Technical Design Document: Klump Hero

A KLUMP WITHOUT A CAUSE

### Change History

Change Log

|  |  |  |
| --- | --- | --- |
| Date | Author | Changes |
| 25/08/2022 | Julian | Didn’t actually do this |
|  |  |  |
|  |  |  |

## Roles

|  |  |
| --- | --- |
| Name | Role(s) / Tasks |
| John | **Designer / Programmer** SystemsScripting  UI  Controls  Etc… |
|  |  |
|  |  |

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# Project Overview

## Game Concept

An homage to the king of roll-em-up games Katamari Damacy with modern physics and new mechanics

Start as a small sticky orb, rolling over everything in sight to grow bigger to stick to even more things. Grow progressively until you reach the size of the universe…

## Technical Goals

Recreate the fun rolling and clumping physics of Katamari with stable and performant gameplay while dealing with hundreds / thousands of small objects

## System Requirements

|  |  |
| --- | --- |
| Platform | Requirements |
| PC | https://docs.unity3d.com/2020.1/Documentation/Manual/system-requirements.html#mobile |
| Web | https://docs.unity3d.com/2020.1/Documentation/Manual/system-requirements.html#mobile |
| Mobile | https://docs.unity3d.com/2020.1/Documentation/Manual/system-requirements.html#mobile |

## Technical Risks

* Physics glitches (large number of objects, clumping mechanic issues)
  + Getting stuck on objects
  + Irregular shape
* Framerate / stutter from large number of objects
* Camera clipping or getting stuck on objects

## Third Party Tools

Unity

# Gameplay

## The Environment

The game consists of a large open world which contains objects of varying sizes that lead up to the largest objects in the game. Objects can only be captured (or clumped) if they are within the certain size of the current clump size. It should always be possible to grow using available objects

Because of the vastly different scale of various objects in the game, some areas are gated to prevent early progression to areas that do not contain the right progression of sizes. This is achieved with an obvious barrier

## Game Structure / Game Objects

**Clump Orb [COMPONENT]**

The main character, a sticky orb piloted by the player, reacts to collision events and attaches clumps that are within eligible clumping size

**Clumpable [COMPONENT]**

Component for anything that can be clumped by the player

Clumpable objects have a Radius property, allowing it’s general size to be compared and checked by various gameplay systems

**Camera Manager [COMPONENT]**

Component to manage the camera (point of view cinemachine component) for situations where the clump orb grows in size and thus needs a different camera perspective

## Physics

The clump orb is a simple convex rigid body controlled via torque impulses

The convex clump collider expands to accommodate additional mass from clumped items. Rather than simply attaching the clumped item’s collider, an additional point is added based on the clumped item’s centre of mass. This keeps the overall collision shape simple and manageable

As the clump grows the convex hull is periodically made more spherical to prevent overly lop-sided and difficult to control shapes

## Level of Detail

In order to handle large amounts of objects both attached to the clump and within the environment, various parts of the level will be enabled/disabled at different scales

The starting area will be significantly smaller than the end-game areas

Each chunk of the environment is loaded in and out at appropriate times via async additive scene loading/unloading

Larger and smaller objects will be enabled/disabled automatically by LOD management based on their radius

## In Game Controls

### Desktop / WebGL

#### Mouse and Keyboard

Orient camera using mouse

Control ball rotation/movement using WASD and Arrow Keys

#### Gamepad

Orient camera using right thumb stick

Control ball rotation/movement using WASD and Arrow Keys

### Mobile (Android / iOS)

#### Touch Screen

Drag single virtual stick to move ball

#### Accelerometer

[DIAGRAM\_HERE]

## Menus

### Main Menu

### Options Menu

### In-Game Hud

# Asset

## Folder Structure

The top level asset folder structure consists of types of assets, with categories of things inside (within reason)

Text

Description automatically generated with low confidence

## List of Assets

Assets sourced from itch.io – David O’reilly “Everything” packs

https://davidoreilly.itch.io/

## Schedule

|  |  |  |  |
| --- | --- | --- | --- |
| Milestone | Features | Due Date | Contributors |
| 1. Proof of concept | Basic clump orb Clumping mechanic Test level Keyboard / mouse Controls | 26/08/2022 | John … |
| 2. Prototype | First level Jump and grapple mechanic | 2/09/2022 | John  Alf |
| 3. Alpha | Second level WebGL build | 9/09/2022 | John  Jake |
| 4. Beta | Mobile controls Mobile build | 16/09/2022 | John  Leroy |

## Strategies for monitoring production progress

Team chat platform such as Slack, Teams or Discord

Project management tool, such as Trello or Jira

Emails