**Iter Design Journal**

Game link: <https://martinjohnh.github.io/iter/>

Website: <https://martinjohnh.github.io/doc-iter/>

**Initial Ideation and Concept**

When the group first came together, we had very loose ideas of the type of gameplay we wanted to achieve. We came to agreement on two core concepts which we evolved into the final version of *Iter*. The first core concept was collaborative gameplay; allowing a player to switch between two characters and use their special abilities to explore and solve puzzles. The second core concept was the idea of changing gravity to add extra difficulty to the puzzles.

Taking inspiration from games like *Ico*, *Journey,* and *The Legend of Zelda* we were interested in what we could do if we forced a player to think of a puzzle from two perspectives. This could open up two possibilities for gameplay. The most obvious is that one character would complete half of a puzzle and the player would have to consider how to situate the second character to complete it. However, the second and less obvious possibility is that players would have to be creative to move their companions around especially if their paths depended on obstacles that only opened after certain actions with the companion.

An example of such gameplay is the Earth Temple from *The Legend of Zelda: The Wind Waker.* In this dungeon, Link is paired with a winged companion that carries a harp that can reflect light. Within the dungeon, many of the puzzles rely on carrying the companion and dropping them at a location where they should use their light-reflecting ability. However, many times, it is the case that in order to do that the player must leave them behind while they open a path. After some time of solving challenges, one is able to backtrack to the companion with a new path that they are also able to follow.

The gravity mechanic was a bit less defined. We originally thought the world would be one where the space-time is corrupted. The player would traverse the world with the aim of exploring. Along the way, as the player crossed from building to building, they would enter areas where the force of gravity could be pointing in any direction. This would be a feature of the worlds themselves and the player would be unable to control them.

We felt that combining the gravity mechanic with the collaborative puzzles would give us a good foundation for some fun gameplay. Once this was established, the decision to make the game from a 3D third-person perspective naturally followed, since it would allow us to leverage the gravity changes while allowing the player the greatest amount of freedom to look at and reason about the spatial puzzles.

**Refining the Original Concept**

After coming to an agreement about the mechanics of gameplay, we felt like we were in a better place to begin editing and trying to arrive at a coherent concept. During this stage we simplified many aspects of the game as we worried that we wouldn’t be able to technically manage it in the span of 12 weeks.

The first cut we made to our original concept was removing the outside areas and exploratory aspects of the game. We felt that even though the appearance of an open world could contribute to the game’s aesthetic of exploration, it did not really contribute to the gameplay. Furthermore, it actually diminished from what we aimed to achieve with the gravity manipulation mechanic.

Another simplification we made to the original concept was to drop the idea that the player could control both characters. Instead, we would allow the player to control one character and let the second one merely follow. This decision was driven mainly by technical considerations. If we did not have to worry about each character moving autonomously, we would no longer have to worry about having to manage their physics independently and it simplified our camera system.

An added bonus of only controlling one character at a time was that it made the puzzles easier to design. We were free to imagine our puzzles in such a way that the main challenge would come from clearing the obstacles that stand in the way of your companion’s path and then letting them walk the path automatically. The objective would be complete if the companion is able to reach the end of the zone.

An adjustment was also made to the gravity manipulation system. With the game taking place entirely indoors, we were afforded some room to lean on the gravity mechanic much more. For the sake of solving puzzles, we decided to allow the player to switch the gravity at will. However, we would dictate the direction of the new gravity flow on a per-area basis depending on the puzzle. By switching the gravity back and forth, the companion along with a select amount of other interactables could fall to specific places. This would set them up to make pathways for the companion to make their way to the goal.

**First Prototype**

With a much more clearly defined scope, we were ready to begin developing a prototype of all the game mechanics in a small environment. The most challenging system to develop was the physics system of the game. We made use of Unity’s convenient NavMesh system to control the companion’s movement as they follow you throughout the level. However, we learned that NavMesh does not work well with Unity’s physics and collision system. Having both enabled on an object causes a race condition as they both try to override each other while moving. This was an important hurdle for us to overcome because the gravity switch system was such an important part of the game. Eventually we managed to write a simplified physics system that could work around NavMesh. The prototype also led us to the tether mechanic.

The tether mechanic, originally just visual feedback for moving the companion, became a way to put pressure on the player whenever they became disconnected. We added a countdown clock that would reset the level if the player took too long to return to the companion. This completely changed the way the game was played. The source of the challenge did not need to stem only the complexity of the spatial puzzle, but even a simple puzzle could become difficult if the player is unable to return in time. Having learned this, the story of the game and the floor plans followed.

**Puzzle Design**

Before diving into the puzzle design, we spent some time developing a story around the game. We hoped that giving the characters a purpose, it would help to gel the various mechanics in the game as well as inform our decisions regarding the puzzles we would design. Since losing the tether made the player’s companion vulnerable and stopped their movement, it led us to the idea that the companion is actually the spirit of a dead person and the player is a living person guiding them to another place.

This story also tied in with the gravity manipulation–the logic being that the laws of physics are different in the spirit realm. Additionally, since the companion is a spirit, various light sources in the environment could dissolve them and break their tether. This would become the centerpiece around which we designed all of our puzzles as well as the graphic design of the game.

We decided to create an introductory level in three sections. This level would consist of three challenges of increasing difficulty that would introduce the player into the player into the various abilities they would have in the game.

**Puzzle 1**

The first puzzle finds the player at the companion’s tomb. We drafted a sparse room which we intended to serve as a non-threatening and safe area for the player to become accustomed to the controls. By experimenting with the controls, the player might accidentally detach the tether, at which point they would be presented with the countdown clock. If, for some reason, the player does not come to this realization on their own, they would reach the end of the room where they would find a small hole that is only big enough for the dog to fit through, but not the companion. At this point, if the player continues through, the tether is automatically detached, and the countdown begins.

Within the 30 seconds allotted, the player is supposed to find the glowing yellow plate beyond the light column. On activating it, the first room’s door is opened, and they are allowed to return to the companion and reattach the tether. The reasoning behind a puzzle this extremely simple was to gently introduce the player into the notion that not only is the tether detachable, but that the dog must be able to go places the companion cannot go.

**Puzzle 2**

The second area increases the difficulty, but only slightly. There is a single column of light that shines on a hole in the ground with a cube in it. This is again an optional lesson. The player may try to cross the light beam, but if they do, the tether will be automatically broken by the light and the companion will begin to dissolve. We thought this was an important lesson to learn early in the game when the stakes were still low as we planned on dramatically increasing the number of light-based obstacles further down the road.

Looking up, the player would find an upside-down version of the room with some stairs leading to a door. Our aim here was to bait the player’s curiosity by showing them a potential exit, that would otherwise be easy to access if only the player could walk upside down. Once the player finds the very obvious valve and activates it, the gravity will be inverted, and they will walk on the ceiling of the room. The catch is that the stairs which lead to the door were actually hanging when the level was right-side up–with gravity pointing in the -Y direction–but once the world is flipped, they fall into a hole in the opposite direction, leaving an uncrossable gap between the door and the passage. To cross the gap, the player must push in a block into the gap to be able to step over.

In retrospect, this puzzle was a bit of a disappointment because of the same physics problems we encountered during the prototyping phase. Because we were using NavMesh, it was not very straightforward to jump certain gaps. We were forced to create an off-mesh link that became active only when the block was in place. However, I allowed my friends to play this puzzle and they were all able to overcome it. Given the time constraint, we decided to instead spend more time on the third puzzle, which makes the bulk of the challenge in this level.

**Puzzle 3**

This third puzzle took us several meeting to be able to design. We knew that if the player arrived in this zone, they would already be aware of all the abilities available to them. Therefore, we couldn’t make it too simple. Originally, we designed a room with an open courtyard section and two covered sections at each end. The player would have had to switch gravity in different directions several times to cause their companion to fall through the open courtyard’s lights onto the area where the exit is. We used a chalkboard to draw and discuss the floor plan. Unfortunately, despite taking photos of the layout, none of us were able to accurately remember how to solve it one week later. We took this as an indication that it was too convoluted. So, we started anew.

The second, and final version of this third puzzle is a room with two very large windows. There is a relatively small part in the center of the room in shade where the player can rest. Unfortunately, when the player enters the room, they automatically land inside the light. This causes the tether to break immediately and causes some panic. The player should find the shaded area and slowly pull their companion into it.

Upon scanning the room, the player will find a large cube as well as three pressure plates. These plates are switches, and if the player activates one, they will notice that the window closes. The catch here is that if the player steps off the plate, it will re-open the window. To solve this room, the player must use the block to press one plate, closing the first window. Then, they must bring the companion into the light and pull them onto the second switch, closing the second window. And, finally, they must untether and go to the third plate. When all three are pressed at the same time, the windows are deactivated permanently, and the exit opens.

Trying to avoid the light while rushing around to retether before the clock runs out greatly increases the difficulty in this room. Our assumption going into this puzzle was that a player familiar with traditional 3D platformers would be familiar with the idea of holding down multiple pressure plates. During playtesting, this assumption was confirmed. However, the level of frustration at immediately landing in the light was very high. Very few players had the patience to try to find the shaded area.

Thinking back on this third puzzle, I feel like we were hurt by the graphic design of the game. We took great pains to make sure the light columns are distinguishable enough from the rest of the environment. However, when a user enters the third room for the first time, they may not notice that they are inside a light column because of the backface culling of the polygon that makes the light beam. When inside the beam, the unlit textures of the floor and walls do not reflect the light, and so a user must move their camera perspective before they notice they are actually in the light. I tried to remedy this by adding a prompt to the player to get out of the light, but this feels like a stop-gap measure. All things considered, knowing how to navigate through the light, the level was fun to solve.

**Conclusion**

Overall, I am satisfied with the game and stand by the mechanics that we developed. However, I do feel like the puzzles could have been more complex. Perhaps if we were not so focused on the graphic design of the game, we would have realized that switching to the comic book look would actually negatively impact our biggest puzzle. One thing I discovered when we were creating the game trailer is how much more fun the game was when I could manipulate gravity at any time, even without using the valve switches. If we were to continue this game, I would push to eliminate the valves and instead allow the player to change gravity whenever they want. The advantage of this approach is that we can design puzzles that could combine many more perspectives. I always imagined that a player could jump off a ledge and do a perfectly timed gravity switch to land at a specific spot to activate some kind of switch to open the path to the next area.