

CUBIC TOY BOX

Design Document



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Table of Contents

CONTENTS

1. INTRODUCTION
2. OVERVIEW GAMEPLAY
 1. Brief Introduction
 2. Game overview and Modes
 3. Genre
 4. Target Audience
 5. Platform
3. UNIQUE SELLING POINTS
 1. Gravity Shifts
 2. Gravitational Paths & the Black Hole
 3. Shortcuts
 4. Teleportation Point
 5. Magnets
4. GAME OBJECTIVE
5. RESOURCES
 1. Game Engine
 2. Rendering and 3D Modelling
 3. 2D Graphic retouches
6. SAVING/LOADING
7. GAME DESIGN
8. GAMEPLAY
 1. Power ups and overview
 2. Interaction Diagram
 3. Interface
 4. Commands
 5. Soundtrack
9. PROJECT SCHEDULE
 1. Team
 2. Localisation
 3. Risks
 4. Further Works
10. REFERENCES
 1. Assets
 2. Images
 3. Music

1. Introduction

“Cubic Toy Box” represents an experimental game, aimed to deliver a more clever experience to the user compared to other Casual Games in today’s market: it in fact is a level-based 3D puzzle game designed to sharpen the user’s sense of perspective and environment-inspection, through the use of physical forces on the game characters, allowing multiple solutions, depending on the user’s intuition and problem-solving skills.

This game in fact has been designed aiming to be a step up in what the average puzzle game has been until now, providing a satisfying and intriguing experience, in which the user is asked to escape a labyrinth, a tower composed of different floors in which the path is obstructed by spikes or holes and the pursuit of the main goal is achieved through the use of gravity shifting in a multidimensional level.

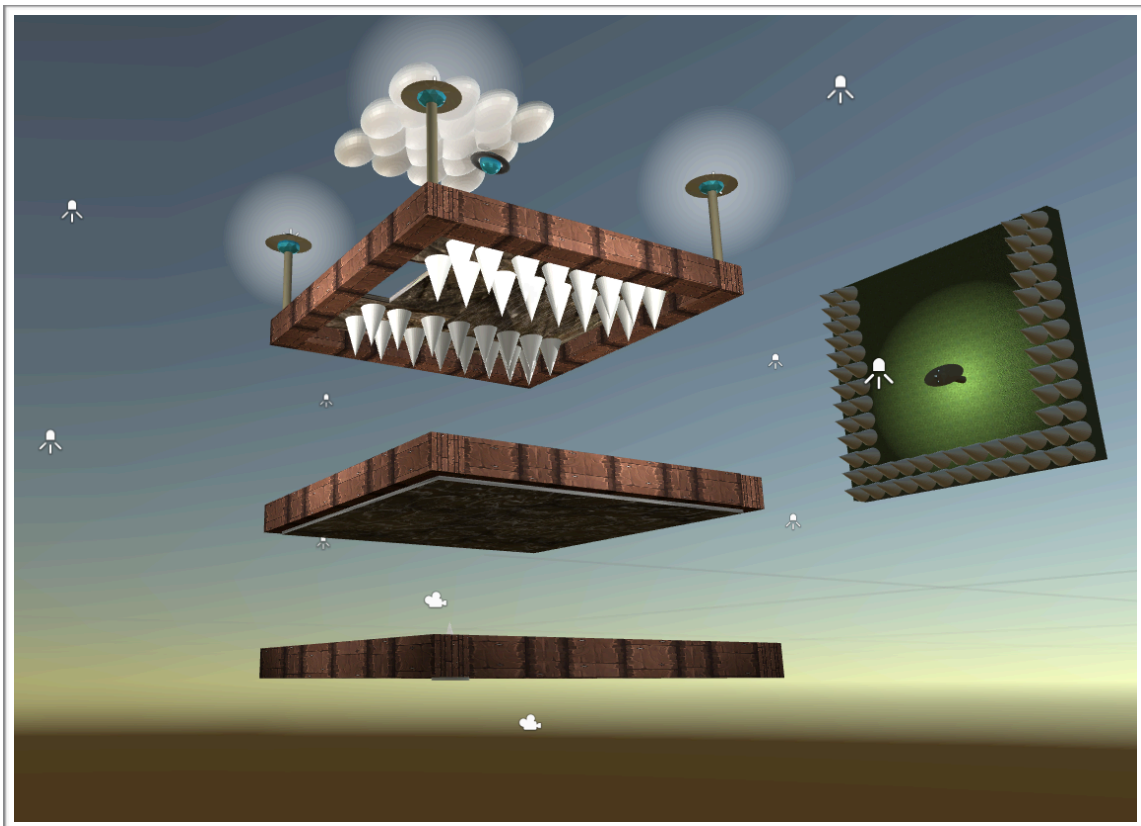


Fig.1, Picture taken during game development process

The main inspiration for this game comes from different sources, first of all the Rubik's cube and the old-fashioned labyrinth game: the main question behind the development of their game is "How can we go forward? How old-fashioned puzzles like these could be cut in pieces and reworked in such a way in which the user keeps being intrigued by?".

Given these, the development stage represented a launch point, from which the use of a 3D environment came from and the use of multiple ways of escaping became the main engine behind the success of the game.

2. Overview Gameplay

2.1 Brief Introduction

“Cubic Toy Box” provides the user with two main methods of gameplay, *Relax Mode* and *Time attack*.

2.2 Game overview and Modes

The level success condition is always the same, reaching the exit of the labyrinth, but yet they may change depending to the game mode: if for the *Relax Mode* the success is represented by the reaching of a particular point of the route, in the *Time Attack* mode this is combined with a time limit in which the condition must be met.

The *Relax Mode* provides the user with different puzzles based on traditional reasoning skills of the user without putting any pressure on it, doing the puzzle for the sake of achieving the end.

The *Time Attack* instead provides a deeper sense of competition between the users: in this mode, the puzzle must be solved in a determined amount of time, creating tension in the user but yet allowing a challenge between different users, comparing their solving times with the others or even different solutions for the same labyrinth. This mode was conceived especially for this purpose: in puzzle games in fact, the competition factor between users never represents the key, the engine behind the engagement with the game.

2.3 Genre

This particular game could be considered part of the puzzle genre, yet as well an action game: a mixture between them, trying to create a frenetic puzzle in order to challenge the user with intriguing riddles and to test their hand-eye coordination and their reaction times, especially for what involves the *Time Attack* mode.

2.4 Target Audience

This particular game doesn't aim to a particular audience, this is due to the fact that everyone could be a player: by not involving critic arguments such as violence or blood, this game can be considered a source of recreation easily be enjoyed by all ages.

2.5 Platform

PC - Windows, OSX

3. Unique Selling Points

3.1 Gravity Shifts

“Gravity Shifts” represents one of the main engine of this game: through that, the user’s movements are augmented, allowing a multidirectional experience. The character is in fact conceived as moving in a Cartesian Plane, in which a force is constantly influencing the body by applying a constant force with value $g = 9.8$, pushing it towards the bottom, or a terrain, using a vector $(0, g, 0)$ in order to have a world-like gravity.

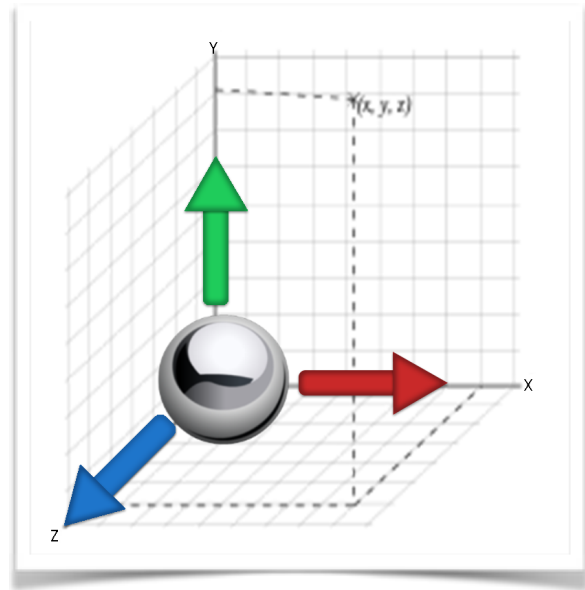


Fig.2, Example of Character on a Cartesian Plane

By exploiting this particular knowledge of common physics laws and gravity, the game is structured in order to allow the player to change these predefined settings: through particular power ups in fact, the user can switch the polarity of the value of the constant force, permitting a reversal to the user’s point of view of what is the roof and what is the terrain, allowing a movement on Y and Z axis.

The “Gravity Shift” power is shaped as a planet in order to recall the idea of Gravity, changing colour pattern depending from its effect.

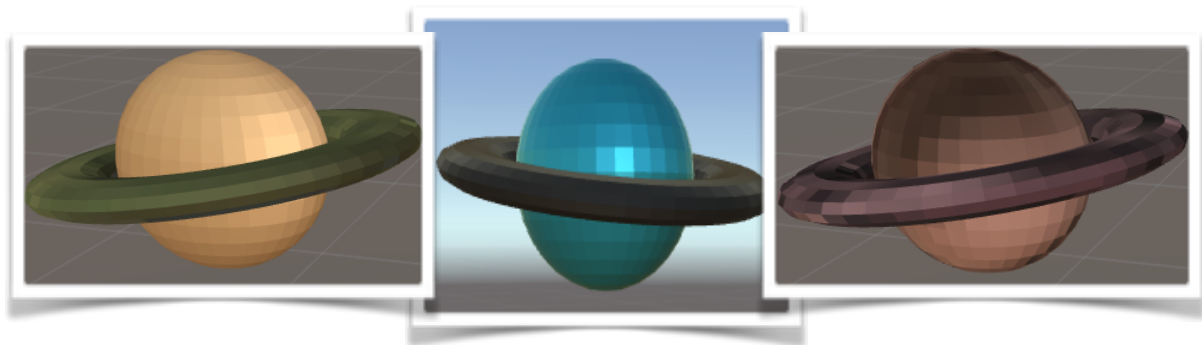


Fig.3, Gravity shift power ups

3.2 Gravitational Paths & the Black Hole

“Gravitational Paths” takes inspiration from world-like astronomical physics in order to create multiple paths: as our planet exercises an attraction on bodies, “Gravity Paths” embody the concept, adapting it to a game. As the Earth has a gravitational influence field, the idea is transposed into another context, exploiting the abstraction of an influence area.

“Gravitational Paths” is in fact referred to particular passages of the level in which the user move through gravitational fields create around specific in-game objects, around which the character can be attracted to or repulsed. depending on the colour of the planet in fact, different forces can be applied in the field: a blue planet will have a field that will attract bodies, a red one will repulse them (Figure 4).

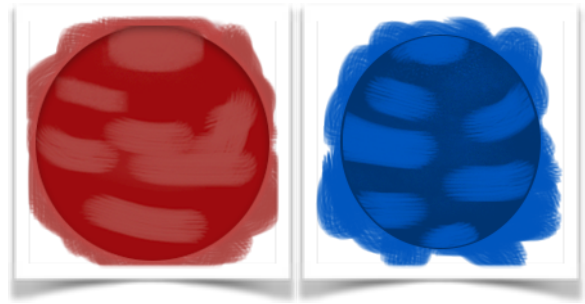


Fig.4, Different Gravity Field Generators

But, as the Gravitational Path represents a clear and nice way to test the user’s readiness, it also introduces a clear obstacle to the user: the Black hole.

The Black Hole has been created in a similar way compared to the gravity-field generators: it only attracts and, has soon as the user reaches it, the level is restarted and the user is brought back to the starting point.

3.3 Shortcuts

Especially for what involves the *Time Attack* mode, it always makes feel better to finish a maze, a race or a particular challenge: the frustration is always outclassed from the feeling of victory; in order to help the user in fact, hidden in every level, there are shortcuts, shorter ways to reach a further point in the maze.

Yet, despite being a succulent way of succeeding, it could happen as well that the shortest path may represent an even bigger threat to the user (Figure 5); shortcuts would sometimes need other objects to be accessed, such as keys or switches pressed before.

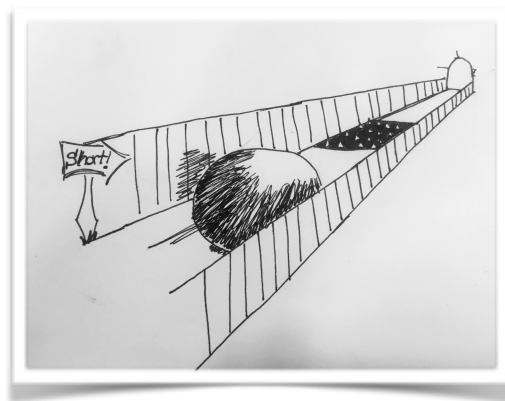


Fig.5, graphical representation of shortcuts threats

3.4 Teleportation Point

Teleportation has always been part of arcade games: it represents a quicker transportation method, allowing as well the developer to switch between different parts of the level without too much effort. In this title, teleportation could be considered for both the solving of the regular maze as well as part of a shortcut. A 3D model is already used in the prototype.

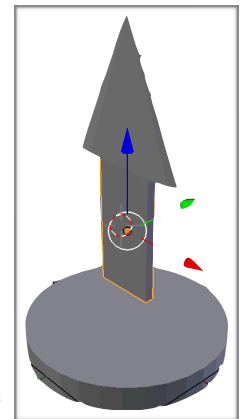


Fig.6, Teleportation point

3.5 Magnets

Magnets, differently from a Gravity Shift, represents a temporary way to detour from obstacles: if in fact Gravity Shift changes the view of the user, overturning in its point of view the up with the down, the magnets allow the user to defy gravity, attracted to walls or specific objects for a determined time, moving on those.

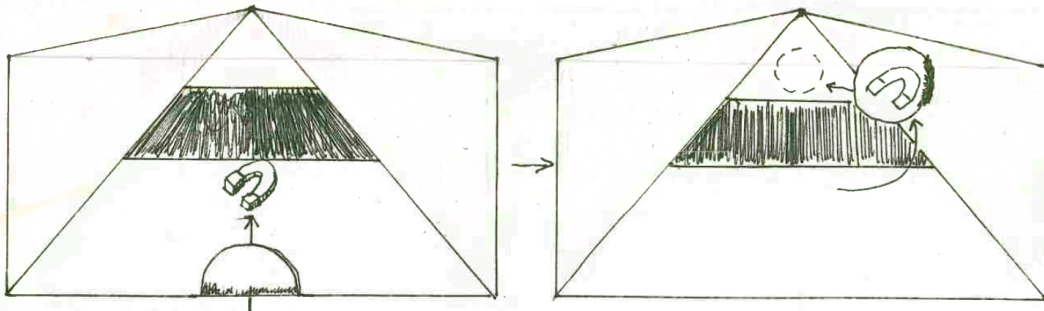


Fig.7, graphical representation of magnets in-action

4. Game Objectives

As said above, Puzzle games represent a branch of Casual games made for the sake of themselves: in “Cubic Toy Box”, the player needs to complete as many levels as possible without getting into any obstacles or jumping off the labyrinth, otherwise he will lose a life.

At the beginning, the user will have 3 lives, and the game will lead to a game over as soon as these three are over.

5. Resources

5.1 Game Engine

The game has been developed using Unity 5.x.x.

5.2 Rendering and 3D Modelling

3D models have been created with Blender.

5.3 2D Graphic retouches

Every 2D improvements have been achieved through Adobe Photoshop.

6. Saving / Loading

This game represent a challenge, a race with itself: the competition itself is represented by how far the user can go. In this sense, the game doesn't provide an actual saving system, due to the fact that it goes contrary to the main concept of the game.

7. Game Design

The main inspiration for this game comes from, as said above, from Rubik's cube and the old-fashioned labyrinth game; from there, the video-gamification of some aspects of those game were made easier through the use as a basis of the game called "Labyrinth", developed by Codify AB. Differently, while that game only focuses on a 2D environment, replicating the wooden maze on a portable device using gyroscopic movements to enable in-game movements, "Cubic Toy Box" takes in account different games such as Super Monkey Ball, Katamari Damacy or Gravity Guy, in order to create a more complete and engaging experience, as it could be seen in the mood board in Figure 9.



Fig.8, conceptual Mood board

As notable in the diagram below (Figure 10), the player has to move the character through a tower labyrinth, with the aim of reaching the goal flag at the end of the path; in order to do this, the player has to climb the labyrinth in multiple ways using the Gravity Shift power ups on its path to move between the different floors: this is possible as well through

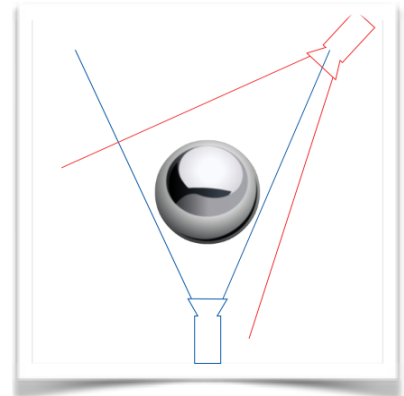


Fig.9, camera

the different use of the camera done by the user. The user is able to play assisting the game from both an isometric point of view and from a camera that points from the bottom side, as shown in Figure 9, permitting a wider point of view to the user, that can now analyse its position from multiple point of view, especially when the gravity is reversed to world one.

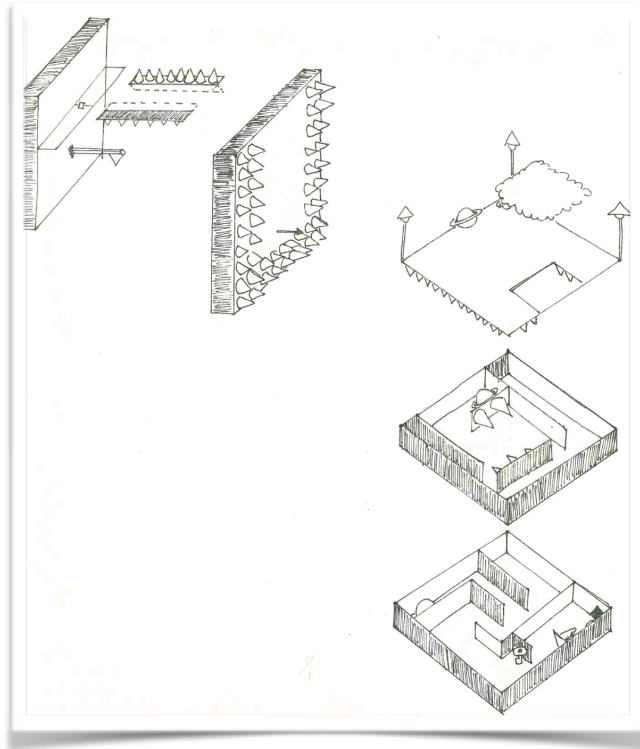
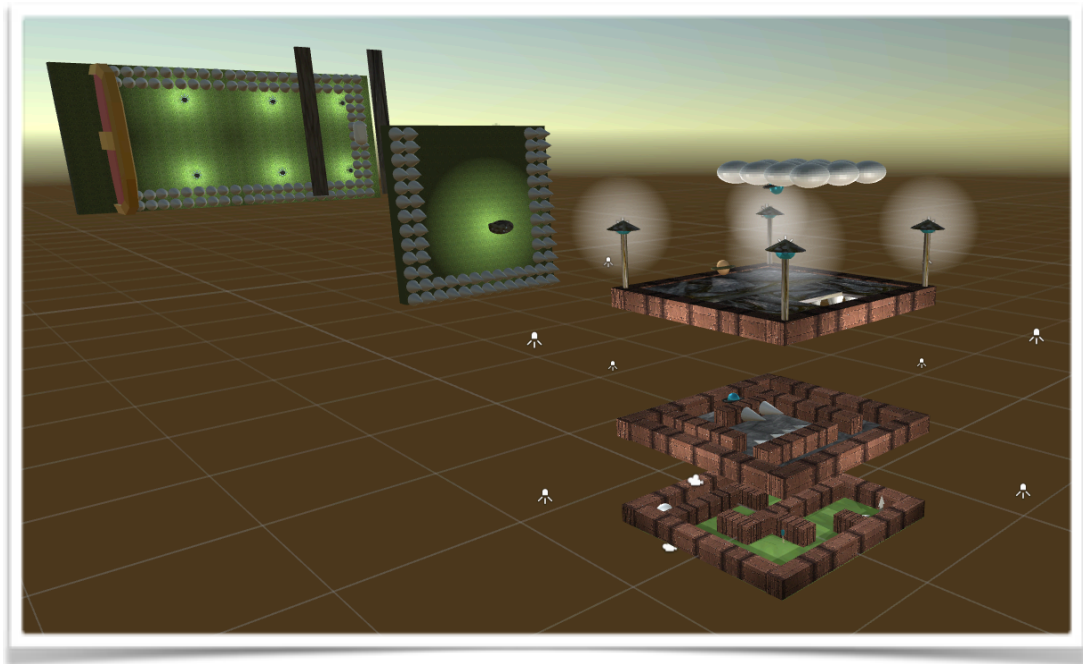


Fig.10, Comparison between conceptualised model of level one and 3D model, done during development stage.



8. Gameplay

8.1 Power Ups and overview

The game starts with character somewhere in the level. The user now takes the lead and control the character along the route, in which is noticeable the presence of collectibles and power ups, together with obstacles.

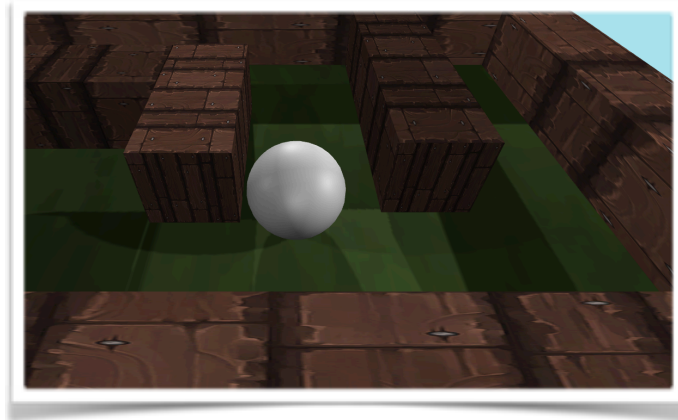
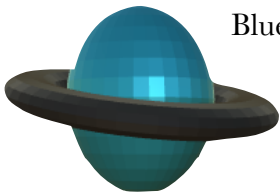
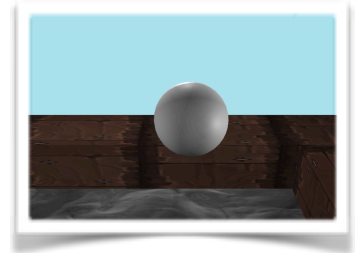


Fig.11, ground floor, level 1, taken during development process

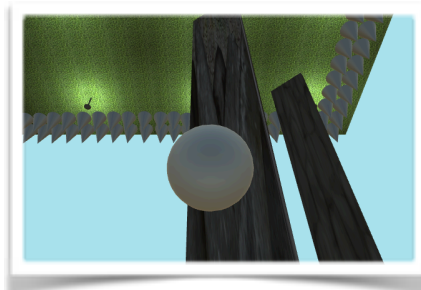
During the gameplay, the character would interact with the other objects that are present on the map as mentioned before, having particular effects every time they collide.



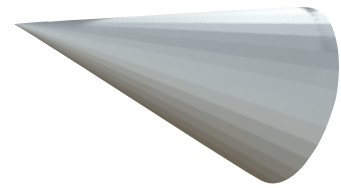
Blue Gravity Shift permits the player to move on the roof as it's pavement, reversing the gravity from the one set by default.



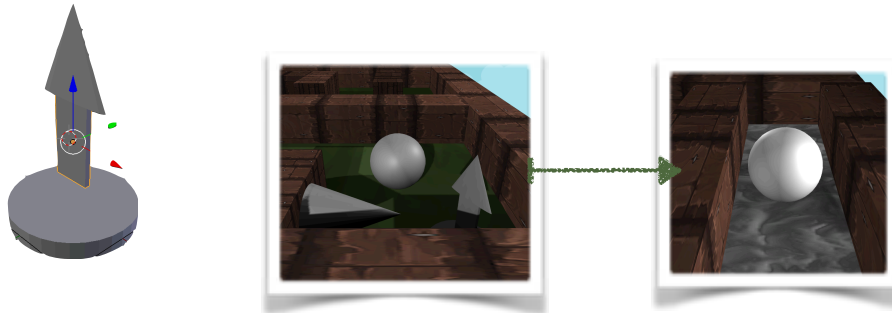
Yellow and Red Gravity Shift share same power: these permit the player to move vertically, as if the wall is pavement. In a deeper analysis, Yellow permits movements by switching gravity on the Z axis, while Red on the X.



The Spike will immediately kill the player, making him lose a life and restart the level from the beginning. As the player finishes his lives, the game will be over.



The teleport point allows the user to reach easily another predefined point in the maze.



The character can be attracted or repulsed by particular objects as well, the Planets. Depending on the colour of the planet in fact, different forces can be applied in the field: a blue planet will create a field that will attract bodies, a red one will repulse them. The diagram below shows an example of their in-game use (figure 12).

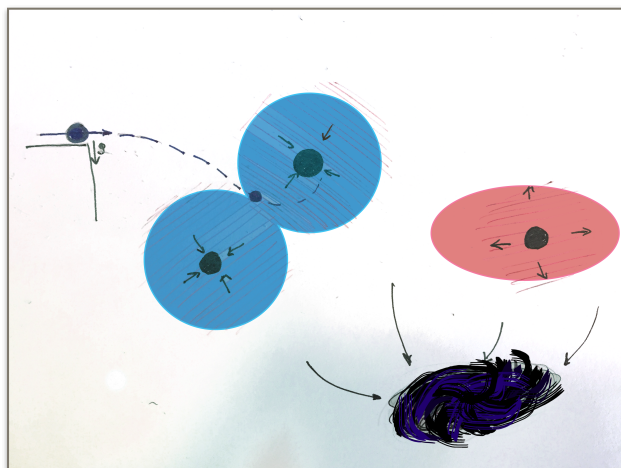
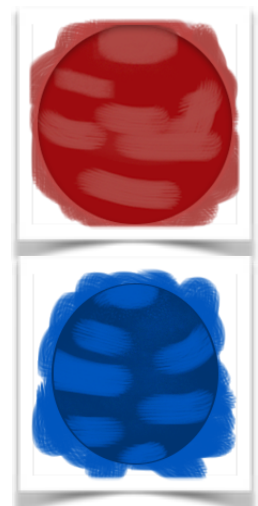
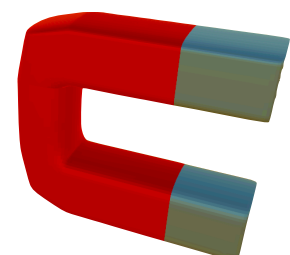
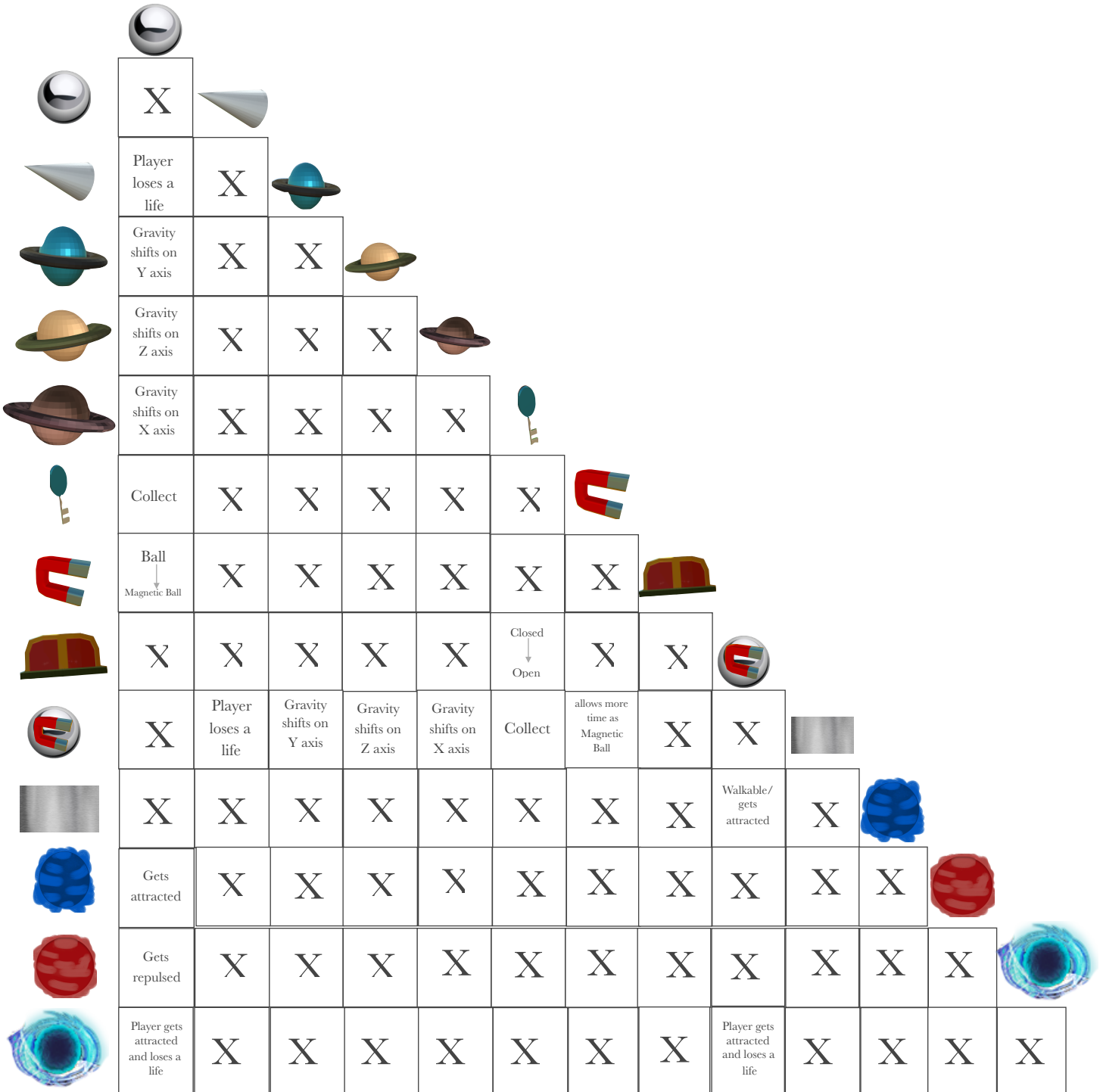


Fig.12, Gravitational Path

Magnets give the power to the character to walk on the walls of the maze for some time, in order to avoid traps.



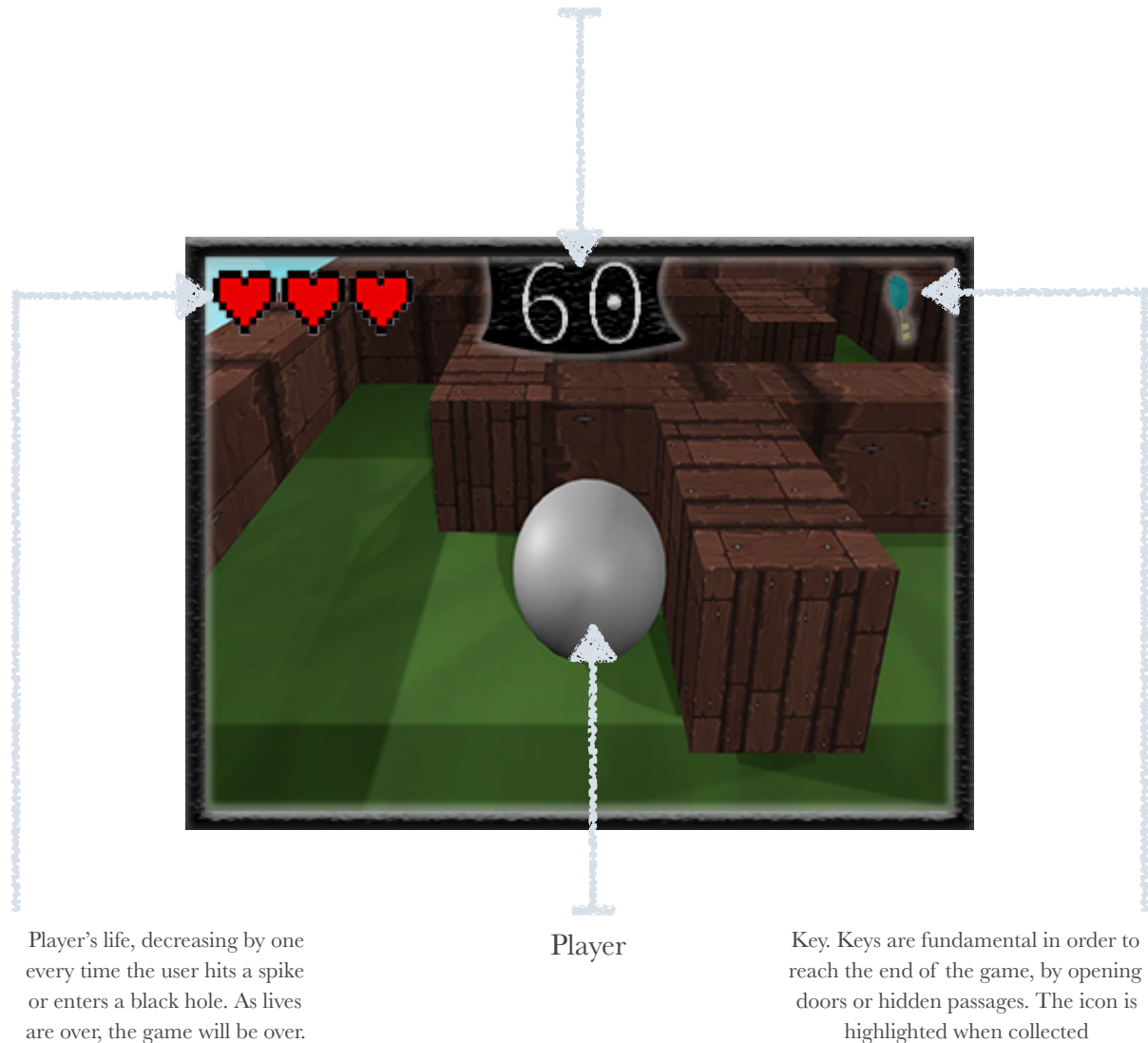
8.2 Interaction Diagram



8.3 Interface

The interface presented in this game would be the same for both the *Relax Mode* and the *Time Attack* mode, with the only difference of the presence of the timer. The interface is displayed below, as well as its components and their functions.

Timer. Fundamental component in the Time Attack mode, it allows the user to be aware of the time spent and the amount of time he still has to complete the game. Absent in the Relax Mode



8.4 Commands

This game will be developed both as a computer game — for Windows and OS X. This choice has been done considering the needs of the game: due to the fact that the user needs to switch in a quick way between different views, a mobile version of this wouldn't have allowed these particular actions.

In order to play, the user uses only the arrow keys to move in the four direction while shifting views between the cameras through the number keys 1 and 2.



8.5 Soundtrack

The game will implement a soundtrack composed by different artists, using different tracks for each level and for the main menu. The soundtrack would be composed by different tracks notables for mellow beats and ambient tones, together with sounds for character's interactions with the different elements of the game. An extract from the chosen background music would be:

Track	Artist
Epoch	Tycho
Hypersleep	65daysofstatic
Back to the start	The Album Leaf
Chihiro	Yoste

9. Project Schedule

9.1 Team

The development team will be composed by 5 people, in detail:

- an Artist, responsible for the 3D Models, textures and the main artistic concepts behind the game.
- two Level Designers, responsible for the structure of the different levels/scenes.
- a programmer, responsible of the implementation of different features.
- a Sound engineer, responsible for the choice of sound effect, recording and mixing in order to have a more harmonic environment, between graphics and music.

The aim of this project is to create an entertaining game in a time period of 6 months.

9.2 Localisation

The game will be developed mainly in English, due to the fact that the game itself doesn't provide itself particular text explanations.

9.3 Risks

- The player won't find the game challenging enough.
- Sounds are not fitting completely into the game.
- 3D maps and models may require too much to be conceptualised and created.
- The game might have a wider audience as a mobile game than as a computer game.

9.4 Further Works

This games presents different ways in which the development could continue:

- New levels and maps.
- New interactions between the player's character and the environment (e.g. the ball could have different materials, chosen by the user at the starting point, each with different effects).
- New features.
- Mobile Implementation with the use of gyroscopic sensors.

10. References

10.1 Assets

- Unity Samples: UI, by Unity Technologies, Version 1.2.1
- Wood Texture Floor, by Antonio Neves, Version 1.2
- Outdoor Ground Textures, by 1.2 A dog's life software, Version 1.2
- Farland Skies - Cloudy Crown, by Borodar, Version 1.0
- Free[3] Metal, by Cogent, Version 1.0
- Hand Painted Textures, by Alex Lusth, Version 1.0

10.2 Images

- Metal Ball: <http://exchangedownloads.smarttech.com/public/content/4d/4d5d9103-d27a-4b29-b2ca-462a43009ad4/previews/small/0001.png>
- Cartesian Plane: https://upload.wikimedia.org/wikipedia/commons/thumb/f/ff/Cartesian_with_grid.svg/220px-Cartesian_with_grid.svg.png
- Monument Valley: <http://images.pocketgamer.co.uk/images/featimgs/monumentvalley-guide-38.jpg>
- Sonic the Hedgehog: http://vignette4.wikia.nocookie.net/sonicwiki/images/d/dd/Spikes_in_Sonic_Runners.png/revision/latest/scale-to-width-down/175?cb=20150512150421&path-prefix=de
- Super Monkey Ball: Banana Blitz,: <http://www.wiisworld.com/images/screenshots/wii/super-monkey-ball-banana-blitz-6.jpg>
- Katamari Damacy: <http://pressthebuttons.typepad.com/.a/6a00d83452033569e201156f5112be970b-600wi>
- Labyrinth: <http://a5.mzstatic.com/us/r30/Purple/v4/28/d6/d1/28d6d185-5d64-0eb6-ed2e-8bd81131c6c2/screen480x480.jpeg>
- Gravity Guy: https://lh3.ggpht.com/1B4d8GuEa2RpPFzmgD9zF8mtS47vzSISTxoY_2_QXF7LAFYldKz40RmLFfbKzIAIO1A=h900
- Keys: http://lh3.ggpht.com/-RnbII_Y5f60/UblurdgE6QI/AAAAAAAAACZs/Vn34AdEY--0/Navigation-keys_thumb%25255B3%25255D.png?imgmax=800

- Lives: http://1.bp.blogspot.com/-CHdwMT8I94g/VPRfu7Tyd4I/AAAAAAAAA3Yk/qUr_B2DbYhE/s1600/hearts%2Bblink%2Bzelda%2Bnintendo%2Bgeekery%2Blife%2Bheart%2Bcontainers.jpg
- Black Hole: http://static.eclipsia.com/public/upload/cke/Starcraft%202/Batiments/warpgate_render.png

10.3 Music

- Hansen, S. - Tycho (2016). "Epoch". On "Epoch". San Francisco, CA. AVAILABLE ONLINE AT: <https://www.youtube.com/watch?v=9kuNshckRIU>
- 65daysofstatic (2016). "Hypersleep". On "No Man's Sky: Music For An Infinite Universe". Sheffield, United Kingdom. AVAILABLE ONLINE AT: <https://soundcloud.com/65daysofstatic/sets/no-mans-sky-music-for-an-1>
- LaValle, J - The Album Leaf (2016). "Back to The Start". On "Between Waves". San Diego, CA. AVAILABLE ONLINE AT: <https://www.youtube.com/watch?v=c3qtsteRea8>
- Sines, K - Yoste (2016). "Chihiro". On "far away". Brisbane, Australia. AVAILABLE ONLINE AT: <https://soundcloud.com/yoste>