



Draw It or Lose It
CS 230 Project Software Design Template
Version 1.0

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Document Revision History

Version	Date	Author	Comments
1.0	<mm/dd/yy?	Brandon Mullins	<Brief description of changes in this revision>

Instructions

Fill in all bracketed information on page one (the cover page), in the Document Revision History table, and below each header. Under each header, remove the bracketed prompt and write your own paragraph response covering the indicated information.

Executive Summary

The Gaming Room seeks to expand its existing game, "Draw It or Lose It," currently available only on the Android platform, to multiple platforms. This expansion aims to increase the client's customer base and revenue. By developing a web-based version of the game, the Gaming Room will be able to reach a wider audience and enhance user engagement.

Design Constraints

- **Multi-Team Capability:** Each game must support one or more teams.
- **Player Assignments:** Each team will consist of multiple players.
- **Unique Naming:** Game and team names must be unique to avoid conflicts during creation.
- **Single Instance:** Only one instance of the game should run at a time.
- **Cross-Platform Compatibility:** The application must function on various platforms.
- **Language:** Development will be conducted in Java.
- **Framework:** An appropriate API framework will be utilized.

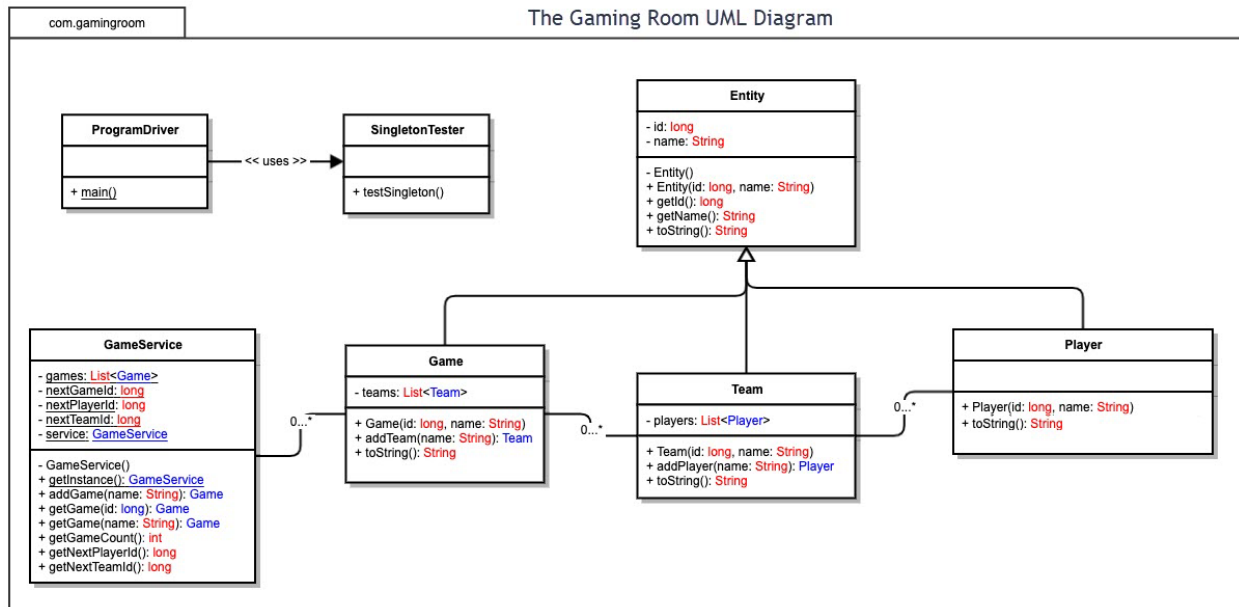
These constraints are essential for the proper functioning of the game. The requirement to support multiple platforms while utilizing existing Android code will necessitate additional development time for refactoring and redesign. Additionally, considerations regarding cloud storage and potential limitations on the number of games, teams, and players will need to be addressed.

System Architecture View

Please note: There is nothing required here for these projects, but this section serves as a reminder that describing the system and subsystem architecture present in the application, including physical components or tiers, may be required for other projects. A logical topology of the communication and storage aspects is also necessary to understand the overall architecture and should be provided.

Domain Model

The UML diagram comprises seven classes. The Game, Team, and Player classes share a generalization relationship with the Entity class, illustrating a form of multiple inheritance. These classes, along with the GameService class, are directly associated, indicating a multiplicity relationship that allows for zero to many instances. Each team can have multiple players, each identified by a unique ID and name. Similarly, a game can include multiple teams, each distinguished by its own name. The GameService class maintains a list of games and implements the singleton pattern to ensure only one instance is active at any given time. Additionally, a SingletonTester class verifies that a single game instance is running, linking it to the ProgramDriver class, which contains the main method that governs the application's entry point and functionality.



Evaluation

Using your expertise, evaluate the characteristics, advantages, and drawbacks of each operating platform—Linux, Mac, and Windows—along with mobile devices. Consider the outlined requirements and provide a comprehensive analysis for each platform. As you fill out the table, keep your client's needs in mind, ensuring that all components work seamlessly together.

Development Requirements	Mac	Linux	Windows	Mobile Devices
Server Side	Mac OS offers a sleek user interface and reliable upgrade options, making server setup straightforward. It has robust terminal commands for configuration and strong security features, including excellent anti-malware protection. However, costs can be high due to hardware and licensing, and it may be less favored by some hosting services.	Linux provides a secure, cost-effective alternative with extensive customization options. Its open-source nature makes it a popular choice for web hosting, but it can be challenging for users due to compatibility issues and a smaller library of available applications.	Windows is user-friendly and offers a vast software library with strong compatibility. However, it may be more vulnerable to viruses and can involve high licensing costs, alongside forced updates that may disrupt workflows.	Mobile platforms have a broad user base and are generally user-friendly with lower virus susceptibility. However, hardware limitations and lack of support for virus incidents can be drawbacks, making fixed server setups more desirable.
Client Side	Setting up on Mac requires moderate technical skill and offers seamless integration with other Apple devices. While the system supports running multiple applications concurrently, the initial costs can be steep, and hardware updates are infrequent.	Linux demands higher expertise for setup and has fewer available applications, though it offers robust security. Its open-source nature makes it cost-effective, but the absence of professional support can lead to more bugs and challenges.	Windows is accessible for most users and offers a wide range of PCs across various price points. It facilitates gaming and has many compatible applications, but it can suffer from inconsistent performance and potential malware issues.	Mobile development is typically cost-effective and user-friendly, with quicker load times. However, creating and maintaining apps can be expensive, especially given the need for expertise in platform-specific languages like Swift or Java for Android.

Development Tools	Mac supports a variety of languages, including HTML, CSS, and JavaScript, and offers robust terminal capabilities. Common IDEs include PyCharm, Eclipse, and Visual Studio Code, along with several online resources for development.	Linux can utilize many of the same IDEs available on Mac but often lacks official support. It supports a range of programming languages and tools suited for web development.	Windows offers ease of use and a wide array of IDEs, allowing users to run both Windows and Linux applications simultaneously. Many additional resources and tools are available for development.	For mobile development, tools like Android Studio and Swift are essential, enabling cross-platform application creation. However, adapting apps for different devices may require specific expertise and additional resources.
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Recommendations

Analyze the characteristics of and techniques specific to various systems architectures and make a recommendation to The Gaming Room. Specifically, address the following:

1. **Operating Platform:** I recommend that The Gaming Room initiate the project using the Windows operating system. Windows is widely recognized for its gaming capabilities and extensive software ecosystem. The availability of numerous development tools and integrated development environments (IDEs) simplifies the coding process, making it efficient and user-friendly. Additionally, the relatively low cost of Windows licenses can help keep the project within budget while still offering a robust platform for game development.
2. **Operating Systems Architectures:** The Windows architecture employs a microkernel design that enhances its stability and performance. This architecture separates core system functions from user applications, providing a more secure and efficient environment. The interaction between user mode and kernel mode allows for the efficient execution of applications while safeguarding system resources, which is particularly beneficial for gaming applications requiring high performance and reliability.
3. **Storage Management:** Utilizing a cloud storage solution is highly advantageous for The Gaming Room, given the relatively small size of game assets and the necessity for quick updates. Cloud storage not only facilitates easy access and management of assets but also provides scalability as the game grows. The Windows server OS offers built-in tools for efficient file management, allowing users to organize and retrieve files effortlessly while ensuring quick access to the image library, which can improve loading times for the game.
4. **Memory Management:** Windows OS efficiently manages memory through its virtual memory system, allowing each application to operate within its own memory space. This isolation protects against data corruption and enhances application stability. By leveraging a 64-bit architecture, The Gaming Room can take advantage of increased memory capacity, enabling smoother performance and faster access to graphic assets, ultimately improving the gaming experience without excessive paging.
5. **Distributed Systems and Networks:** For cross-platform development, I recommend using a versatile engine like Unity, which supports various operating systems including Windows, Linux, Android, and iOS. Unity's user-friendly interface and extensive community support make it an excellent choice for game development. Additionally, implementing a dedicated gaming server can optimize performance, ensuring low latency and high availability, which is crucial for maintaining an engaging online gaming experience.
6. **Security:** The Windows server operating system provides robust security features that safeguard user data and system integrity. It includes advanced user account control settings to manage permissions and access levels, protecting sensitive information. The built-in virtual memory management system ensures that processes operate in isolated environments, reducing the risk of data breaches. Furthermore, Windows supports various third-party security solutions, such as McAfee and Norton, which can enhance protection against malware and cyber threats, ensuring the safety of The Gaming Room's application and its users.