Draw it or lose it

# CS 230 Project Software Design Template

Version 1.0

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[Document Revision History 2](https://usc-word-edit.officeapps.live.com/we/wordeditorframe.aspx?new=1&ui=en%2DUS&rs=en%2DUS&wopisrc=https%3A%2F%2Fsnhu-my.sharepoint.com%2Fpersonal%2Fcorey_hamilton1_snhu_edu%2F_vti_bin%2Fwopi.ashx%2Ffiles%2F123ebd760e3649649023b90031c72269&wdprevioussession=f6871c66%2Dc66b%2D4a4b%2D928b%2D2ac0a89dfc34&wdnewandopenct=1683985523165&wdo=4&wdorigin=wacFileNew&wdtpl=blank&wdlcid=1033&wdpreviouscorrelation=4d578c8e%2D0fe1%2D4cee%2Da2e6%2D4bd69bdb0299&wdenableroaming=1&mscc=1&wdodb=1&hid=8B78B2A0-70D7-3000-99E1-626AD943D73D&jsapi=1&jsapiver=v1&newsession=1&corrid=7013c6fd-5f49-488a-b4ba-066287d10123&usid=7013c6fd-5f49-488a-b4ba-066287d10123&sftc=1&cac=1&mtf=1&sfp=1&wdredirectionreason=Unified_SingleFlush&rct=Normal&ctp=LeastProtected#_Toc115077319)

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[Requirements 3](https://usc-word-edit.officeapps.live.com/we/wordeditorframe.aspx?new=1&ui=en%2DUS&rs=en%2DUS&wopisrc=https%3A%2F%2Fsnhu-my.sharepoint.com%2Fpersonal%2Fcorey_hamilton1_snhu_edu%2F_vti_bin%2Fwopi.ashx%2Ffiles%2F123ebd760e3649649023b90031c72269&wdprevioussession=f6871c66%2Dc66b%2D4a4b%2D928b%2D2ac0a89dfc34&wdnewandopenct=1683985523165&wdo=4&wdorigin=wacFileNew&wdtpl=blank&wdlcid=1033&wdpreviouscorrelation=4d578c8e%2D0fe1%2D4cee%2Da2e6%2D4bd69bdb0299&wdenableroaming=1&mscc=1&wdodb=1&hid=8B78B2A0-70D7-3000-99E1-626AD943D73D&jsapi=1&jsapiver=v1&newsession=1&corrid=7013c6fd-5f49-488a-b4ba-066287d10123&usid=7013c6fd-5f49-488a-b4ba-066287d10123&sftc=1&cac=1&mtf=1&sfp=1&wdredirectionreason=Unified_SingleFlush&rct=Normal&ctp=LeastProtected#_Toc115077321)

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[System Architecture View 3](https://usc-word-edit.officeapps.live.com/we/wordeditorframe.aspx?new=1&ui=en%2DUS&rs=en%2DUS&wopisrc=https%3A%2F%2Fsnhu-my.sharepoint.com%2Fpersonal%2Fcorey_hamilton1_snhu_edu%2F_vti_bin%2Fwopi.ashx%2Ffiles%2F123ebd760e3649649023b90031c72269&wdprevioussession=f6871c66%2Dc66b%2D4a4b%2D928b%2D2ac0a89dfc34&wdnewandopenct=1683985523165&wdo=4&wdorigin=wacFileNew&wdtpl=blank&wdlcid=1033&wdpreviouscorrelation=4d578c8e%2D0fe1%2D4cee%2Da2e6%2D4bd69bdb0299&wdenableroaming=1&mscc=1&wdodb=1&hid=8B78B2A0-70D7-3000-99E1-626AD943D73D&jsapi=1&jsapiver=v1&newsession=1&corrid=7013c6fd-5f49-488a-b4ba-066287d10123&usid=7013c6fd-5f49-488a-b4ba-066287d10123&sftc=1&cac=1&mtf=1&sfp=1&wdredirectionreason=Unified_SingleFlush&rct=Normal&ctp=LeastProtected#_Toc115077323)

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[Recommendations 5](https://usc-word-edit.officeapps.live.com/we/wordeditorframe.aspx?new=1&ui=en%2DUS&rs=en%2DUS&wopisrc=https%3A%2F%2Fsnhu-my.sharepoint.com%2Fpersonal%2Fcorey_hamilton1_snhu_edu%2F_vti_bin%2Fwopi.ashx%2Ffiles%2F123ebd760e3649649023b90031c72269&wdprevioussession=f6871c66%2Dc66b%2D4a4b%2D928b%2D2ac0a89dfc34&wdnewandopenct=1683985523165&wdo=4&wdorigin=wacFileNew&wdtpl=blank&wdlcid=1033&wdpreviouscorrelation=4d578c8e%2D0fe1%2D4cee%2Da2e6%2D4bd69bdb0299&wdenableroaming=1&mscc=1&wdodb=1&hid=8B78B2A0-70D7-3000-99E1-626AD943D73D&jsapi=1&jsapiver=v1&newsession=1&corrid=7013c6fd-5f49-488a-b4ba-066287d10123&usid=7013c6fd-5f49-488a-b4ba-066287d10123&sftc=1&cac=1&mtf=1&sfp=1&wdredirectionreason=Unified_SingleFlush&rct=Normal&ctp=LeastProtected#_Toc115077326)

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| Version | Date | Author | Comments |
| 1.0 | <5/12/23> | Corey, Hamilton |  |

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The Gaming Room is developing a multiplayer application titled Draw it or Lose it. It is a team placed player available on the android platform, but they plan to make it compatible with iPhones, computers, and tablets. In the game, players must guess words from pictures within a minute, and if they cannot guess it in time, as part of the game mechanics, other teams are provided with a 15-second time limit to solve a puzzle and gain an opportunity to advance in the game.

## Requirements

To make the game accessible across multiple devices, we need to ensure that it is compatible with various programming languages or modify the code. This is important because the goal is to enable as many individuals as possible to participate in the game, regardless of the device they use. To accomplish this, we will need to review the current codebase and identify any dependencies on specific platforms or languages. We can then either rewrite those portions of the code to be more platform-agnostic or use tools such as cross-compilers to generate code for multiple platforms from a single source codebase. Additionally, we may need to consider the differences in hardware and screen sizes on various devices and adjust the user interface accordingly. By taking these steps, we can make the game available to a wider audience and increase its overall accessibility.

[Design Constraints](https://usc-word-edit.officeapps.live.com/we/wordeditorframe.aspx?new=1&ui=en%2DUS&rs=en%2DUS&wopisrc=https%3A%2F%2Fsnhu-my.sharepoint.com%2Fpersonal%2Fcorey_hamilton1_snhu_edu%2F_vti_bin%2Fwopi.ashx%2Ffiles%2F123ebd760e3649649023b90031c72269&wdprevioussession=f6871c66%2Dc66b%2D4a4b%2D928b%2D2ac0a89dfc34&wdnewandopenct=1683985523165&wdo=4&wdorigin=wacFileNew&wdtpl=blank&wdlcid=1033&wdpreviouscorrelation=4d578c8e%2D0fe1%2D4cee%2Da2e6%2D4bd69bdb0299&wdenableroaming=1&mscc=1&wdodb=1&hid=8B78B2A0-70D7-3000-99E1-626AD943D73D&jsapi=1&jsapiver=v1&newsession=1&corrid=7013c6fd-5f49-488a-b4ba-066287d10123&usid=7013c6fd-5f49-488a-b4ba-066287d10123&sftc=1&cac=1&mtf=1&sfp=1&wdredirectionreason=Unified_SingleFlush&rct=Normal&ctp=LeastProtected#_2et92p0)

To meet the client's needs for the game application, there are some things we need to keep in mind. It is recommended that the game application should possess the capability to accommodate the game should allow for multiple teams, and each team should have several players assigned to it. To provide users with the ability to customize their game and team names, we must implement a system to ensure that each name is unique and not already in use. Third, we can only have one version of the game running at once so we need to assign individual identifiers for each game, team, and player. By considering these things, we can make sure the game works well for the users and meets the client's requirements.

[System Architecture View](https://usc-word-edit.officeapps.live.com/we/wordeditorframe.aspx?new=1&ui=en%2DUS&rs=en%2DUS&wopisrc=https%3A%2F%2Fsnhu-my.sharepoint.com%2Fpersonal%2Fcorey_hamilton1_snhu_edu%2F_vti_bin%2Fwopi.ashx%2Ffiles%2F123ebd760e3649649023b90031c72269&wdprevioussession=f6871c66%2Dc66b%2D4a4b%2D928b%2D2ac0a89dfc34&wdnewandopenct=1683985523165&wdo=4&wdorigin=wacFileNew&wdtpl=blank&wdlcid=1033&wdpreviouscorrelation=4d578c8e%2D0fe1%2D4cee%2Da2e6%2D4bd69bdb0299&wdenableroaming=1&mscc=1&wdodb=1&hid=8B78B2A0-70D7-3000-99E1-626AD943D73D&jsapi=1&jsapiver=v1&newsession=1&corrid=7013c6fd-5f49-488a-b4ba-066287d10123&usid=7013c6fd-5f49-488a-b4ba-066287d10123&sftc=1&cac=1&mtf=1&sfp=1&wdredirectionreason=Unified_SingleFlush&rct=Normal&ctp=LeastProtected#_ilbxbyevv6b6)

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The Domain Model shows the connection that is shared between the game, the player team classes via the entity class. This is the process by which the classes share information or characteristics from the entity class which acts as a foundation for them. Using UML notation, we can represent this relationship as an inheritance hierarchy.

When we observe the relationships, we can see that Team and Player are types of classes, meaning they have some unique properties that set them apart from one another. The game class and the team class share a relationship, which means that a game can have two or more teams playing against each other. On the other hand, the GameService class has Games, which means its function is to manage all of the games that are being played. Aggregation refers to a relationship between classes, where one class uses or refers to another class to help achieve its purpose. It is like a puzzle piece that fits into another to create a bigger picture.

For example, the GameService class refrences the Games that are being played, while Games have a reference to the Teams playing in each game. Similarly, Teams have a reference to the Players who are part of the team.

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| Development Requirements | Mac | Linux | Windows | Mobile Devices |
| Server Side | MacOS is a viable option for hosting web-based software applications on the server side due to its stable and secure Unix-based architecture, robust development tools like Xcode and Swift, and a strong support community. However, Mac's limited hardware options and higher cost of entry may not be the most cost-effective choice for smaller-scale applications. Furthermore, Mac servers are not as widely used as Linux-based servers, which can limit the availability of support and expertise.  Mac also provides server-based deployment options, although it is less commonly used compared to Linux in server environments.  Mac offers good performance and stability, but it may not be as optimized for high-scale web hosting as Linux.  The licensing costs for the Mac operating system may be higher compared to Linux, as Mac hardware and software are proprietary and often more expensive. | Linux is an operating system that is very adaptable and open to modifications is a highly flexible, open-source operating system with a wide range of distributions, including Ubuntu, Debian, and Red Hat, making it a popular choice for hosting web-based software applications. This operating system can be adjusted to fit the specific requirements of a user and provides a lot of options for personalization. Linux is also free and has a large community of developers, which facilitates access to development tools and support. However, some distributions may require more technical expertise to install and configure for web-based software hosting, which can be a weakness for those without experience in Linux-specific programming languages and development tools. Linux provides a deployment method specifically designed for hosting websites on servers. It offers a diverse selection of server software options like Apache, Nginx, and Lighttpd that are highly suitable for hosting web applications.  Linux has a reputation for being stable and reliable. Security, and scalability, makes it particularly well-suited for the task of hosting web-based software applications that require the ability to handle a large number of players, potentially reaching into the thousands.  The licensing costs for Linux are generally low or non-existent, as Linux distributions are open-source and freely available. | Windows is an operating system that is used by many people with a large market share, making it a good choice for web based applications. It offers a user-friendly interface which means that it can work with various devices and programs. Windows provides strong support for .NET and C# programming languages and a wide scope of tools such as,Microsoft Visual Studio. However, it is known for its susceptibility to viruses and malware, which can compromise the security of web- based software applications hosted on the platform. This weakness requires the implementation of robust security measures to ensure the protection of sensitive data.  Windows provides server-based deployment methods through its various server editions, such as Windows Server.  Windows Server offers robust features for hosting web applications and has good integration with Microsoft technologies.  However, Windows Server licenses can be relatively expensive compared to Linux, especially for larger deployments. | Mobile devices can be the perfect platform for hosting web-based software applications that require mobility and on -the-go access. The downside is that they have limited processing power, storage capacity, and smaller screens, which can impact the user experience. Creating software applications that can be accessed through the internet on mobile devices needs optimization for performance and usability on small screens, which can increase development time and cost. Despite these limitations, mobile devices offer built-in features such as GPS and cameras, which can enhance the user experience.  Android is the client's current platform, and it can continue to be supported. It offers a robust ecosystem for developing mobile applications.  Hosting the web-based software application on Android requires deploying it on a web server and ensuring compatibility with Android web browsers.  Android development requires expertise in Java or Kotlin programming languages and Android development tools like Android Studio.  The licensing costs for Android development tools are generally free, as Android Studio is an open-source IDE. |
| Client Side | Supporting multiple types of clients on Mac can bring several benefits, including the ability to reach a wider audience and improve user experience on Apple devices. However, it can also increase development time and cost, as developers need to ensure compatibility and optimize the software for each platform. The need for expertise in developing and testing software for multiple platforms also adds to the cost. Additionally, there may be a shortage of skilled Mac developers, which can impact the availability and cost of development resources. | Supporting multiple clients on Linux, software development considerations must be considered. This involves developing and testing software for different distributions, which can increase the cost and time of development. Additionally, developers need to consider the availability of skilled Linux developers and the potential need for additional resources to support cross-platform development. However, the benefits of supporting multiple types of clients on Linux include its open-source nature, which can result in lower licensing costs and a strong community for support and collaboration. | Supporting multiple types of clients on Windows also requires careful software development considerations, including expertise in developing and testing software for multiple platforms. It may increase the cost and time of development, especially if the software needs to be customized for different types of clients. Additionally, developers should consider the availability of skilled Windows developers and the potential need for additional resources to support cross-platform development. This may include investing in development tools and training for developers to ensure they have the necessary expertise to develop software for different Windows-based clients. | The support multipelt types of clients, the processinvolves several software development considerations. Firstly, developers need to consider the diversity of mobile devices and their varying hardware specifications, operating systems, screen sizes, and resolutions. This may increase the cost and time of development, as developers need to create multiple versions of the software for different platforms. Secondly, mobile app development requires expertise in developing and testing software for different devices and operating systems, such as iOS and Android. Developers should also consider the availability of skilled mobile app developers and the potential need for additional resources to support cross-platform development. |
| Development Tools | Developers building software for deploying on Mac have a variety programlanguages and tools available to them. Some commonly used programming languages for Mac software development include Objective-C, Swift, and C++. In the field of iOS app development, Apple's Xcode integrated development environment (IDE) reigns as the predominant software solution. used for Mac software development, incorporating advanced functionalities such as auto-complete, syntax highlighting, and debugging capabilities, the software offers a comprehensive suite of tools. Other tools that can be useful for Mac software development include JetBrains' AppCode, Visual Studio Code, and Eclipse. In addition to these, developers may also utilize various third-party libraries and frameworks to streamline development and provide additional functionality. | For deploying software on Linux, developers typically use programming languages including C,C++, Java, Python, andRuby. Popular IDEs used for Linux development include Eclipse, NetBeans, and IntelliJ IDEA . Other commonly used tools for building and deploying Linux-based software include the GNU Compiler Collection (GCC), Make, and Git for version control. Additionally, package managers such as apt and yum are often used to install and manage software dependencies on Linux systems. | When developing software for deployment on Windows, there are various programming languages and tools to consider. Popular programming languages for Windows include C++, C#, and Visual Basic .NET. Development environments such as Visual Studio, Code:Blocks, and Eclipse with CDT provide integrated development environments (IDEs) that support these languages and allow for the creation of Windows applications. Additionally, developers may use tools such as .NET Framework, Windows Communication Foundation, Windows Forms , and Windows Presentation Foundation to build software for Windows. These tools can help with various aspects of development, such as building graphical user interfaces (GUIs) or handling networking. | The programming languages and tools used to build software for deployment on mobile devices depend on the specific platform and operating system being targeted. In the realm of iOS development, the go-to integrated development environment (IDE) for most developers is Apple's Xcode. This powerful tool provides support for applications that include Swift and Objective-C which are commonly used to develop software applications for Apple's mobile devices.. For Android devices, the primary development environment is Android Studio, which supports languages like Java and Kotlin. Other mobile development tools such as, React Native , Xamarin, and Flutter , which offer cross-platform development capabilities. By using these tools, developers can write the code for their software only once and then make it work on different platforms without having to write new code for each platform. This strategy can be beneficial in saving both time and costs associated with development.. |

To support iOS, the web-based application needs to be developed as a responsive HTML interface compatible with iOS web browsers, such as Safari.

iOS development requires expertise in Swift programming language and iOS development tools like Xcode.

The licensing costs for iOS development tools may include an annual fee for Apple's developer program.

Desktop (Linux, Mac, Windows):

For desktop clients utilizing Linux, Mac, or Windows operating systems, the application should be presented as a contemporary and responsive HTML interface that runs seamlessly within web browsers.

The development process should focus on ensuring cross-browser compatibility, adhering to web standards, and using responsive design techniques.

The relevant programming languages for web development include HTML, CSS, and JavaScript.

IDEs and tools like Visual Studio Code, Sublime Text, or Atom can be used for web development on multiple operating platforms.

These technical requirements may not significantly impact the development team if they already have experience in web development and cross-platform compatibility.

However, additional expertise may be required for specific platform-related features or optimizations, potentially necessitating multiple development teams.

The licensing costs for web development tools are typically minimal, as many popular IDEs and tools are available for free.

In summary, Linux is a strong choice for hosting the web-based software application due to its scalability and cost-effectiveness. Mac and Windows can also be used, but they may have higher licensing costs. When aiming to support multiple client platforms, important development considerations encompass ensuring compatibility with a variety of web browsers and mobile devices. using appropriate programming languages and leveraging cross-platform development tools.

## Recommendations

1. Operating Platform:

Based on the desire To broaden the reach of Draw It or Lose It, there is a need to extend its compatibility to various computing environments., we recommend using a cross-platform operating system such as Linux or Windows. These operating systems are widely used and support multiple hardware architectures, which will enable the software to run on a variety of devices and reach a broader user base.

1. Operating Systems Architectures:

Linux is known for its flexibility and adaptability. An area where it excels is its proficiency to r un on a wide range of hardware architectures, including popular ones such as x86, ARM, and PowerPC.. This flexibility makes it an excellent choice for software that needs to run on different devices. Windows, on the other hand, is primarily designed for x86 and x64 architectures but also supports ARM-based devices. Both operating systems have a stable architecture that ensures compatibility with a wide range of software.

1. Storage Management:

As a recommendation for storage management, our team suggests utilizing a cloud-based service. The most common services are Amazon Web Services and Microsoft Azure. These platforms provide reliable, scalable , and secure storage solutions that can be conveniently accessed from various devices and locations.

1. Memory Management:

To achieve optimal performance for Draw It or Lose It, we recommend utilizing an operating platform that employs advanced memory management techniques, such as virtual memory. These techniques ensure efficient allocation of memory and prioritize system resources for the software, which ultimately enhances its speed and reliability.

1. Distributed Systems and Networks:

In order to facilitate communication between different platforms, we recommend using A software structure that spans across multiple devices and computers based on a client-server model. This architecture will allow the software to run on different devices while maintaining a centralized server to handle communication and data management. For network connectivity, we recommend using a reliable and secure internet connection with redundant failover systems to prevent outages and ensure uninterrupted communication.

1. Security:

To ensure the safety of user information across multiple platforms, it is highly recommended to implement strong security measures such as encryption and Transport Layer Security (TLS) protocols. Both Windows and Linux have inherent security features such as firewalls and user authentication that can be customized to enhance user protection. Moreover, cloud-based storage solutions like AWS and Microsoft Azure offer advanced protection of user data, security measures such as access control and data encryption are implemented.