

The Gamers Game

# **CS 230 Project Software Design Template**

Version 1.0

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## [Document Revision History](#_grjogdjh5fi8)

| Version | Date | Author | Comments |
| --- | --- | --- | --- |
| 1.0 | May 17, 2023 | Carisma Carter | Prepare a software design document and begin developing the game application |

**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 Gaming Room seeks to create a cross-platform web game named "Draw It or Lose It." Currently exclusive only to Android devices, the game's objective is to engage multiple teams involving several players in four one-minute rounds. A picture is randomly selected from a library of images, and one team attempts to guess it within the given time limit. If the team does not answer, each member of the opponent team has 15 seconds to give their answer.

## Requirements

* Design the game application that can handle many players as each team requires multiple people.
* Design the game application to have the ability to run on multiple platforms.
* At any given time, the game can only haveone instance.
* Needs multiple teams involved no less than two.

## [Design Constraints](#_2et92p0)

Some design constraints for developing the game application in a web-based distributed environment are bandwidth limitations and network stability Some implications of the design constraints on application development are performance optimization and cross-platform ability. Performance optimization improves network communication by reducing the bandwidth usage reducing the rate of data transfer across a given path. Cross-function ability allows the game application to be supported on different devices and browsers.

## [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 Game, Team, and Player classes are all linked through a relationship called the Entity class. This relationship indicates that they inherit information from the Entity class. In UML, this inheritance can be represented using the appropriate representation. Each class will share common attributes such as id and name making Entity the superclass. By analyzing the diagram, it becomes apparent that Team and Player have an association with the Entity class, while Game has a Team, and GameService has Games. In UML, this type of association is referred to as aggregation. An aggregation means that one class instance contains a reference to another class instance. The diagram shows that GameService has a reference to Games, Games has a reference to Team, and Team has a reference to Player.

**"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. Stability and Reliability.  b. Security and privacy. Easy to use.  c. Not always affordable for everyone. | a. Stability and performance.  b. Compatibility and security.  c. Not as user-friendly as Mac or windows | a. User-friendly and compatible with other Microsoft products.  b. Provides IDEs  c. Must pay for a license to use. | a. Portability  b. Provides broad accessibility for web-based applications.  c. Battery life may not last long. |
| **Client Side** | Cost may be more expensive end when it comes to Mac.  Developing apps on Mac requires additional time. Developing applications on Mac requires a certain level of expertise and experience. | Linux is free to use.  Developing applications requires additional time spent targeting multiple distributions.  Developers need to be familiar with the specific distribution they are targeting. | Windows costs vary depending on the product you are using.  Developing applications takes additional time from different product versions and editions.  Expertise requires knowledge of Windows technology. | The cost varies depending on the type of mobile device the user gets. Different devices have different features.  Every mobile device has its own time development some may take longer than others.  Expertise should be in mobile app development since applications are constantly changing. |
| **Development Tools** | Programming languages available on Mac are Swift and Objective-C.  Some IDEs include Xcode and C/C++. | Programming languages available are C/C++, python, and JavaScript. IDEs include Visual Studio Code and Eclipse. | Programming languages available C# and .NET Framework.  IDEs include Visual Studio and Visual Studio Code. | Programming languages available are Swift on IOS devices and Java and Kotlin on Android devices.  IDEs on IOS are Xcode and Objective-C. The IDE on Android is Android Studio. |
| Project 2 | Project 2 | Project 2 | Project 2 | Project 2 |
| **Server Side** | Mac offers a server-based deployment method where websites can be hosted.  Advantages for hosting a web-based application are user-friendly and strong network and server management. Weaknesses are the cost tends to be higher than other operating platforms. Cost for licensing depends on which version of macOS is being used. | Linux offers a server-based deployment method where websites can be hosted.  Advantages for hosting a web-based application are cost-effective because Linux is free and performance.  Weaknesses are Linux requires more in-depth learning of the platform.  Linux is an open-source that most distributions are free to use. | Windows offers a server-based deployment method where websites can be hosted.  Advantages for hosting a web-based application are software compatibility from programming languages, web servers, databases, etc. Weaknesses are licensing costs some programs require a purchase of a license. Cost for licensing depends on which version or edition of Windows is being used. | Mobile devices do not offer a server-based deployment method for hosting websites. Advantages for hosting a web-based application are remote monitoring. Weaknesses are connectivity and the reliability of a mobile device. Because mobile devices do not function as web-based servers for hosting websites there are no licensing costs associated with the server operating system on mobile devices. |
| **Client Side** | Developing an application that is compatible with multiple types of clients can bring on additional costs for Mac.  Supporting multiple types of clients can extend the development timeline. Different Mac platforms have different unique requirements.  Developers should have knowledge of the Mac development environment, programming languages, and framework.  Adapt User Interface and Design is required of Mac development process to ensure the application is compatible with all web browser platforms and mobile devices. | Developing an application that is compatible with multiple types of clients can bring on additional costs for Linux.  Linux can have an extended development process. Developers must perform thorough testing and debugging on Linux systems. Developers will need experience and expertise in Linux applications.  Open-Source Community Engagement is required in the Linux development process to ensure the application is compatible with all web browser platforms and mobile devices. This will allow insights and feedback on Linux systems. | Developing an application that is compatible with multiple types of clients can bring on additional costs for Windows. Each Window platform has a unique requirement that developers will need to take an extended time to adapt the application to work on different Windows versions. Developers will need experience and expertise in Windows applications, such as system layout programming languages and frameworks. Security and permissions are required of Windows development process to ensure the application is compatible with all web browser platforms and mobile devices. | Developing an application that is compatible with multiple types of mobile devices, such as iOS and Android clients can bring on additional costs. Each mobile device has its own timeline for developers. Different mobile devices require different tools and applications. Developers with expertise and experience in mobile application development are necessary for ensuring compatibility with different platforms. Cross-Platform development is essential for the mobile devices development process to ensure the application is compatible with all web browser platforms. |
| **Development Tools** | Relevant programming languages and IDE for Mac are Objective-C, AppCode, and Xcodde. The impact these languages have on Mac are developers or the team must have certain expertise or experience in these languages. Collaboration between the development team, designers, and testers are crucial to the platform as well. Xcode is free to download on the App Store. AppCode is a paid license through third-party JetBrains. The cost may vary depending on the type of license. | Relevant programming languages and IDE for Linux are C/C++, Eclipse, and Git. The impact these languages have on Linux are a technical requirement for Linux development. It is beneficial to have multiple teams with specialized skills in different programming languages. Most of the relevant programming languages, such as C/C++ and Python, are open-source and freely available for Linux development. Git is an open-source tool and does not have licensing costs associated with their usage. | Relevant programming languages and IDE for Windows are C#, .NET Framework Visual Studio, and Visual Studio Code. Depending on the size and complexity of the project, it may be beneficial to have separate teams specializing in different aspects of Windows development. Visual Studio Community Edition is a free version of Visual Studio that provides most of the features needed for Windows development. Visual Studio Professional requires paid licenses, and the cost may vary. | Relevant programming languages and IDE for mobile devices are Swift, Java/Kotlin, Xcode, Android Studio, etc. Technical requirements may impact development on different mobile devices. Xcode and Android Studio frameworks are available as free downloads and do not have any licensing costs. Some extensions for the IDEs may require paid licenses, but these are optional. |

## 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 start on Mac or Windows. Both software’s are used the most, user-friendly, and are great for people who are not as technical. Most applications are also compatible with Mac and Windows.
2. **Operating Systems Architectures**: Mac operating systems are built on an architecture that combines hardware, frameworks, and applications. Mac provides service on all Apple Mac devices, such as MacBooks, iMacs, Mac Pros, as well as Mac Minis. Mac operating platform architectures provide a strong foundation for user-friendly computing experiences. Other architecture details include security and the ability to integrate with other Apple devices.
3. **Storage Management**: Mac operating systems provide several features for storage management. To list some of the few are iCloud Drive, storage recommendations, and storage overview. Each of these features gives the ability for Mac to hold more storage beyond what the device itself can handle. It also allows room for large datasets.
4. **Memory Management**: Creating the game involves creating a unique memory system. Draw It or Lose It is a game of pictures, so you would want a database full of images. Memory Allocation on the operating platform handles the allocation of memory required by the Draw It or Lose It software. It assigns memory segments to different components, such as graphics rendering and audio processing. The memory allocation process ensures that each component has sufficient memory to perform its tasks in the game.
5. **Distributed Systems and Networks**: Different operating system means having to find a different way for the game on all devices with little error. I would advise data synchronization. As the game progresses, data must be synchronized between different devices and platforms. Data synchronization can ensure accuracy and security. This can be achieved by using techniques such as real-time messaging or utilizing a centralized database or data warehouse that all platforms can have access to.
6. **Security**: Some key considerations to protect user information on and between various platforms are encryption, user access controls, and regular security updates. One example of security measures when pertaining to IOS, uses the user’s fingerprint to unlock the device. This way unauthorized access to your device is prevented.