

Draw It or Lose It

# **CS 230 Project Software Design Template**

Version 1.0

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## [Document Revision History](#_grjogdjh5fi8)

| Version | Date | Author | Comments |
| --- | --- | --- | --- |
| 1.0 | 03/21/2025 | Damian le | Updated Summary, Requirements, Constraints, and Domain model. |

**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](#_sbfa50wo7nsh)

The client wants to convert their current game, "Draw It or Lose It," currently an Android based game only, into a web-based multi-platform game. The client wishes the game to be developed based on their current Android application and requires help in creating the environment as well as optimizing their coding. The game will need to be programmed based on a cross-platform. Every team and game needs to be a unique name, and the game must only be capable of having one instance of the game running at a time. There will be more than one player per team, and the game needs to be able to have multiple or single teams per game.

## Requirements

The client requires the game to be able to have one or many teams playing and each team being assigned several players. There can only be a single instance of the game at any given time. They would like this to be implemented by creating unique identifiers for each game instance, team, or player. The user should be able to check whether a name already exists while choosing a team name, so each game and team name should be unique.

## [Design Constraints](#_2et92p0)

The main constraint for this project is making the game on different platforms. Without team members with cross-platform knowledge, it will require several teams with different products based on environment experience. The other constraints are that the development must meet all client requirements on each platform.

## [System Architecture View](#_ilbxbyevv6b6)

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](#_8h2ehzxfam4o)

**The Entity Class serves as the parent class for the Game, Team, and Player classes. This indicates that the Game, Team, and Player classes, as subclasses of Entity, will receive Entity's attributes, while also having their own distinct attributes that are independent from the parent class. The Game Service Class is utilized to fulfill the client’s needs, delivering one game instance at a time, a unique team name, a unique game name, and a unique player name. Program Driver includes the primary statement and utilizes the Singleton Tester class. The Game class has a list of teams, while the Team class possesses a list of Players. The Player class lacks a list, as it guarantees that every player has a distinct id that can be allocated to a team. Although a player may belong to a team, and a team consists of players, the player class itself does not include or possess a team or a game.**

**"The Gaming Room UML diagram. The top of the diagram is labeled as com dot gamingroom. Test boxes are placed in two layers. The first layer has three text boxes and the second layer has four of them. In the first layer, the 'ProgramDriver' textbox points to 'SingletonTester' textbox. The 'ProgramDriver' textbox contains the text 'asterisk main round brackets.' The 'SingletonTester' textbox contains the text 'asterisk testSingleton round brackets.' The arrow between these two text boxes are labeled 'open two angle brackets uses close two angle brackets'. In the second layer, there are 'GameService', 'Game', 'Team', and 'Player' text boxes. The 'GameService' textbox has texts arranged in two layers. The first layer contains games colon List open angle bracket Game close angle bracket, nextGamesId colon long, nextPlayer Id colon long, nextTeamId colon long, and service colon GameService. The second layer contains GameService round brackets, getinstance round brackets colon GameService, addGame open parenthesis name colon String close parenthesis colon Game, getGame open parenthesis id colon long close open parenthesis colon Game, getGame open open parenthesis name colon String close open parenthesis colon Game, getGameCount round brackets colon int, getNextPlayerID round brackets colon long, and getNextTeamId round brackets colon long. The 'GameService' box is connected with the 'Game' textbox with a line labeled 'zero dot dt dot asterisk'.  The 'Game' textbox also contains text in two layers. The first layers contains the text teams colon List open angle bracket Team close angle bracket. The second layer has Game open round bracket id colon long comma name colon String close parenthesis, addTeam open parenthesis name colon String close parenthesis Team, toString round brackets colon String. The 'Game' textbox is connected with the 'Team' textbox with a line labeled 'zero dot dt dot asterisk'. The 'Team' textbox also contains text in two layers. The first layers contains the text players colon List open angle bracket Player close angle bracket. The second layer has Team open parenthesis id colon long comma name colon String close parenthesis, addPlayer open parenthesis name colon String close parenthesis colon Player, and toString round brackets colon String. The 'Team' textbox is connected with the 'Player' textbox with a line labeled 'zero dot dt dot asterisk'. It contains the text Player open parenthesis id colon long comma name colon String close parenthesis and toString round brackets colon String. The 'Game', the 'Team, and the 'Player' boxes point to the 'Entity' textbox in first layer. The 'Entity' textbox contains text in two layers. The first layer has the text id colon long and name colon String. The second layer has Entity round brackets, Entity open parenthesis id colon long comma name colon String close parenthesis, getId round brackets colon long, getName round brackets colon String, toString round brackets colon String.**

## [Evaluation](#_2o15spng8stw)

Using your experience to evaluate the characteristics, advantages, and weaknesses of each operating platform (Linux, Mac, and Windows) as well as mobile devices, consider the requirements outlined below and articulate your findings for each. As you complete the table, keep in mind your client’s requirements and look at the situation holistically, as it all has to work together.

In each cell, remove the bracketed prompt and write your own paragraph response covering the indicated information.

| **Development Requirements** | **Mac** | **Linux** | **Windows** | **Mobile Devices** |
| --- | --- | --- | --- | --- |
| **Server Side** | A benefit of MacOS is its capability to execute MacOS, Windows, and Linux applications concurrently. One more benefit that is frequently disregarded with MacOS is its uniformity. MacOS and its system have stayed consistent, allowing for easy operation for users familiar with the OS. The drawbacks of MacOS primarily include its expense and restrictions on hardware choices relative to Windows or Linux | The primary benefits of Linux are its diverse distribution options and its open-source nature, which provides numerous free or affordable alternatives. Linux is widely recognized for its adaptability in servers and embedded systems because of its simple customization. Linux possesses better security measures in comparison to Windows or MacOS. The drawbacks include limited options for pre-assembled machines and problems with file format compatibility | The primary benefit of Windows is for business users; Windows authentication seamlessly connects with Active Directory corporate servers, with no extra costs or add-ons required. The drawbacks of Windows include insufficient mobility advancement and weak security protocols, which may result in malware, spyware, and ransomware | Hosting a web application on a mobile device can be advantageous when user numbers are restricted, and the application isn't large or complex. Numerous affordable web server applications are accessible to Android users, providing an additional benefit for utilizing mobile devices to host web applications. The drawbacks are that in many cases, the mobile hosting solutions are cloud-based, making companies more vulnerable and accessible to hackers. Mobile devices are generally considered more susceptible than PCs overall |
| **Client Side** | The advantages of MacOS lie in its user-friendliness after skills and knowledge are acquired. The drawbacks include its lack of accessibility beyond Apple OS. It is only available on an Apple device, which may restrict developers who possess the skills and training to create MacOS applications but do not work on or develop from a Mac device. | The Advantages include cost-effectiveness and the level of control over your projects provided by Linux. Since Linux is a free and open-source operating system, it is often easier to manage, resulting in reduced maintenance time. Each of the advantages noted also has its drawbacks. Since Linux is open-source and user-managed, security could be a concern dealt with independently, unlike Windows or MacOS which provide technical support services for their products | The advantages of Windows include its availability and a variety of price options that can be tailored to project requirements and usage. They provide technical assistance and enhanced security features in comparison to Linux. The drawbacks are that you require someone knowledgeable in Windows OS, and additional costs may arise for certain features you wish to incorporate | Although numerous applications and tools exist for mobile devices, they often fall short in accessibility and comprehensive features compared to those available on a PC. The advantages include their easy accessibility and a range of price options. The drawbacks are that mobile devices come with numerous distinct operating systems, and typically, each device needs or is designed for a particular OS, resulting in incompatibility with other systems |
| **Development Tools** | MacOS uses the programming language Swift. The primary resource accessible and easily utilized by MacOS and IOS developers is Xcode along with Xcode Cloud. Xcode Cloud is a tool created especially for Apple developers, enabling teams to build, test, and deploy applications more quickly and easily | Linux offers a vast array of development tools to select from. Due to their abundance, I will discuss one choice. Docker is utilized to provide a consistent development environment, create cross-platform applications, and facilitate straightforward deployment. Docker Hub is also utilized to bypass the development environment setup, enabling users to jump straight into development | Windows was mainly developed in C, with certain sections in assembly language. One of the most recognized and utilized IDEs for Windows is Visual Studio. It serves as an IDE, along with a code editor and, in certain cases, as a source/version control. Visual Studios provides a variety of tools; however, it took me some time to recognize their advantages | For most mobile apps, the preferred language is Java. Its object-oriented characteristics make it a preferred option among numerous developers building mobile applications. While Python and C++, along with other C variants, are also employed in mobile development projects, especially in gaming. Although many IDEs facilitate mobile app development, the most widely used are VSCode, IntelliJ IDEA, and Eclipse. |

## 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 think this project recommends using Windows as the operating system. Windows is the best option because it can seamlessly work with their existing Android app "Draw It or Lose It." Due to Windows' extensive user base, which accounts for approximately 90% of operating systems globally, it provides a broader array of developers, skill sets, and tools to successfully complete a project for a cross-platform application.
2. **Operating Systems Architectures**: Windows 10 launched the Universal Windows Platform (UWP), advancing the Windows Runtime framework. Applications built for UWP can invoke the Win32 APIs, Microsoft .NET Framework, and the Windows RT APIs. This implies that developers can design one application that operates on all devices with this dual stack method, which is the suggested architecture for this project
3. **Storage Management**: Storage based on servers will enable centralized access to files, enhancing functionality and providing failover clustering. It also offers redundancy, automated backups, and improved, faster performance
4. **Memory Management**: Windows provides numerous options for managing storage and memory. For example, Azure Storage. The operating system comprises virtual and physical address space for memory distribution. There is also the option of OneDrive, Visual Studio, or even Azure Cloud services.
5. **Distributed Systems and Networks**: Utilizing a cross-platform development framework will reduce the need for various skills and facilitate a more seamless application development experience. One of these choices is "Develop 4." To tackle connectivity or outage problems, I recommend confirming that the servers are constructed with the capacity that satisfies the clients' requirements by projecting game usage/users after the application is deployed in the new environments
6. **Security**: Given that methods of stealing user data are a persistent and continuous threat, I suggest placing special emphasis and care on security protocols. Aura is a service that provides protection for devices running PC, Mac, Android, and iOS. Although this will incur expenses, relying on the built-in security of an operating system is not advisable, since an extra layer of defense is necessary to ensure systems remain secure and function efficiently. Aura provides round-the-clock customer support based in the U.S.