

<Name-of-Software-Application>

# **CS 230 Project Software Design Template**

Version 1.0

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| Version | Date | Author | Comments |
| --- | --- | --- | --- |
| 1.0 | 02/26/2024 | Ethan M Mills | Filled out for completion |

**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](#_heading=h.35nkun2)

The client presented us with their game Draw it or lose it which is currently available on Android and Android only. They are seeking to turn it into a multi platform web based game and want the application to be based off of the current Android version. The client is seeking out help in the set up of the environment and development. The clients requirements for the game are as follows: Ability to have one or more teams involved, each team will have multiple players assigned to it, game and team names must be unique to allow users to check whether a name is in use when choosing a team name, one one instance of the game can exist in memory at any given time, creating unique identifiers for each instance of game, team or player.

## Requirements

The clients requirements are as follows: Ability to have one or more teams involved, each team to be assigned multiple players, Only one instance of the game can exist at any given time. This can be accomplished by creating unique identifiers for each instance of a game, team, or player. The user also needs to have the ability to check if a name is in use when choosing a team name to allow users to have a unique team name on the user end and on the developer end allows for each game to be unique.

## [Design Constraints](#_heading=h.1ksv4uv)

Design constraints of the project will be as follows: Developing the application for a multi platform purpose. With this being the client's main need from us, we are going to need a team that has experience in the design of applications made for multi platform. The other constraints are going to be meeting the clients requirements for the application which are listed above.

## [System Architecture View](#_heading=h.44sinio)

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](#_heading=h.2jxsxqh)

The UMl diagram below showcases the following Classes: Entity Class which is the parent class of the Classes Game, Team and Players. The Game class is what contains the teams list, the Team Class is what contains the Players list and the Players class does not contain a list but it ensures that each player has a unique player id. With the Game, Team and Players classes being the child classes they inherit The parent class Entity’s attributes while at the same time utilizing their own attributes given to them which are separate from the Entity’s parent class. Now I will explain the function of the Game Service Class, the game service class is utilized to ensure that the applications requirements are met providing that single game instance at a time, a unique team name, a unique game name along with a unique player name, all of which are the requirements set by the client for their application. Next is the Program Driver, the program driver is what contains the main statement and also uses the Singleton Tester Class.

**"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](#_heading=h.z337ya)

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** | Advantage is the ease of use of MacOS for the users.  MacOS also has the ability to run apps from linux and windows operating systems.  Disadvantage that comes with MacOS is the cost and the limitation the hardware has compared to the other operating systems. | Advantages of using linux are that linux provides an open source along with free or fairly cheap options.  Linux is also known for its ease of customization along with the versatility in servers.  Linuxs security protocols are superior to that of Mac and windows.  Disadvantages are the limited choice you have when purchasing pre built machines that operate on linux along with file format and compatibility problems | advantages of Windows are that it offers a friendly graphical user interface that allows users to easily navigate  Windows  disadvantage is that it lacks the mobility aspect as compared to linux or especially macos.  Windows is also lacking in the security department when compared to linux and macos. | advantages of mobile devices are they offer low cost applications that allow for web service applications.  Disadvantages are the security aspect to mobile devices because they are cloud bases that can leave the door open to security risks for companies. |
| **Server Side Project 2** | OS X server is available for MacOS  OS x Servers costs up to 499 USD | The most popular web hosting OS due to is being open sourced.  Licenses cost are cheaper than the other operating systems  Usually chosen by bigger companies over windows. | License cost per user  License cost is higher when compared to Linux | Muli user server not available  Hardware options are limited |
| **Client Side** | Advantages for the client side for MacOS are the ease of use for MacOS.  Disadvantages are that MacOS capabilities are only accessible on a MacOS device. | Advantages for the client side for linux are the affordability offered from linux products.  Since linux is free and open sourced it has been said they are easier to maintain and less maintenance time. | There are many different options for what version of the operating system you want for windows allowing for many options based on personal preferences.  The technical and security support available for windows users when compared to the other operating systems is superior.  Disadvantages to using windows are the applications and the want of tools for developing features are far greater than the other operating systems. | Advantages for mobile devices are there are many applications and tools available but most of the time you cannot get the full capabilities of those applications compared to when you are on a Pc operating system.  Usually mobile devices lean towards one operating system which makes applications unusable by other operating systems. |
| **Client Side Project 2** | MacOS usage when compared to Windows is significantly less leading to less market opportunity.  Swift and OC are less used languages might cause problems when searching for developers | Languages like Java, c, C++ and python are commonly used providing various options for developers  Linux offers multi user support | Windows also has commonly used languages like C# and .net which would allow for finding developers easy like linux  Windows also supports multi user support  The most common OS used | IOS utilizes swift which means IOS has some of the same requirements as Mac.  No multi user support  SDK is java based |
| **Development Tools** | MacOs uses Swift.  A tool called xcode and xcode cloud available for Mac and IOS developers.  xcode cloud is a service made for apple developers that allow for a faster way to build test and release apps. | Linux offers many options for development tools for the user to utilize | Windows is known for using IDE applications like Visual Studio which I personally love when compared to other development applications like eclipse that are old and hard to navigate. | Majority of applications for mobile devices are in Java. But does offer the use of other languages and the use of many IDE applications |
| **Development tools Project 2** | Utilizes Swift and OC  Xcode is most common for MacOS  Xcode cost is 99 per year per user | utilizes C,C++, Java and python  Most of those languages IDE clients are free and very new. (VS Code is my favorite) | Utilizes C# and .net  VS studio offers many tools  visual studio can cost up to 250 a year per user | Utilized Java in Android Studio which is free |

## Recommendations

**Project 3 submission**

06/23/2024

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 would recommend Windows as the operating system for the project. With windows being the primary os that users use this will give us the ability to take on developers easier because the majority of developers use windows.
   1. Windows has the ability to integrate with the current android build
   2. Ability to use Cordova and Xamarin for the multi platform design the client wants.
   3. Microsoft offers many products for development that are easy to work with when designing.
   4. Many options for Command prompt and testing
   5. Is the most common platform used by developers
2. **Operating Systems Architectures**: I would recommend using a hybrid systems architecture. For example Microsoft Windows NT Kemal. With this being a layered approach, it is easy to manage, less layers, improved security and allows for more customization based on the clients wants and needs.
3. **Storage Management**: For this project I recommend Microsoft Azure. From the pricing to the outstanding customer support and consistent updates I believe that this is our best choice.
   1. Used Docket Containers and utilizes cloud storage.
   2. Offers many scaling options which are easy to deploy.
   3. Offers 1.6GB of storage per user
   4. Offers File share
4. **Memory Management**: The Windows kernel-mode memory manager component manages physical memory for the operating system. This memory is primarily in the form of random access memory (RAM).The memory manager manages memory by performing the following major tasks. Managing the allocation and deallocation of memory virtually and dynamically. Supporting the concepts of memory-mapped files, shared memory, and copy-on-write. When using windows there are a plethora of storage and memory management options. For example Azure storage, this Operating system offers both virtual and physical space for memory allocation. Other examples are OneDrive or Visual studio.
5. **Distributed Systems and Networks**: I think utilizing Azure cloud storage will best benefit us and the project because of the ease of access when working distributed networks and Systems.
   1. Offers maximum uptime
   2. App insite logging
   3. Monitoring Services

1. **Security**: Using a security service provider that offers security for all platforms is a must given that the client wants a multi platform application. So using a security service provider like Aura could be of use. When it comes to security you get what you pay for. If you want good security for your applications and for the protection of your customers, paying a little extra if needed should not be a question. Aura offers protection for all platforms along with its customer support based in the United States.
   1. Allows limitations that can be set per user
   2. Ability to use a vpn for better security
   3. Encryption options

Citations

*Database security best practices and solutions: Microsoft Azure*. Database Security Best Practices and Solutions | Microsoft Azure. (n.d.). <https://azure.microsoft.com/en-us/resources/cloud-computing-dictionary/what-is-database-security/?ef_id=037eecb058b31669a99b888c6d034e7a%3AG%3As&OCID=AIDcmme9zx2qiz_SEM_037eecb058b31669a99b888c6d034e7a%3AG%3As>

Jha, S. (2023a, June 1). *What is Microsoft Azure and how does it work [updated]: Simplilearn*. Simplilearn.com. <https://www.simplilearn.com/tutorials/azure-tutorial/what-is-azure#:~:text=Azure%20is%20a%20cloud%20computing%20platform%20and,and%20transforming%20it%2C%20depending%20on%20your%20requirements>.

**Server Side**: The client has asked you to create a web-based application. This implies a server-style configuration for hosting the website and allowing it to scale up to thousands of players. What does this mean for your ability to host the software application on each operating platform listed above?

* + Evaluate various platforms for their characteristics, advantages, and weaknesses for hosting a web-based software application. Consider the following in your evaluation and articulate your findings in the software design template:
    - Does each of the operating platforms offer a server-based deployment method where the website will be hosted?
    - What are the potential licensing costs to the client, The Gaming Room, for the server operating system?
      * depending on development team size it could cost upwards of 500 dollars per license. ``
* **Client Side**: The client wishes to move beyond their current Android-only application to supporting players on iOS and Android mobile platforms, as well as traditional desktop-based operating systems. The application must be delivered as a modern, responsive HTML interface running inside the web browser for desktop clients (Linux, Mac, Windows), as well as on mobile platforms. Each will be capable of communicating with the back-end web application running on the server.
  + Determine the software development considerations (cost, time, expertise) that are necessary for supporting multiple types of clients. Consider the following in your evaluation and articulate your findings in the software design template:
    - What is required of the application development process to ensure the application is compatible with all web browser platforms and mobile devices?
      * User agent detection to be able to detect what kind of user and what type of device they are on.
* **Development Tools**
  + Identify the relevant programming languages and tools (IDEs and other tools) that are used to build this type of software for deploying on each operating platform. Consider the following and articulate your findings in the software design template:
    - What impact do these technical requirements have on a development team? Consider whether multiple development teams may be needed.
      * using a language that is compatible with all OS and along with the language being commonly used to help mitigate problems finding developers.
    - Are there licensing costs related to the development tools?
      * yeah all OS costs for development tools vary and have their pros and cons when compared to each other.