

Creative Technology Solutions: 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 | 01/25/2024 | Daniel Schween | Refactor Project\_1\_Milestone to incorporate the game “Draw It or Lose It” Where teams of players compete to guess the rendered drawing. Including a Brand-new Entity class will help achieve the new software requirements from CTS. Requirements and constraints are updated to optimize game development. |

**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)

Creative Technology Solutions wants to develop a fully functional, web-based multi-player version of their game called “Draw It or Lose It”. The game will be able to host multiple teams, allow multiple players per team, and must check whether a team/player name is in use allowing unique names only. Only one instance of the game can exist in memory at any given time.

## Requirements

* Game is web-based, requiring software and language to be compatible with all web browsers and operating systems.
* One or more teams will participate in the game.
* Each team will have multiple players assigned to them.
* Team and player names must be unique, no duplicates.
* Only one instance of game can exist in memory.

## [Design Constraints](#_2et92p0)

* For the game to be fully functional in any web-based browser, the game must be written in a specifically capable language, such as Python or Java.
* The script must include additional class and objects as well as specific design patterns to allow multiple teams with multiple players.
* Singleton Pattern must be implemented in code to check team and player names for uniqueness.
* Only one instance of the game can exist in memory, so Instantiation must be implemented by creating a unique id for each game, team, or player. Must include iterator patterns to check for uniqueness.

## [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 superclass is created to hold common information and operations. One instance is created to be shared by multiple classes. The inheritance relationship between Game, Team, and Player classes and the Entity superclass allows for common attributes to be shared and only be written once.

The gameService file refers to the Game class while the Game class extends to the Team class and the Team Class Extends to the Player class. The ProgramDriver contains the necessary utilities to execute the program as a whole and extends to the SingletonTester class. The SingletonTester class is used to meet the project requirements such as hosting multiple teams or players, uniqueness, and one game allowed at a time.

**"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** | -MacOS is only available for Apple/Macintosh devices and comes with a built-in GUI for an exclusive interface. Apple uses Mac OS X for its unique, high-quality server.  - Apple makes both its hardware and software. This limits configuration to Apple’s desire; however, the license to use the server is only 20 dollars, which is very obtainable. Apple’s licensing forbids mac OS X from being used anywhere else than on a Mac.  - To run the server the programmer must be familiar with Apple | - Linux is a completely free, open-source OS. Anyone is free to download the primary server called Ubuntu developed by Canonical.  - Programmers have modified and made many improvements to Linux OS all thanks to the reliable, free, and easy to use server. The Ubuntu server can support 4 types of web hosting: Shared, VPS, Dedicated, and cloud.  - Not all programmers are familiar with Linux, so an expert may be required to run the server | - Microsoft’s Windows is the most popular OS and its GUI makes it accessible to the general public, often preloaded to devices.  - The server it uses is called “Windows Server”, and the latest release was in 2022. There are 3 editions of the server based on the clients’ needs. Since The Gaming Room wants to host thousands of players the standard edition will work and costs 1069 dollars.  - Windows is the most popular OS and many players and/or programmers will use the platform, so the price can be justified. | -Mobile devices servers are inherently user-friendly, and easy to use. A mobile web server is software on a smartphone that connects to a gateway application that runs on an external computer with a connector application. This connection enables the mobile device to run applications.  - The most used HTTP servers are Jetty, Tomcat, Glassfish and Resin.  -Android web server applications are based on an open-source Linux OS and Apple applications are closed-source, pre-approved, and can be found in The App Store. |
| **Client Side** | -Cost for Mac is comparable to Windows, but it is not open-source.  -It may take a bit more time and money in comparison to Windows or Linux to work in a closed-source environment.  - An experienced Apple developer is required to keep cost comparable. | - Lower cost since Linux is open-source and free, open-source OS, but challenging to program.  - A high level of expertise in Linux is crucial to save time. Without an expert, it will take the developers more time and money. | -Cost would be comparable, if not cheaper than Mac or Linux  -Embedded as the default OS worldwide, development would require the least amount of time and expertise.  - Generally, developers would be most familiar with Windows. | - In comparison, the lowest cost due to the OS simplicity and approachable interface.  - Time is dependent on a developer’s experience with mobile platforms.  - A high level of expertise would save cost and time but isn’t necessary. - A novice programmer would still be able to complete the job because there is a lot of software and applications already established for both android and Apple.  - However, a programmer with experience in Apple would save some time and money |
| **Development Tools** | One popular language is Objective-C which is built on the principles of C language. Using this foundation, Objective-C builds upon creating a unique OOP language.  Cocoa API or Swift is used in conjunction to develop applications.  There are multiple IDEs that can be used, such as Atom. | Linux accepts many languages, but the challenge is selecting the right one for the job. Python is a top choice, but C, C++, Java, and JavaScript can also be used. Eclipse and Atom are commonly used IDEs. | Windows is built on the foundation of C languages. C++ is the best option to develop the game. Visual Studios is a great IDE to support the OOP code. Eclipse can also be used as an IDE. | Swift or Objective-C are the top languages for iOS applications. JavaScript or Java would be the ideal choice for Android applications. Eclipse as the IDE. |

## 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 would recommend the Windows OS if The Gaming Room were looking to expand its business and reach the largest possible audience. Costs would be affordable, and programmers can easily develop and maintain the game “Draw It or Lose it”. Windows OS being an open-source environment will lead to more collaborators, adverts, and potential to grow.
2. **Operating Systems Architectures**: Windows OS is an open-source environment, and the supporting Graphical User Interface (GUI) provides an approachable and simplistic platform for developers. Windows OS offers a wide range of supporting platforms and configurations. The public GUI is perfect for The Gaming Room for its graphics and web services. Additionally, Windows OS is based off the C and C++ languages, which is dependable and tested. Visual Studios is a great IDE to support the language.
3. **Storage Management**: Windows OS Manages storage directly to the hard drive. This is easy to use and manage through file explorer. Storage is easy to access and edit. The library of drawings from The Gaming Room can be updated and expanded to keep players interested.
4. **Memory Management**: Memory Management on Windows is typically stored by the Random Access Memory (RAM). RAM capacity defines how many tasks can be handled simultaneously, and the more RAM available, the faster a program can execute instructions. The Gaming Room can store a library of drawings available to “Draw It or Lose It” players on the hard drive, and the RAM can access drawings on demand.
5. **Distributed Systems and Networks**: Rather than a single computer or server handling all the processes and functionality of the game, distributed systems break down the components of the game. The client’s computer handles the user interface and sends the inputs to a collection of servers. One server can handle the database of drawings, while another server collects the information of teams and players. A different server can track the score or render the different drawings in the 30 seconds the clients must guess the drawing. Having more than one server improves performance and simplifies development. Also, if one node in the server fails it won’t necessarily disable the entire system.
6. **Security**: Now-a-days, Windows comes with built in virus protection. If that isn’t enough, Windows supports a wide variety of third-party security software. In order to breach the OS or internal applications, one would have to be an expert in cyber security and even then, Windows will be able to detect a breach and handle it accordingly.