

Game Design Document

Fantasy dARts

Games For Love

Revision 2.0.0
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Table of Contents

Use for linking to specific documentation (refresh after editing)

[Overview](#)

[Game Description](#)

[Project Scope](#)

[Story Point Estimate System](#)

[Target Platform/Audience](#)

[Core Gameplay Mechanics \(Brief\)](#)

[Influences](#)

[Gameplay Design \(501\)](#)

[Goals](#)

[Game Board](#)

[Rules](#)

[Examples](#)

[Controls](#)

[Skillz Integration](#)

[Synchronous Matches](#)

[Asynchronous Matches](#)

[Analytics](#)

[Visual and Audio Style](#)

[Environment 1 - Tavern](#)

[Environment 2 - Outdoors](#)

[Environment 3 - Castle Throne Room](#)

[Visuals](#)

[AR Mode Visuals](#)

[Music](#)

[SFX](#)

[User Interface](#)

[Intro Page](#)

[Main Menu](#)

[Game Mode Select](#)

[Customize](#)

[Options](#)

[Credits](#)

[In-Game](#)

3rd-Party Assets Needed

Art

Models

Audio

Animation

Code

Milestones

Official Start Date

Design Phase

Milestone 1a - Prototype

Milestone 2a - Vertical Slice

Milestone 3a - Final Build

Submit to Apple

Milestone 1b - Prototype

Milestone 2b - Vertical Slice

Milestone 3b - Final Build

Release Update 2.0

1. Overview

1.1. Game Description

- 1.2. A darts game on mobile devices with two modes of play.
- 1.3. The first mode utilizes AR technology to pin a board on the wall of their real time environment. The user must print out a QR code supplied by the game. (Look into AR tech that locks onto a particular piece of furniture. See this link: <https://library.vuforia.com/articles/Training/Image-Target-Guide>). Second, they must tape the paper with the QR code onto a wall. Alternatively, they can also read the QR code off a monitor, TV, or another mobile device. Our app will read the QR code and transplant a 3D image of the game board. The player must stand a certain distance and angle away from the board to play.
- 1.4. The second mode is a virtual 3D environment. The app will still read gyroscopic information from the phone to determine the rotation of the camera. However, the entire surrounding environment will be created using 3D models and the player will be a set distance away from the board.

1.5. Project Scope

- 1.6. MVP v1.0
 - 1.6.1. The game will feature 2 game types, “301” & “101”.
 - 1.6.2. Local player vs player (1 phone will be shared between players).
 - 1.6.3. Integrate Skillz for async 1-vs-1 matches.
 - 1.6.4. Create a playable virtual mode.
 - 1.6.5. 1 main menu song and 1-2 in-game songs.
- 1.7. MVP v2.0
 - 1.7.1. Skillz synchronous matches. Online players wait turns and compete in all game modes in virtual mode.
 - 1.7.2. Create a playable AR mode.
 - 1.7.3. Added game types of Cricket, Around the World, and free mode.
 - 1.7.4. 2-3 more in-game songs.
 - 1.7.5. Options Menu
 - 1.7.6. Polish UI
 - 1.7.7. Android release
 - 1.7.8. Integrate Skillz for analytics.
 - 1.7.9. Customizable board and dart (selecting between presets).
 - 1.7.10. Customizable environment
- 1.8. MVP v3.0
 - 1.8.1. Develop new game type or create a twist on an old classic by making strong use of the AR technology. For example, having bullseyes move around the world that the player has to hit.

- 1.8.2. AI opponent.
- 1.8.3. Online players can use AR mode.
- 1.8.4. In-game tutorial

1.9. Story Point Estimate System

- 1.10. The “Story Point Estimate” integer given to each task is the amount of hours a developer is expected to work on that task until completion.
- 1.11. For example, a task with a story point estimate of 2 would take about 2 hours to finish.
- 1.12. A singular task shouldn’t take less time than an hour and shouldn’t take longer than a week. Break tasks up if it takes that long.

1.13. Target Platform/Audience

- 1.14. IOS and Android mobile platforms.
- 1.15. Ages 18+
- 1.16. Casual market.

1.17. Core Gameplay Mechanics (Brief)

- 1.18. To throw a dart, the player must touch the dart at the bottom of the screen and flick upwards, towards the direction of the board. The game will calculate the velocity and direction of the dart from that flick.
- 1.19. Once released, the dart will enter a physical state and fly towards the board.
- 1.20. Once the dart makes contact with the board, the game will determine where it has landed, making the appropriate changes to the score.

1.21. Influences

- 1.21.1. Dart AR:
https://play.google.com/store/apps/details?id=com.hd.dartar&hl=en_US
- 1.21.2. Darts Game Online:
<https://www.memory-improvement-tips.com/darts-game-online.html>
- 1.21.3. Strike! eSports Bowling:
<https://apps.apple.com/us/app/strike-esports-bowling/id797092883>

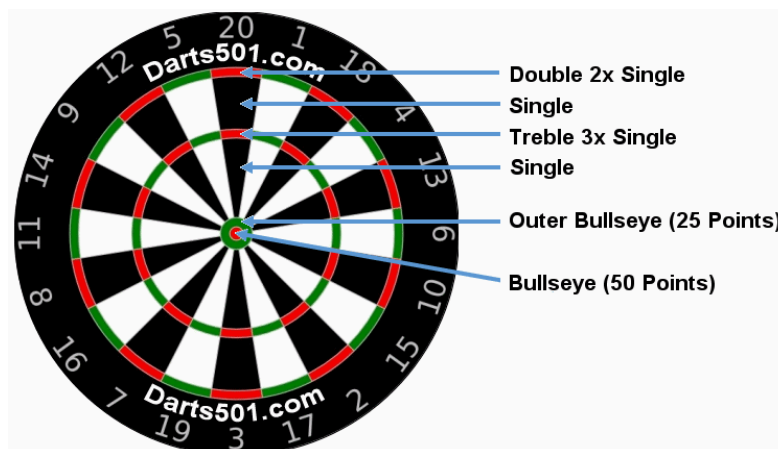
2. Gameplay Design (501)

2.1. Goals

- 2.2. The first player to reduce their score to 0 without busting wins.

2.3. Game Board

- 2.4. The Bullseye gets you 50 points and also counts as a 'double'.
- 2.5. The outer area of the Bullseye gets you 25 points.
- 2.6. The outer ring is worth double the points of the segment number (listed in outermost ring)
- 2.7. The inner ring is a treble and is worth triple points of the segment number.
- 2.8. The black and white segments are singles, and are worth the amount of the segment they're in.



2.9. Rules

- 2.10. Each player throws a dart to decide the playing order. The nearest to the bullseye goes first while the furthest to it goes last.
- 2.11. Each player starts with a score of 501 and takes turns throwing three darts. However, you have a choice to throw one or two darts as well. For example, if you end up with a score of 20 then you have an opportunity to throw a single double 20 to end the game.
- 2.12. The score from the three darts is subtracted from the total score.
- 2.13. The objective is to be the first player to reduce the score to exactly 0. The only caveat being that the last dart thrown must land in a double or bullseye.
- 2.14. If a player reduces the score to 1 or goes below 0, the score is bust. That turn ends immediately and the score is returned to what it was at the start of that turn.

- 2.15. If after playing 20 turns none of the players have managed to reach the zero score then the person with the lowest score will be declared the winner. The purpose of this rule is to prevent the game from dragging on too long.

2.16. Examples

- 2.17. If a player has 32 to go out and the first dart is a 16, the second is a 15, the player is bust and the score is returned to 32. So on the last turn, it is not necessary to throw all 3 darts - a player can win with the first or second dart of the turn.
- 2.18. Example 1 (Win): Doug knocks down his original 501 points to 31. To win the game, his last dart - the one that brings his total down to zero - must land in the Doubles ring or bullseye. Since there is no double that totals 31, he must first lower the 31 to a doubled number. As an expert dart player, Doug is able to throw a 7, which knocks down his total to 24; he then throws a dart into the Doubles ring of the 12 section. Since $12 \times 2 = 24$, and Doug has 24 points remaining, he wins the game.
- 2.19. Example 2 (Fail): As in Example 1, Doug has knocked down his point total to 31. He then throws a 17 which lowers his points to 14. He could actually win by throwing a Double 7. But his throw is off the mark and he hits the 16. What happens now? His points reset to the the total he had at the beginning of the round. In other words, his total goes back to 31. He can try again the next round to get to zero. But no matter what happens, to WIN his final throw has to be on the Double ring or bullseye and bring his total down to zero.

2.20. Controls

- 2.21. Touch and gyroscopic controls only.
- 2.22. Touching, holding, and moving your finger across the dart will slightly adjust the position of the 3D dart model. If you let go during this state (without flicking), the position will interpolate back to its default position.
- 2.23. Touching and flicking the dart will launch it from your hand towards the direction of the flick.

3. Skillz Integration

3.1. Synchronous Matches

- 3.2. Player 1 (randomly chosen) shoots darts while player 2 waits (a waiting screen appears for that player).

- 3.3. When player 1 is done, the turn shifts to player 2. Player 2 shoots darts while player 1 waits.
- 3.4. This loops until a player has met the game mode's conditions for a win or loss.
- 3.5. The game is over and the winner is announced in a menu. Then the Skillz interface pops up and announces your winnings/losses.

3.6. Asynchronous Matches

- 3.7. Player 1 and player 2 compete in a race to finish the win condition for the given game mode.
- 3.8. The first player to reach that goal is declared the winner.

3.9. Analytics

- 3.10. Every analytic below will be in these categories: Local, AI, sync, and async.
- 3.11. Win/loss ratio
- 3.12. Accuracy
 - 3.12.1. Not just accuracy of hitting the board, but accuracy across all points on the board.
- 3.13. Average velocity

4. Visual and Audio Style

4.1. Environment 1 - Tavern

- 4.2. Tavern (completed)



4.3. Environment 2 - Outdoors

- 4.4. Outdoors area with a mobile camp.
- 4.5. Dart board is placed on a tree beside the camp.
- 4.6. Small camp fire sparkling nearby.
- 4.7. Surrounding area comprised mostly of open fields and a small group of trees/shrubbery.





4.8. Environment 3 - Castle Throne Room

- 4.9. Castle throne room
- 4.10. Player is positioned 180 degrees away from the throne (as if the king is watching them play).

- 4.11. Dart board is held by chain from the ceiling.
4.12. Pillars adorn the sides of the room.





4.13. Visuals

- 4.14. Blizzard-like visual style.
- 4.15. Focus on fantasy and medieval architecture





4.16. AR Mode Visuals

- 4.17. Only need 3 models: dart, dart board, and chalkboard (used for score keeping).
- 4.18. Each of these elements will adhere to the style of a high-fantasy/elven environment.

4.19. Music

- 4.20. Music will primarily be in a lounge/Bossa Nova style. Also include a bit of fantasy/video-game flair as well.
- 4.21. Very low-key, and should blend way back in the background/SFX.
- 4.22. Light instrumentation; only 3-4 instruments at one time.
- 4.23. References:

<https://youtu.be/H281SM3AIY8?t=2010>

<https://youtu.be/H281SM3AIY8?t=2509>

<https://www.youtube.com/watch?v=U3nQeHzqoxM>

4.24. SFX

- 4.25. SFX should be crisp, focusing on high-frequency sounds. A bit of magic and whimsy.
- 4.26. Throwing and handling darts should sound soft, yet precise.
- 4.27. Environmental sounds should emulate a late-night tavern.

5. User Interface

5.1. Intro Page

- 5.2. Simple and clean. Just a “Start” button in the center.
- 5.3. Camera pans around virtual environment slowly.
- 5.4. Main menu music is playing.

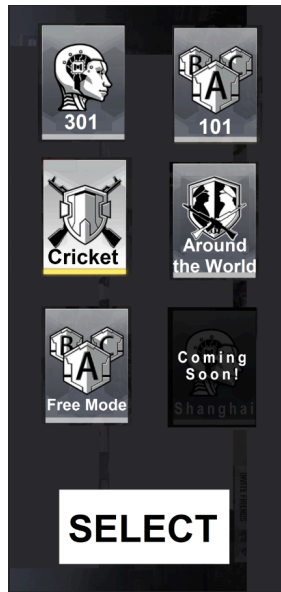
5.5. Main Menu



- 5.6. The default game mode is “301”.
- 5.7. Pressing the “i” button directs to the Credits page.
- 5.8. Pressing the “X” button will go back to the intro page.
- 5.9. The intro page includes a basic logo and a play button (leading to the above menu). The camera slowly pans around the virtual environment (tavern).
- 5.10. A AR/virtual switch will appear on the game type select screen across all MVPs.

6. Game Mode Select

- 7. Upon entering the menu, the game mode already selected (by default 301) is highlighted.
- 8. Users must press on the game mode of choice and then press “Select” to return back to the main menu.



8.1. Customize

8.2. Environment

8.2.1. Combo box with the names of “Tavern”, “Outdoors”, “Castle”.

8.3. Board

8.3.1. Combo box with different variations of models.

8.4. Dart

8.4.1. Combo box with different variations of models.

8.5. Dart Color

8.5.1. Color picker for base dart component.

8.6. Options

8.7. Quality options (low, medium, high)

8.8. Music volume

8.9. SFX volume

8.10. Environmental SFX volume

8.11. Credits

8.12. List of individual’s names and their roles in the project in text.

8.13. In-Game

- 8.14. Informs the player of how to set up the AR with their phone. Gives choice of either printing a QR code to hang on their wall, or picking a piece of furniture to “mark”.
- 8.15. Once marked, the tutorial instructs the player to stand a certain distance and angle away from the board.
- 8.16. Once done, the game now begins and the game UI appears.
- 8.17. The menu button appears at the top left.
- 8.18. The rules button appears at the top right.
- 8.19. The player’s scores and remaining darts are attached to a 3D model hanging beside the board. The model is a chalkboard hanging from the ceiling by a rope or chain.
- 8.20. Whenever you throw a dart and it lands/misses, bright text will appear at the top of the screen signaling the amount of points lost.
- 8.21. When you throw 3 darts, text appears at the top of the screen signalling the next player’s turn is up.
- 8.22. When a player busts, foreboding text appears signaling a bust.
- 8.23. When a player wins, hold for 3 seconds to show who text at the top of the screen who won. After that duration, show a menu with options to replay or go back to menu.

9. 3rd-Party Assets Needed

9.1. Art

9.2.

9.3. Models

9.4.

9.5. Audio

9.6.

9.7. Animation

9.8.

9.9. Code

9.10. Possible AR SDK's

9.10.1. Vuforia

9.10.1.1. Free, supports both Android and IOS.

9.10.2. ARCore

9.10.2.1. By Google. Free and compatible with Android and IOS.

9.10.3. AR Foundation (with ARCore and ARKit plugins)

9.10.3.1. Free. Compatible with Android and IOS with plugins

9.10.4. ARKit 3

9.10.4.1. By Apple. Needs Apple Developer account (I have one), but only compatible with IOS

9.11. Skillz SDK

10. Milestones

10.1. Official Start Date

10.2. 11/20/2019

10.3. Design Phase

10.4. 11/20/2019 - 11/25/2019

10.5. Milestone 1a - Prototype

10.6. 11/22/2019 - 12/03/2019

10.7. Milestone 2a - Vertical Slice

10.8. 12/04/2019 - 12/12/2019

10.9. Milestone 3a - Final Build

10.10. 12/11/2019 - 12/21/2019

10.11. Submit to Apple

10.12. 12/22/2019 - 12/31/2019

10.13. Milestone 1b - Prototype

10.14. 01/06/2020 - 01/12/2020

10.15. Milestone 2b - Vertical Slice

10.16. 01/12/2020 - 01/23/2020

10.17. Milestone 3b - Final Build

10.18. 01/24/2020 - 01/28/2020

10.19. Release Update 2.0

10.20. 01/29/2020 - 02/31/2020