecture is a system that has 3 hierarchically ordered layers in the model. Each of these builds on top of the next and can be realized with an open or closed architecture. An example for this would be a basic GUI application where all user interaction is handled on the View layer. This input is then passed on to various Controller(s) to be processed. If any of the internal state of the application needs to be changed as a result, the Model layer is updated.

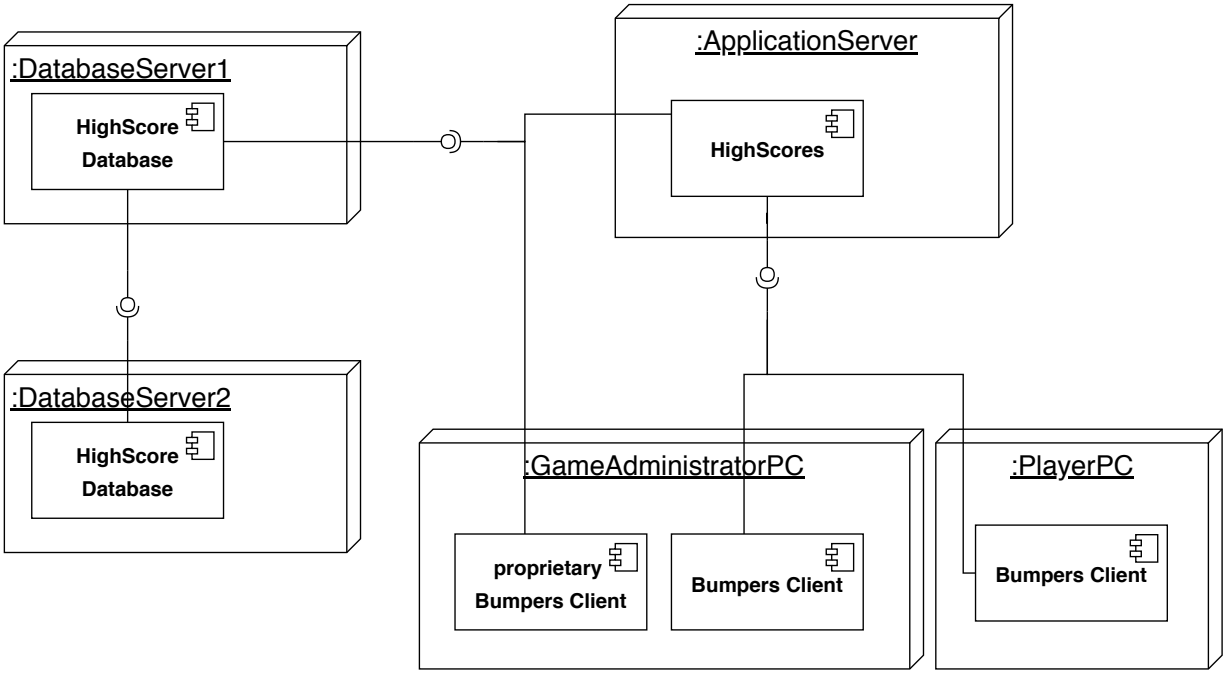
   A 3-tier architecture however is also divided into three separate layers, but these are then distributed to three different physical systems. This architecture style is for example present in most modern web applications, where the first tier is the user's web browser. It then connects to the application's web server and receives html, css and JavaScript files. If any state needs to be saved or loaded the third tier is invoked. This is the database backing the web server.

2. Create a UML component diagram for Bumpers based on the following analysis object model. Use the Model View Controller (MVC) architectural style and explain why you modeled it like this.



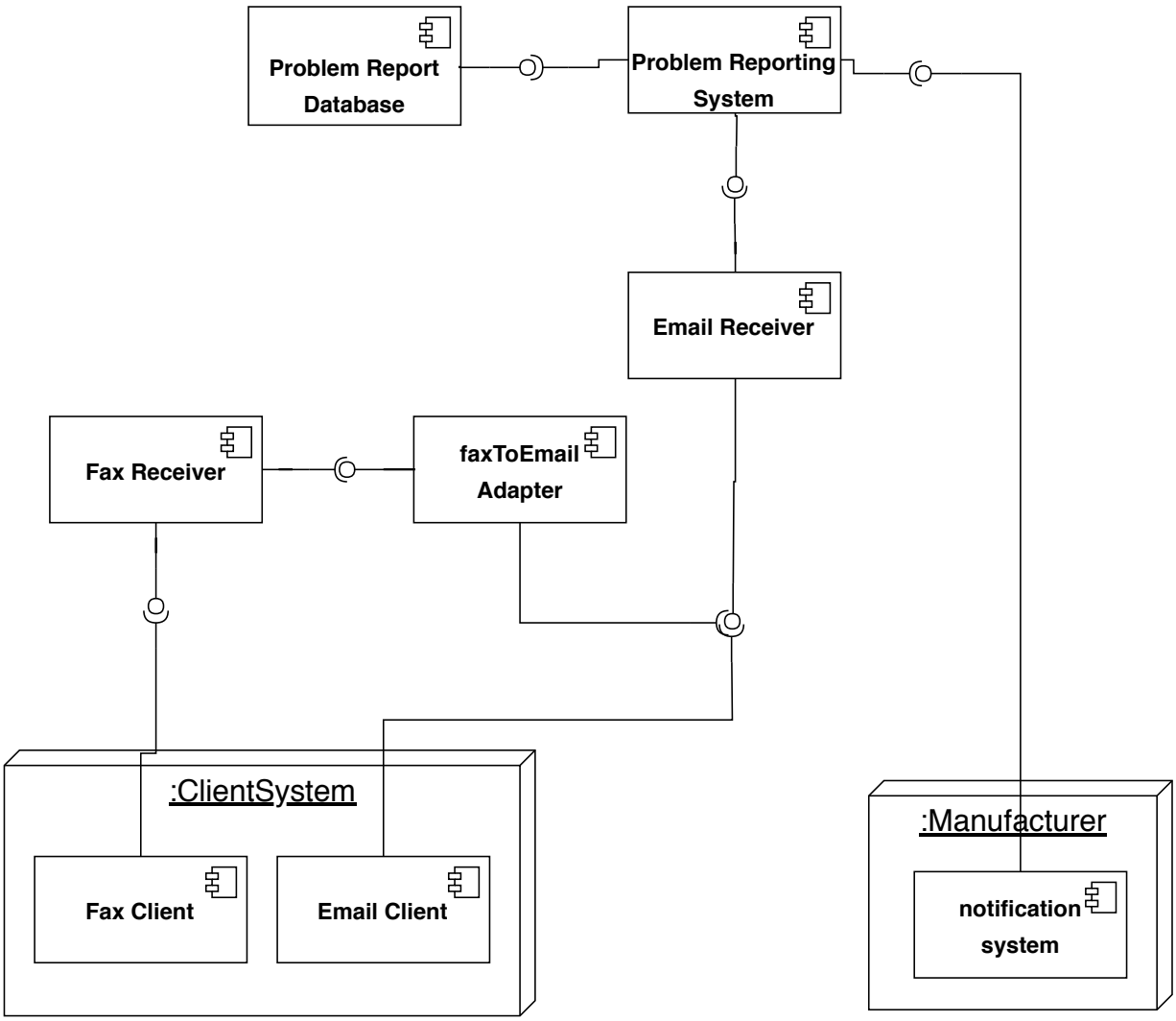
3. Consider the following extension to Bumpers. The game includes a high- score mechanism to determine the best players. High-scores are saved on a separate database server and are accessed by the game through an application server. To improve redundancy, two identical database servers should be used: the first acts as a main server, and the second acts as a redundant back-up in case the first one fails. The Bumpers game accesses data through the application server. Game administrators have the option of using a proprietary

client that accesses the databases directly. Draw a UML deployment diagram representing the hardware/ software mapping of this system and explain why you modeled it like this. Which architectural style did you choose?



The architectural style chosen is a 3-tiered architecture.

4. Consider a legacy, fax-based, problem-reporting system for an aircraft manufacturer. You are part of a reengineering project replacing the core of the system with a computer-based system that includes a database and a notification system. The client requires the fax to remain an entry point for problem reports. You propose an E- mail entry point. Describe a subsystem decomposition that would allow both interfaces. Note that such systems are used to process many problem reports per day (e.g., 2000 faxes per day). Draw a UML component diagram representing the subsystem decomposition of this system and explain why you modeled it like this.


Problem Report Database
Problem Reporting System
Email Receiver
Fax Receiver
faxToEmail Adapter
:ClientSystem
Fax Client
Email Client
:Manufacturer
notification system