



Whale Song Park

Arcade Cabinet Game Specification Document

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Overview

An arcade cabinet is being developed for installation at Whale Song Park (WSP), a digital play park at Dundee's waterfront place, positioned next to V&A Dundee. The arcade cabinet is made up for four screens which create a monolithic cube of screens that facilitate 360-degree play around the arcade. The arcade cabinet will host a series of fun mini games that can be played by 1-4 players. The games will allow players to play alone on their individual screens and together across all four screens in a collaborative play experience. The mini games will be short, fun and engaging. Each will have simple inputs and UI to teach the player how to play quickly and the gameplay experience will be fast paced. The games will make use of visual and aural feedback throughout, but audio must also be sensitive to the other interactive elements within the park (particularly interactive audio installation).

Due to the public nature of the installation, game must be flexible, supporting any number of players between 1 and 4. It must also support players joining or leaving the game during active play and will require an appealing idle state that invites interaction whilst also complementing the overall aesthetics of the park.

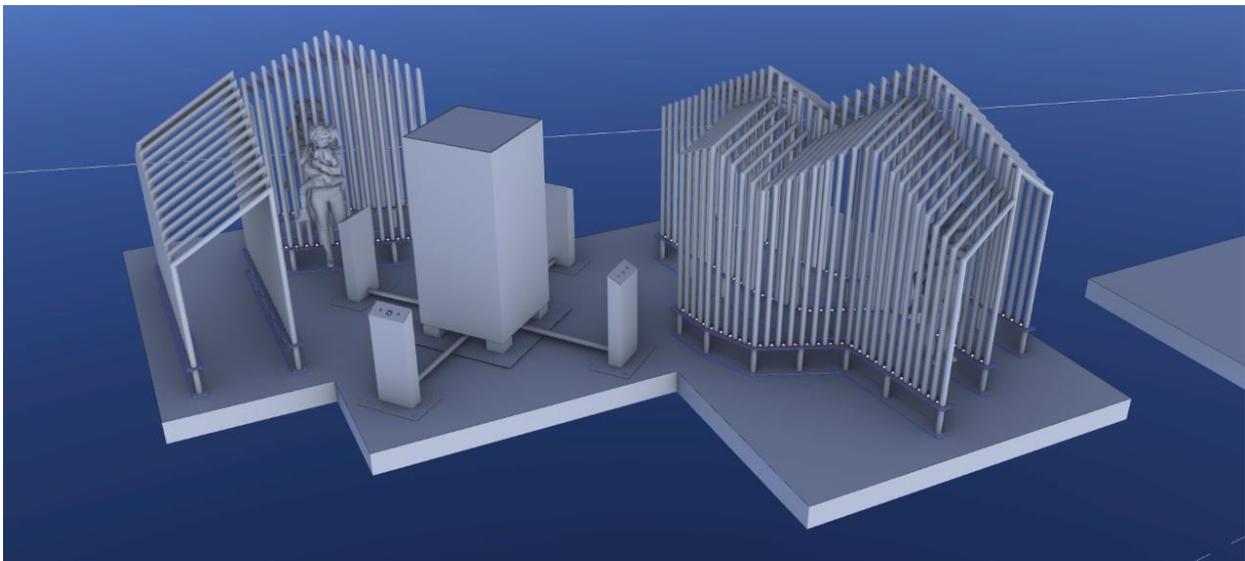


Figure 1: a mock-up of the monolith play space with surrounding play structures. The screen is signified by the box with four plinths coming from it. Each plinth will hold the input roller ball and push buttons for each player. Please note that the cabling for the plinths will be underground. (Image courtesy of Lee Simmons)

Technical Specification

The arcade will have four (2m high X 1m wide) screens arranged to make a four-sided play space. Before each screen is a podium consisting of a roller ball input and two push buttons (four podiums in total). Players will be able to interact through the roller ball (e.g., mouse pointer input) and through the two push buttons (toggle switches). The screens will display a widescreen game space, split into four (one space for each screen). The screens operate on 2.5mm pixel pitch. The game space screen ratio will be 2:1. The pixel pitch of the screens requires that the visual style will be somewhat abstracted, making use of bold shapes which can be read well by players at a lower resolution than a typical video game. The resolution of the total screen is 1600 X 800 and 400 X 800 for each player screen.



Figure 2: A mock-up of the widescreen game space with four zones (white, purple, yellow and green) one for each of the four players. Each play zone will display on one of the four screens and gameplay will loop around (at times) across all screens. At the edges, play will move seamlessly from the white to the green play zone. Please note, the graphic style is placeholder.

The game will be created in Unity/Unreal engine. The buttons will be hooked up to an interface to allow the game engine to read on/off presses from the button inputs and screen co-ordinates from the rollerball input. The game system will react to inputs and provide visual and aural feedback to the players. The game build will be created for Windows PC. The PC running the game will be located 20-25m away from the game installation. Testing is taking place to determine potential lag in input device/screen feedback during gameplay.

The push buttons are vandal proof piezo buttons. The roller ball is a standard outdoor input device which is also weatherproof and vandal proof. The exact specifications will be confirmed ASAP. The game will react to 4 mouse pointer and 8 button inputs. The mouse pointers should be limited within the game so that each player is not able to leave the extremities of their individual screen space (400 X 800). Each of the sets of two buttons should be allocated to a particular player.

Audio will be delivered via a system in the bottom of the cabinet. The interactive audio for the park is being driven by QLab on a Mac Mini. The sound for the game can be independent from this, but it would be preferable to integrate the sound design of the game into the larger installation.

Audience

The arcade cabinet is located in a digital play park in a prime location on Dundee's waterfront, next to V&A Dundee. The site is regularly frequented by families, cyclists, professionals commuting or taking lunch/coffee breaks, skaters of all ages and teenagers. As the location attracts a diverse range of visitors, the target audience is broad, however, the games should be accessible.

As Whale Song Park is being pitched as a digital playpark, we are targeting families in particular, with children aged between 5-15. The mini-games concepts we have devised aim to be easy to learn and grasp to help to enhance accessibility to younger players, whilst the competitive, collaborative and unique aspects of the technology (and the play it enables) should enhance appeal to players between 10-15.

Market/Inspiration

The cabinet draws from the traditions of the arcade and from large scale installations in art and public settings. As the game is a public installation, in-depth market analysis is not necessary, however, below, some useful references and inspirations are listed for information.

The gameplay planned is inspired by the frantic, easy to understand and engage with gameplay of *Wario Ware* (2003). The games within Whale Song Park, however, will mix competitive and collaborative gameplay to promote positive social interaction between players. The scale of the installation and impact upon the player is inspired by Chris Milk's installation *The Treachery of Sanctuary* (2013) but makes use of input devices more suited to outdoor installation. *Electroplankton* (2005) and *Flow* (2006) also influence the potential theming and visual style of the game.

Game High Concept

The arcade game invites players to try out a range of fun frantic mini games themed around the setting of Whale Song Park. 1-4 players will be able to play at a time, being challenged to complete very simple tasks in a short period of time. Fun comes from the frantic nature of the play, the convivial nature of the tasks to be performed and the social nature of the play space. Players will also be able to extend their play experience, with players who are good at the game winning more play time to continue their play session. The play experience is co-operative, with all players completing either individual or group tasks in order to win play time to keep on playing. The average play session will be between 5 and 10 minutes per play group.

Arcade Game Requirements

The game on the arcade cabinet will:

- Accommodate anywhere between 1 and 4 players at a time
- Allow players to jump in and drop out of play during a live game
- Reset itself to an idle state if no input is detected over time
- Have simple non-textual UI to enhance usability
- Make diverse use of input devices to create a range of play across the mini games
- Load a random selection of mini games (from a list) to vary each playthrough
- Record a team score over the course of gameplay and feed this back to players
- Allow players to identify their individual contribution to team score through feedback after each mini game
- The score will be time – players will begin with a set play time. In each mini game they win more time and can increase their play session length
- A play session will continue until players run out of time
- Games can be repeated in a play session, but difficulty should be ramped up in line with longer play times to increase the challenge for players

Basic Game Loop

- A player presses any button on any plinth to begin
- The game loads a minigame
- Short tutorial introduces gameplay to player
- Player plays game for set timeframe (between 10 and 45 seconds per game)
- At the end of each mini game, players are provided with feedback showing how much time they “scored” individually
- The individual time scores are added up to show total play time left for the ‘player team’
- A new mini game is presented. The game loop continues until the players run out of time.

Enabling Drop-in/out of players

Throughout play, the game checks for new players joining the game. If a player tries to join during a mini game, they will be shown a holding screen and will be able to join at the start of the next mini game.

If input is not read from a previously active plinth for over 10 seconds, a time out will be shown on that player’s screen. If no further input is detected after 10 seconds, the player is removed from the game. The screen will return to the idle state and play will continue for all other active players.

During live play, screens not being used by a player will invite new players to join, whilst also visually reacting to the play of the other players (celebration effects, time progress feedback, juicy features etc.)

Scoring and Difficulty

Time is won through player performance in each mini game. The amount of time available to win will differ from game to game. See mini game concepts below for more information.

As the player can win more time to play, the arcade will reuse mini games in the same play session. To ensure that mini games continue to be engaging when being reused, their difficulty will increase with every re-use and in relation to the length of the play session. If players have won a lot of time, and have had a lengthy play session for example, the difficulty will be much higher. Difficulty will be dynamically adjusted in one of two ways

1. A decrease in the play time per game
2. a decrease in the time that can be won by playing.

End Game State

At the end of the game, players are given the feedback of how many mini games they successfully completed. A “leaderboard” will be provided to help the players to contextualise their performance in relation to other players (drawing from the traditions of the arcade.)

The game will then reset to its idle/invitation state.

Idle/invitation State

When the game is not being played, it should return to an idle state. This will be an abstracted animation of bioluminescent creatures moving around in an ocean to complement the overall look and feel of the park. The idle state will have no sound and will instead link into the interactive audio installation in the larger park. The idle state should include a clear invitation to press a button, but without using text to enhance accessibility.

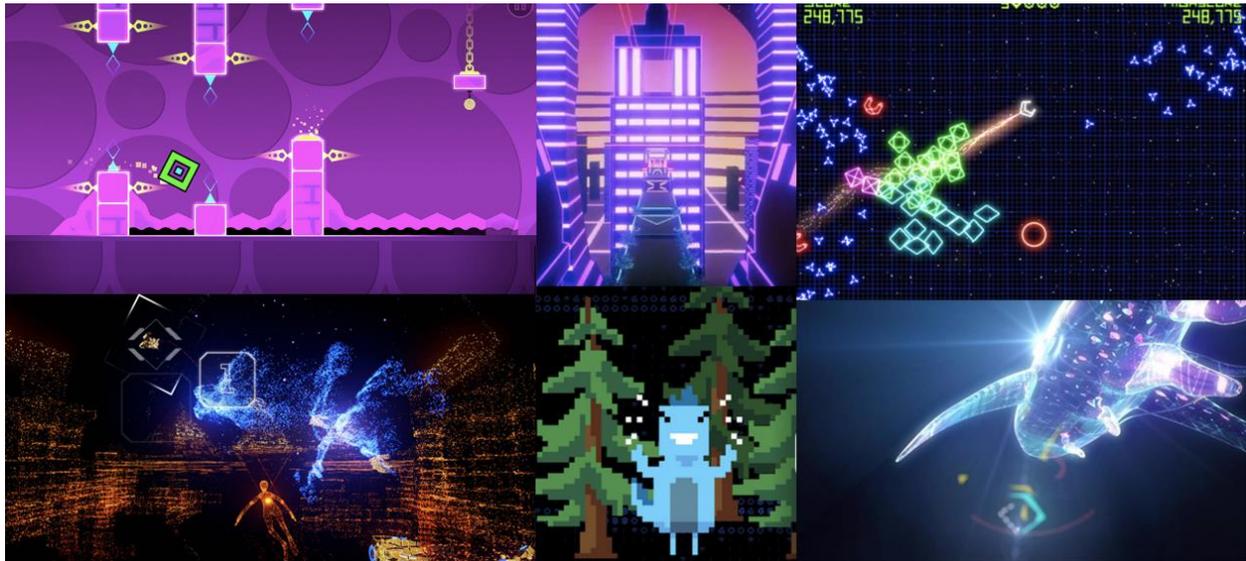
Audio

The audio of the game should be inspired by the arcade so a chip tune style approach may be appropriate. The sound should set the scene for the game in terms of gameplay music and should provide user feedback for interaction and achievement. The audio should also take into account the oceanic setting and may benefit from consideration of sounds of the sea, especially whale song.

Art Style

Due to the pixel pitch and resolution of the screen, bold geometric shapes are recommended, making use of bright colours and juicy effects. Thin lines will not read well so bold block colours, an abstracted style or pixel art may be both be visually appealing and effective in this setting. A test session with the

screens will be organised and hosted at Abertay to ensure the visuals are readable and appealing on the final screens. The visual style may benefit from drawing from the inspirational images below.



Accessibility

The arcade will make use of very little/no text and rely more upon clear iconography, tutorials with simple motion graphics to communicate gameplay requirements and intuitive UI.

Colour blindness should be taken into account when selecting colour palettes.

Mini Game Concepts

The arcade cabinet will be presented with 8 mini-games at launch. The mini games purposefully play on known game mechanics to help to enhance accessibility and the ability for players to pick up what they need to do in each game very quickly.

Mini games are focus on individual or social play. Individual play asks players to complete individual tasks and they are awarded time based upon their success. The outcome of individual play benefits the whole team as every player's score is combined at the end of each mini game to increase the overall play session time for the team as a whole.

Social play games on the other hand, are mini games where players interact with and affect the gameplay of the other players. These mini games can only be used if there are 2 or more players. They promote social interaction and communication between players whilst also making use of the unique technological set-up on the arcade.

Below the proposed games for inclusion in the launch of the game are outlined. The suggested timeframes and scoring for the games are for illustration purposes only, game balancing will be required during prototyping and playtesting of the game to ensure the games are fun, challenging and encourage frantic social play.

1. COLLECT:

The screen is filled with multi-coloured plankton. The Plankton drift across the four-screen play space, moving effortlessly from one player's screen to the next. To play the game, each player uses the roller ball to move their cursor over a plankton. The player uses one of the button inputs to collect the plankton. The plankton are colour coded and players can only collect their own colour of plankton. The game lasts 10-15 seconds.

- Scoring for first play: each plankton collected = 1 second more play time
- Scoring for second play: each plankton collected = 0.5 second play time

Play type: individual

2. MASH:

Each player will alternate between their two input buttons, pressing them sequentially as fast as they can, to help a whale on their screen to swim vertically up the screen from the bottom to the top. The faster the players press their buttons in order, the quicker the whale will swim vertically up the screen. The screen is divided into three parts vertically. Each division point signals a milestone and scoring for this mini game:

- Player passes the first milestone = 1 second more play time
- Player passes the second milestone = 2 seconds more play time
- Player passes the third milestone = 5 seconds more play time

Difficulty:

- On first play: game lasts 20 seconds
- On second play: game lasts 10 seconds (levels do not change)

Play type: individual

3. NET:

At the top of the screen there is a fishing boat, sailing on the waves with a net open in the ocean. The boat loops around all four screens endlessly. When the boat is on the player's screen their buttons do not do anything. When the boat is not on screen, players can press their two buttons to move the creatures in the ocean up and down the screen. Players have to try to position their creatures to evade the net of the fishing boat by guessing whether the net will encapsulate the top, middle or bottom of the ocean when it next comes on to the player's screen. One button will move the creatures up and the other will move them down.

Players will score points based on the % of creatures they are able to save in the play time. The game lasts 45 seconds.

- Scoring for first play: 25% = 1 second 50% = 2 seconds, 75% = 3 seconds, 100% = 5 seconds more play time.
- Scoring for second play: 25% = 0.5 second 50% = 1 seconds, 75% = 2 seconds, 100% = 3 seconds more play time.

Play type: individual

4. FIND:

Players use their cursor to find a specific object in a crowded scene in a given time frame. The object is shown to them at the top of the screen. When they find the object, they move their cursor over the object and press a button. The scene may be finding a constellation in a sky of stars or a particular object/fish in a sunken wreck. The game lasts 10 seconds. Each play through, players would need to find different objects.

- a. Scoring for first play: each object found = 3 seconds more play time
- b. Scoring for second play: each object found = 1 second more play time

Play type: individual

5. SWAP:

Each player is given a colour. That colour corresponds to their side of the four-sided screen. At any time during the whole game, SWAP can be called. The game then randomly assigns the player colour to another side of the screen. The game also gives the player a 'secret code' which they must remember. When SWAP is called, players must find their colour on one of the other screens by physically moving around the arcade cabinet. When they find their colour, they must enter their 'secret code' to complete the swap. This feature is much like the black hole feature in Space Team (2012) and does not affect scoring. The play time, however, does continue to count down during this game and time loss does not end until all players have entered their 'secret code.'

The secret code will be a series of three shapes/glyphs which they need to select from a menu of glyphs on the screen that they move to. They will select the glyphs using their mouse pointer and push button inputs.

Play type: individual & social play

6. PASS:

Each player must collect objects of a certain colour. Objects fall from the top of the screen (e.g., Tetris (1984)). Players can either collect the object or pass the object to the player on the left or

right. For every object collected, more play time is won. Passing objects of the right colour to other players helps the team to score more points.

The players will have three icons on screen: left arrow, right arrow and down arrow (which points to a “bank”). The object will fall from the top of the screen. Whilst the object is still falling, the player can move the roller ball over any of the icons and press their button to pass the object left/right or to bank it. If the object touches the ground without being passed, it is locked in place and will begin to obscure the play space. Each player’s screen space can accommodate 8 objects before becoming obscured and inoperable. If this occurs for any player, it is the end of this mini game.

When players pass an object to their co-player, it will be loaded in as the next object that falls for the co-player. Players score 1 second extra play time per banked object.

Difficulty:

- On first play: Play lasts 45 seconds or until one player has no play space left to accommodate objects.
- On second play: Play lasts 20 seconds or until one player has no play space left to accommodate objects.

Play type: Social play

7. TEAM MASH:

The screen has a series of interconnected pipes running across all four screens. The pipes will travel at diagonal angles twisted around themselves, crossing across all four players’ screens.

The players need to fill the pipes by increasing water pressure. To build water pressure, players must sequentially press one of the input buttons as quickly as they can. As they press the button, the pipe on their screen will begin to fill. When the first player has filled their pipe right up to the edge of the screen (to the left of right depending upon the layout of the pipes), the next player will take over filling the pipe as the water begins to appear in their screen. The next player will then have to take over pressing one of their buttons as quickly as they can. Once they have filled the pipe on their part of the screen they will pass to the next player.

To begin with, only one player will need to mash their button at a time. As play time increases, the pipes will reach points where the water splits into two. This will then invite two players to mash their buttons and pass the water from player to player.

The aim is to fill all the pipes on all screens with water. The water will be coloured on each screen to match individual player colours.

Points are awarded based on % of pipe filled.

- On first play: Play lasts 45 seconds.

- On second play: Play lasts 30 seconds.

Play type: Social play

8. CLEAR:

There is a landscape which wraps around the four screens. There are creatures which swim around that landscape, moving from one player's play space to the next. Players must work together to help corral the creatures to a goal, positioned on one player's screen. The landscape will have obstacles that the players must help clear to allow the creatures to swim through. Each player has a different ability which they can imbue upon the creatures to help with their journey around the screen. Abilities include allowing the creatures to pull other creatures towards them, allowing a creature to push objects away and to teleport. The player can activate the creature's ability when the creature is on any screen, allowing all players to benefit from each other's abilities. This promotes social play. This game is inspired by Lemmings (1991). The game will last 45 seconds

- Scoring for first play: each creature saved = 1 second more play time
- Scoring for second play: each creature saved = 0.5 seconds more play time Play type: team

Play type: Social play