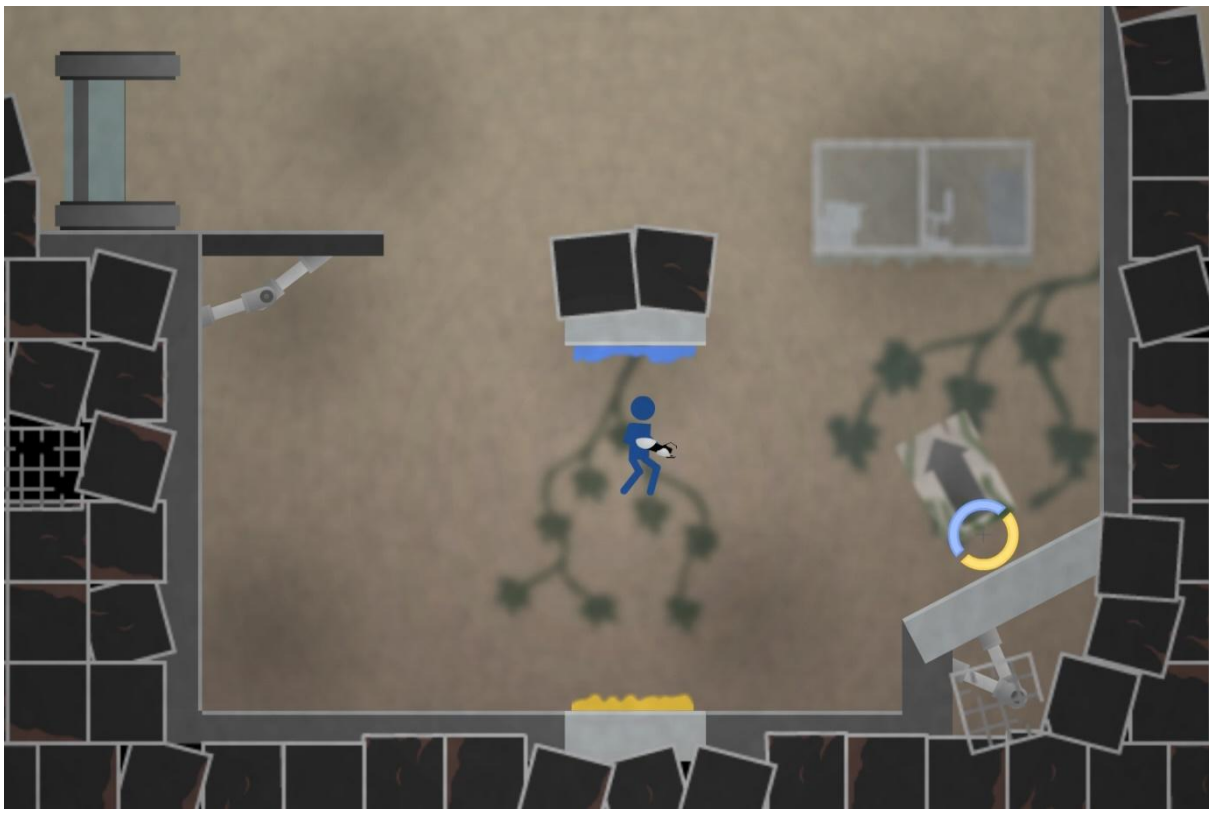
Knight's Dungeon

Inspirations

The main inspiration sources for my game are Portal 2D and Spelunky. Portal 2D is a browser-based flash game created by Kano games in 2018 and is an escape the room puzzle game in which you can teleporting gates to reach the exit of every level using the portal gun to traverse through the level to complete puzzles and reach the end. What interests me about this game is the orthographic stationary camera angle as the camera does not move with the player and remains stationary for each level as this frames the level to the camera, so you can have the entire level just to fit on the screen so the player can see everything in the level at the start and they can plan their route rather than having to move ahead to see what's ahead.



Spelunky is a PC game created by Mossmouth in 2008 and is a platformer roguelike where the goal is to grab as much treasure from the cave as possible while avoiding traps and enemies, with each play through being different as the levels are randomly generated. What interests me about the game is the gameplay aspects such as the various traps and the traversal options such as the ladder, as well as the gameplay loop as the player traverse the level avoiding danger in order to reach the end Door, I am not interested by the treasure point system only by how the player travels through the level and what dangers they come across to get an idea of what the player will face in my game.

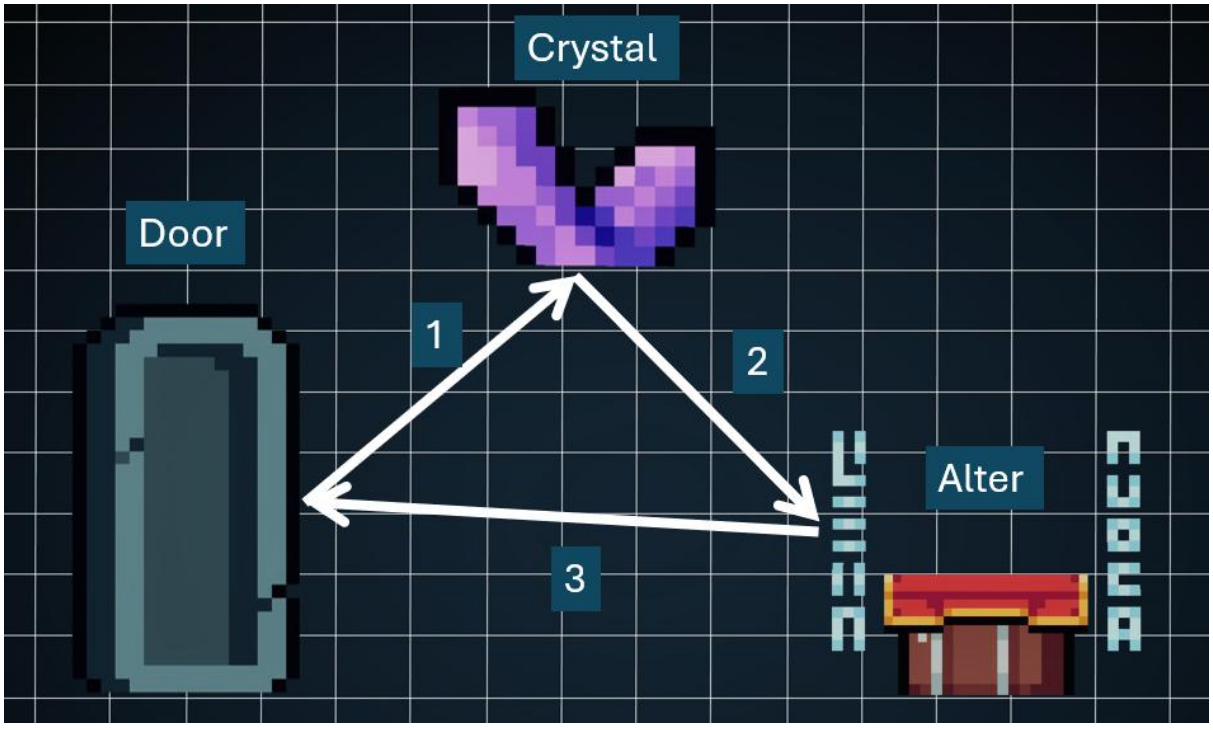
Design

Gameplay loop

The Gameplay loop is important in all games as it defines what the player does in the game, as in Portal 2D the gameplay loop is to reach then end of the level by completing the puzzles and for Spelunky it is to collect treasure while avoiding danger and make it to the end of level door. For my game the gameplay loop can be separated into 3 steps:

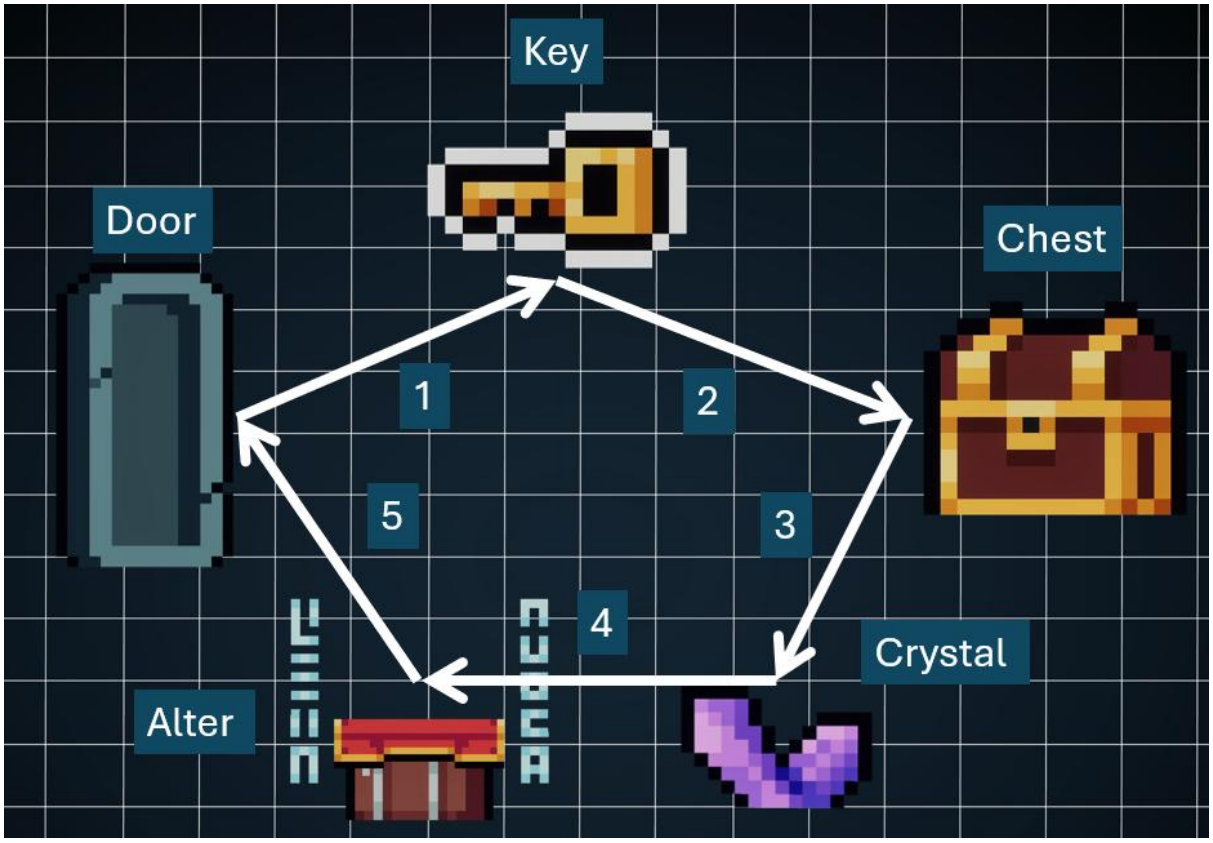
1. The player spawns at the deactivated End Door and needs to acquire the Crystal for the Alter.
2. The player collects the Crystal and needs to take it to the Alter to activate the End Door.
3. The player places the Crystal on the Alter which activated the End Door and now needs to return to the door, finishing the level.

What makes my gameplay loop interesting is that you start at the end and that each item is placed somewhere in the level, so the player needs to traverse the whole level to 3 different points rather than start to finish as the player's spawn point is the End of level Door just deactivated as in Spelunky and Portal 2D it is just going start to finish but in my game the start is the finish so it creates better gameplay loop rather than just a straight line of point A to point B.



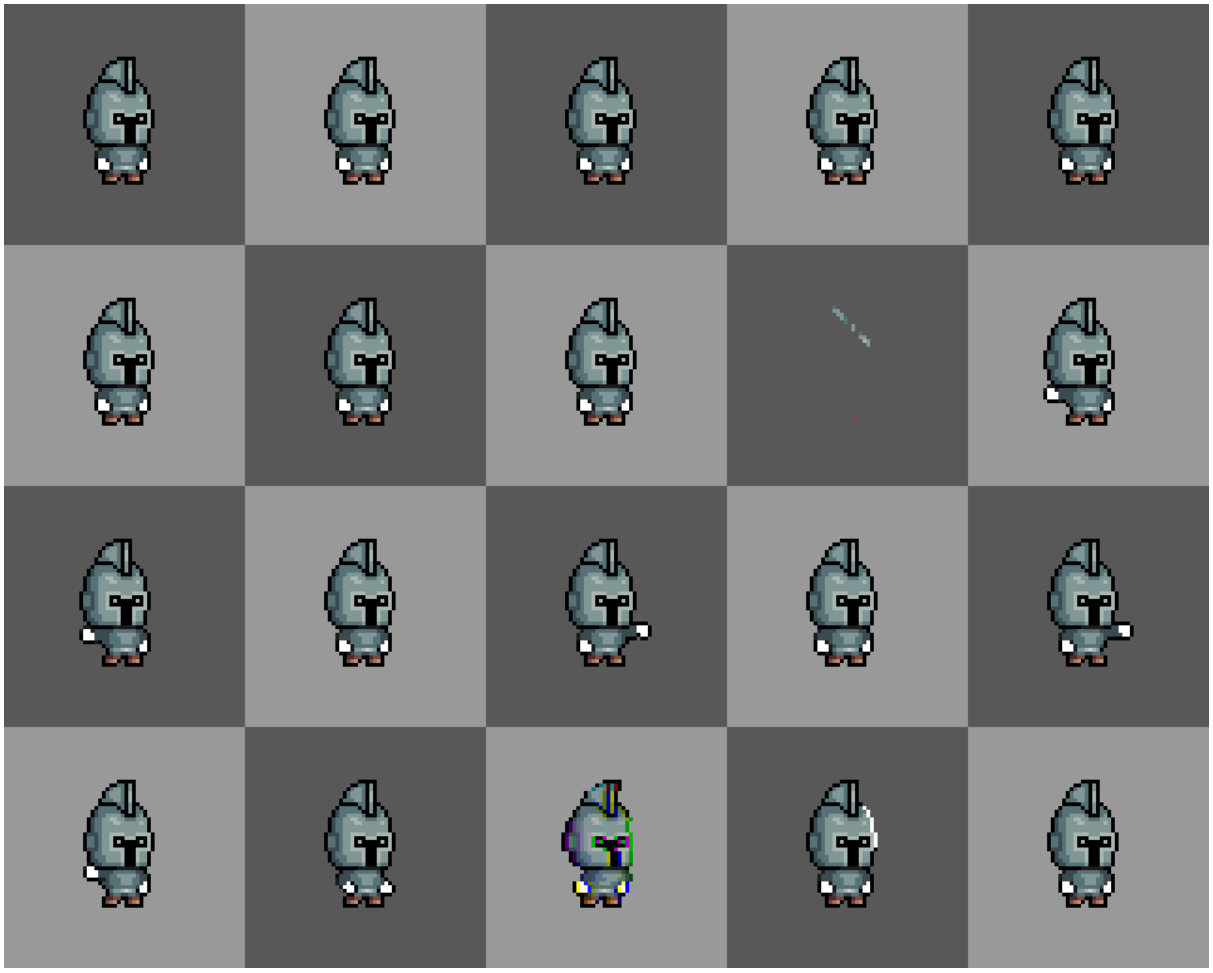
A draw back to this gameplay loop is its simplicity as the player only needs to traverse to 3 different points which will make later levels more repetitive, so to fix this I added 2 additional steps to the gameplay loop which is a chest and a Key to add more variety to the level since the player now has to do 5 tasks in order to complete the level instead of 3, which are:

1. The player spawns at the deactivated End Door and needs to acquire the Key to open the Chest.
2. The player collects the Key and heads to the Chest.
3. The player opens the Chest with the Key and is rewarded the Crystal.
4. Now with the Crystal the player heads to the Alter to complete the ritual.
5. The player places the Crystal on the Alter which activated the End Door and now needs to return to the door, finishing the level.



Character and World Assets

For my character I chose to use a free character pack from BDragon1727 on Itch.io since it had all the animations I need as well as a few additional ones, which is a 16x16 pixel Knight Character which is exactly what I need since it requires a knight for Knight's Dungeon. For the World I used a 16x16 Dungeon Asset pack by Uma Alma containing 34 different assets which include the tiles for the background and several different items for decoration or gameplay aspects such as the platforms, arrows, spikes etc, for me to use for the level and the reason why I chose this asset pack is because its Dungeon theme and the shade of the background tiles does not clash with anything within the asset pack as well as the knight character so all is clearly visible.



Levels

For my game it will feature 7 levels, 5 playable and 2 exemptions, and will be structured by the player starting at the Main Menu which will bring them to the first level and on completion will bring them to the second until completing the 6th and final level will bring them to the Win level before being taken back to the Main menu.

These Exemptions are the Main Menu and Win Level, as because for my game instead of a Main menu which the player clicks a button to start, the player can actually move and play within the Main Menu and they need to move over to the Play "button" to start the game, same with the Win Level as instead of a Win Screen it is a level the player plays. I got this idea from the Undertale Credits as rather than a scroll of credits passing by the player instead can move around and is attacked by the credits and needs to avoid them, so I thought instead the player can play with a Menu rather than it being a menu.

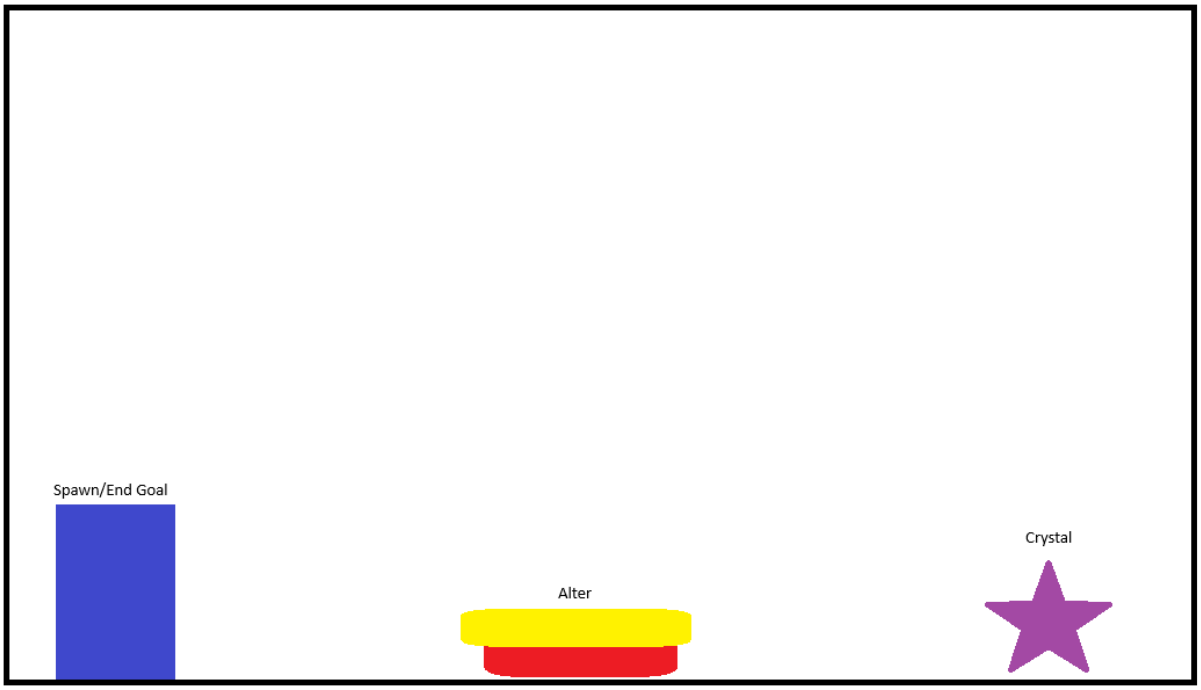
Main Menu

For the Main Menu it will be the first thing the player will see when they start my game, so it needs to feature several important features, such as the Title, where to start the game, how to quit and since my main menu is a interactable level, how to move because rather than a traditional main menu where the player moves their cursor over the play button to start the player needs to move the character over the play button to start. Taking this into mind I created the level featuring the Title taking a large space in the middle of the screen with the player starting below with 2 button symbols telling the player how to move so they can go over to either start or quit the game, with the Play and Quit button on each end of the Level where they is some empty space framed by the title.

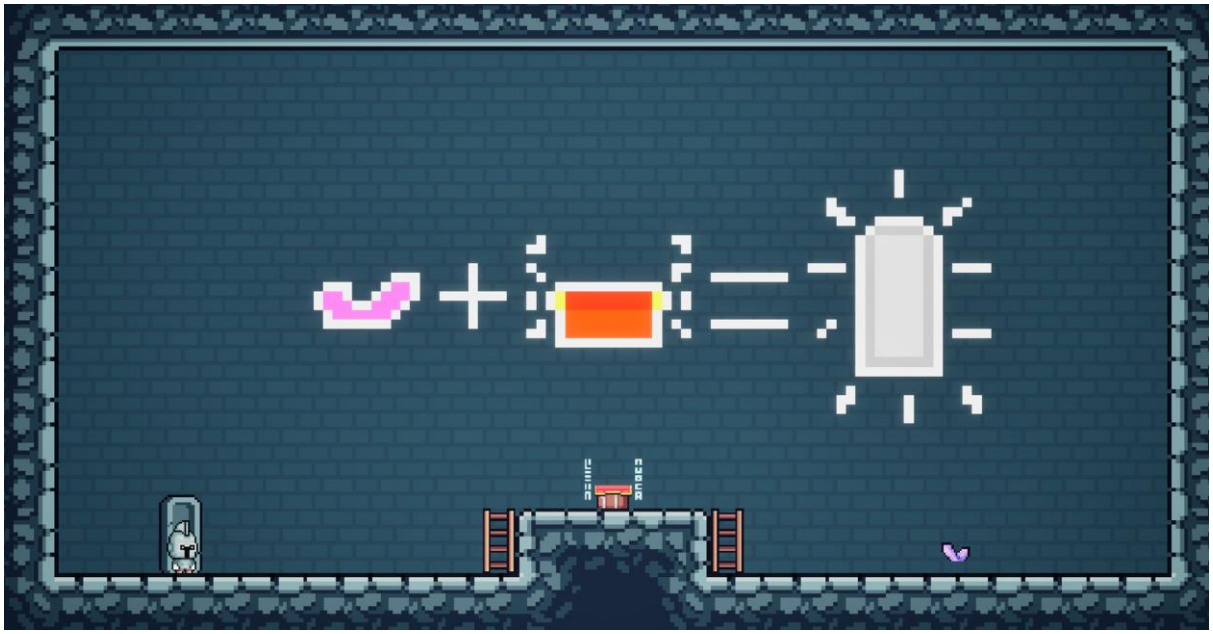
Level 1

For the first level it introduces the player to the gameplay loop by introducing the player to the Alter, Crystal and End Door by having them be the only thing in the level, to not distract the player, and the large mural on the wall telling the player on how to complete the level so that the player knows what they are doing for future levels and the level features no danger so the player can learn how to play in a safe environment with danger being added in the future. Initially the level was going to on the same level, but I decided to change that later to introduce ladders to the player so that the player learns how they function as well as they are seen often in later levels.

Level 1 Plan:



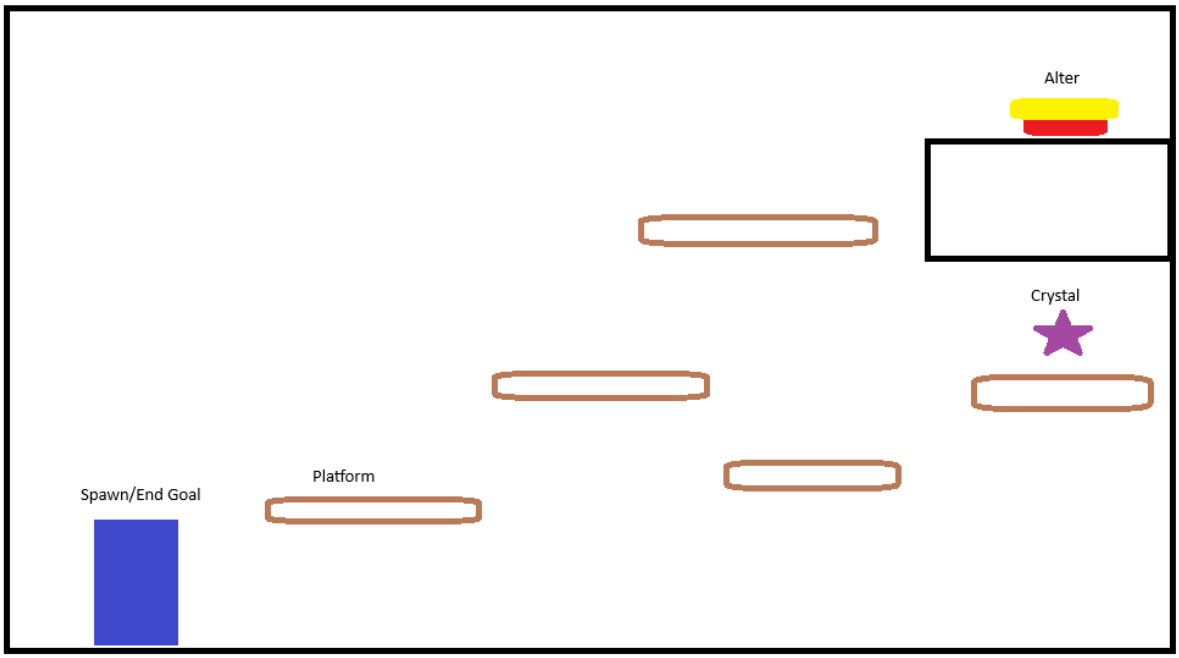
Level 1:



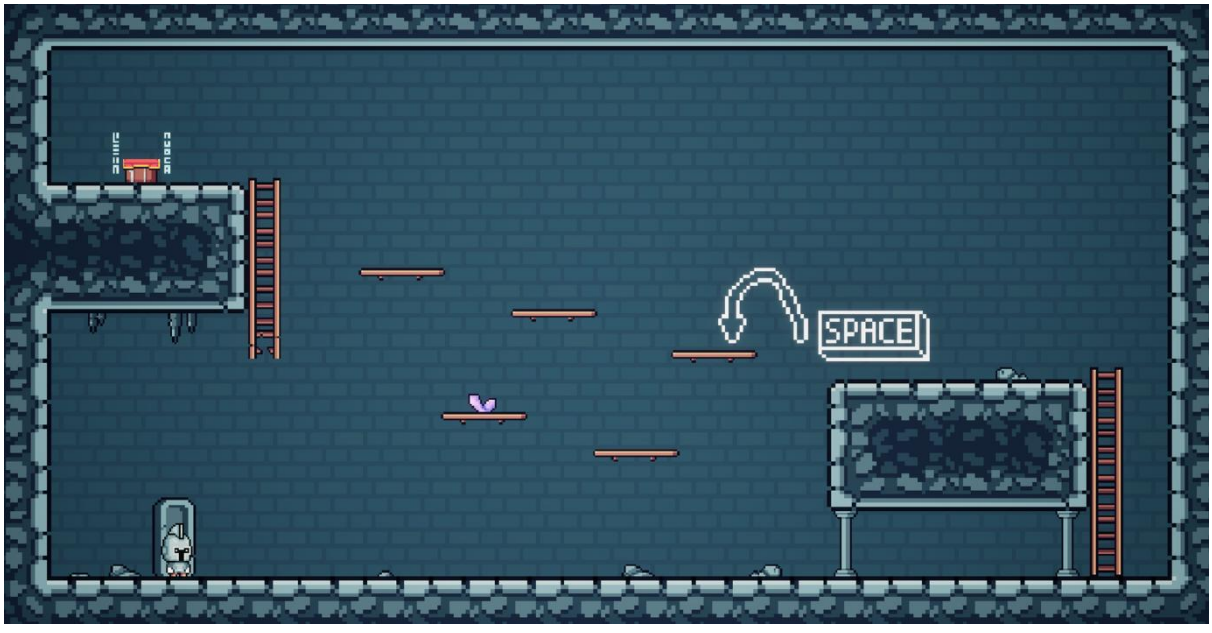
Level 2

For the second level, it introduces the player to jumping with several platforms that the player needs to jump across to get the crystal and to get to the Alter to complete the level, I positioned the platforms so that the player needs to go through 2 different paths across the platforms to get the Crystal and to get to the Alter so the player needs to go down one path be going through the other to add more jumping to the level instead of having the Crystal on the way to the alter. Initially I had it in the plan that the player would start by climbing the platforms to reach the Crystal and Alter but decided to change it so the jumping starts at the right of the level rather than the left so the player has a chance to observe the level by looking as they walk from left to right and I positioned the platforms so that the player has to fall to reach the Crystal so they have to do the jumping puzzle twice for length and so the player knows how to control their fall.

Level 2 Plan:



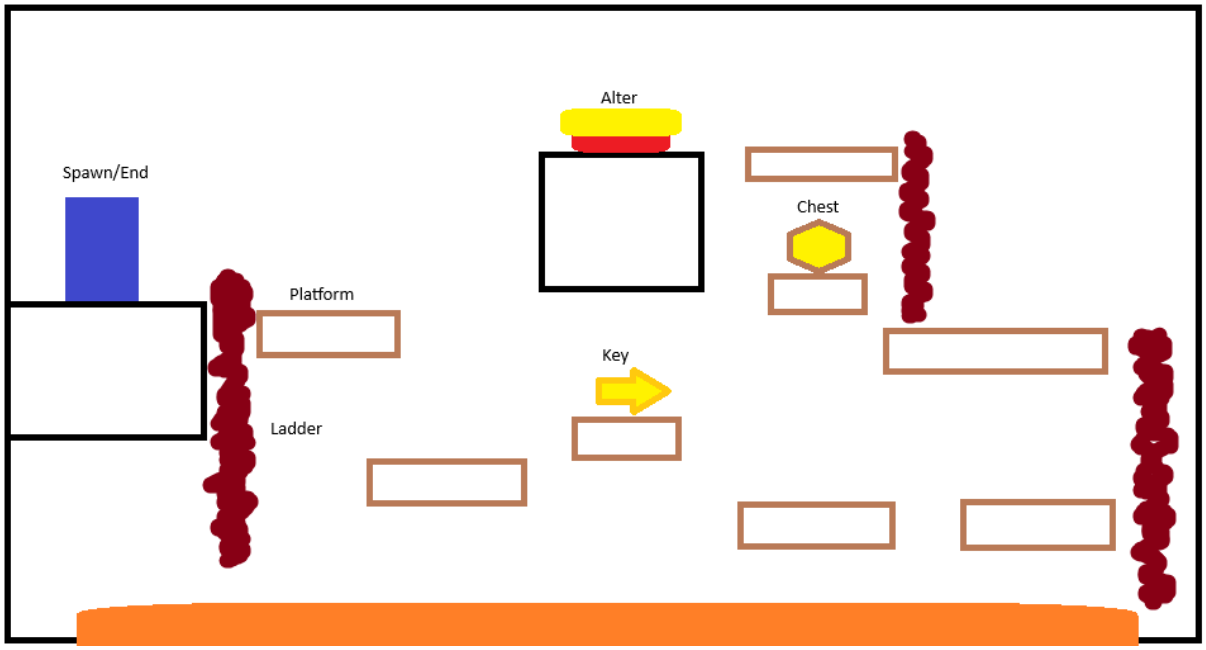
Level 2:



Level 3

For the third level it expands upon the gameplay loop by adding in the Chest and Key as well as a Danger to the level which is lava, that If the player falls into they die, and that being the only danger so the player is still in a relatively safe environment by only adding consequences to their falls so that the player has a relatively safe environment to learn how the Key and Chest work by jumping from each platform, snaking around the level, until they reach the alter and activate the End door and escape. I also added a lava fall into the level for decoration which overlaps the level so it is positioned in front of everything so the player can go behind, just to make the level look nicer.

Level 3 Plan:

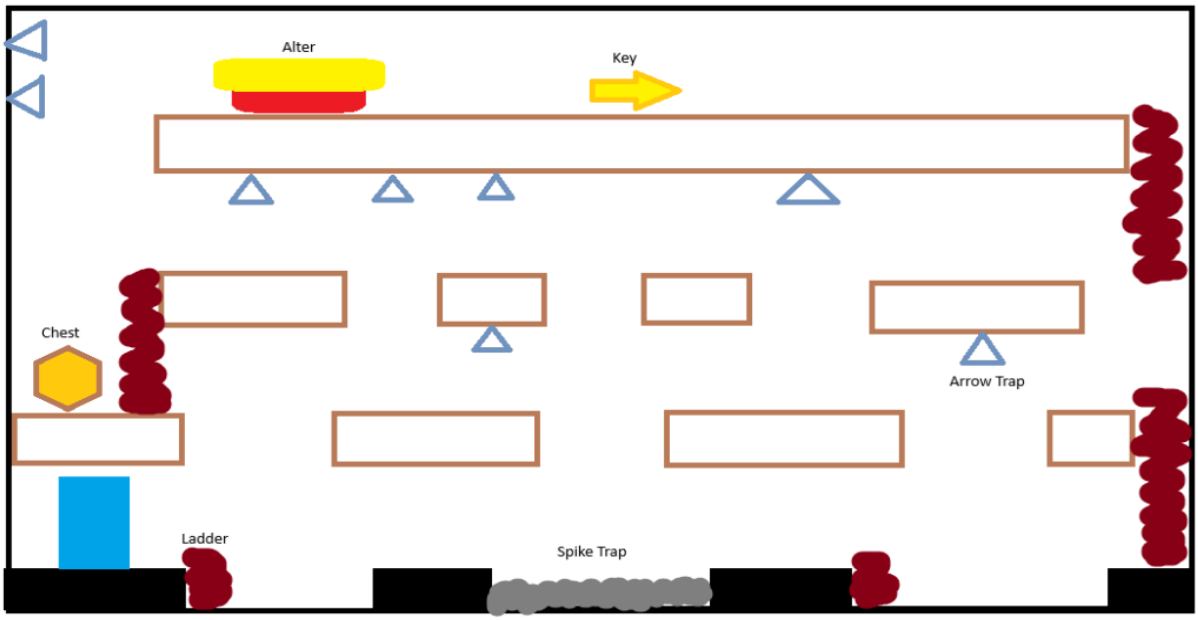


Level 3:

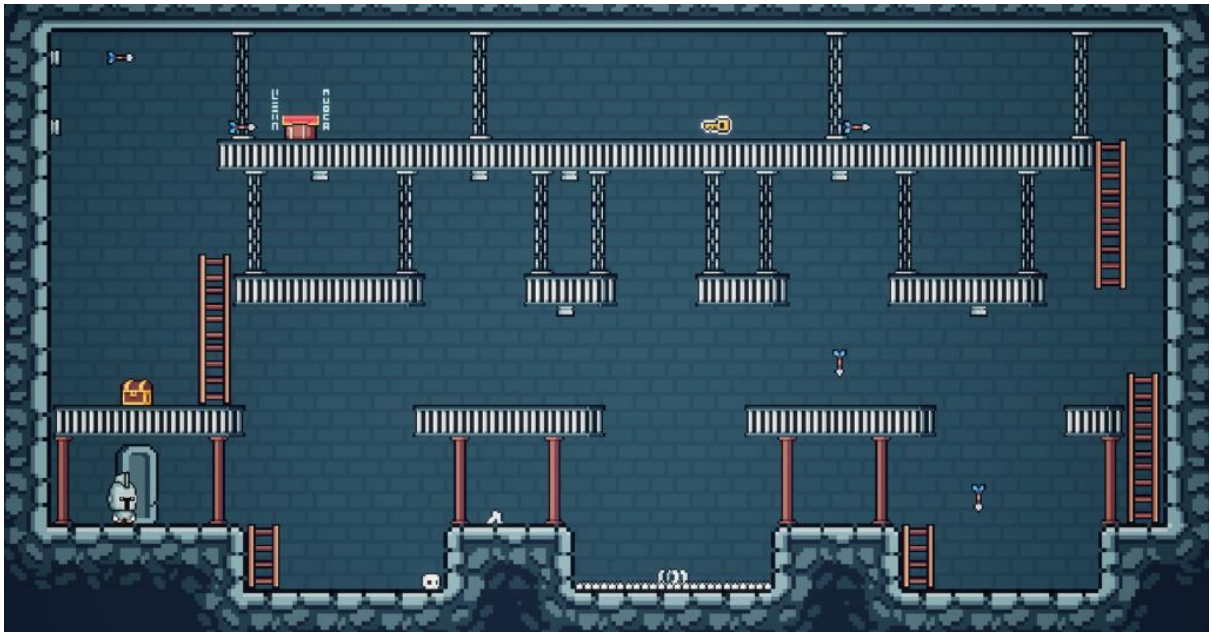
Level 4

For the forth level it introduces traps to the player such as the spike trap and arrow trap, seen in Spelunky, to add much more danger to the level to where the player now needs to look out for where the stand and fall as it may result in death, also I have especially designed the level to be structured in floors in which multiple traps overlap different floors, so the same traps is a danger to floor 2 and 3, so that the number of traps is reduced as many traps scattered around the level maybe confusing to the player but a few traps encountered several times is easy to keep track of. The level is divided into 4 floors, 1 being the bottom and 4 being the top, so that floor 1 features 3 long jumps which may be difficult to the player so the first jump has no danger, the 2nd has spikes and the 3rd has an arrow trap so the player has to time their jumps, for the 2nd floor it features several arrow traps and falls which will cause them to fall back down to floor 1, for floor 3 it features more arrow traps and falls which will either get the player back on floor 2 or the spike pit, and for floor 4 it has 2 arrow traps which fire at 2 different times so the player has to carefully time their jumps to avoid the arrows and by the positioning of the key and alter the player has to do the 3rd and 4th floor twice to complete the level.

Floor 4 Plan:



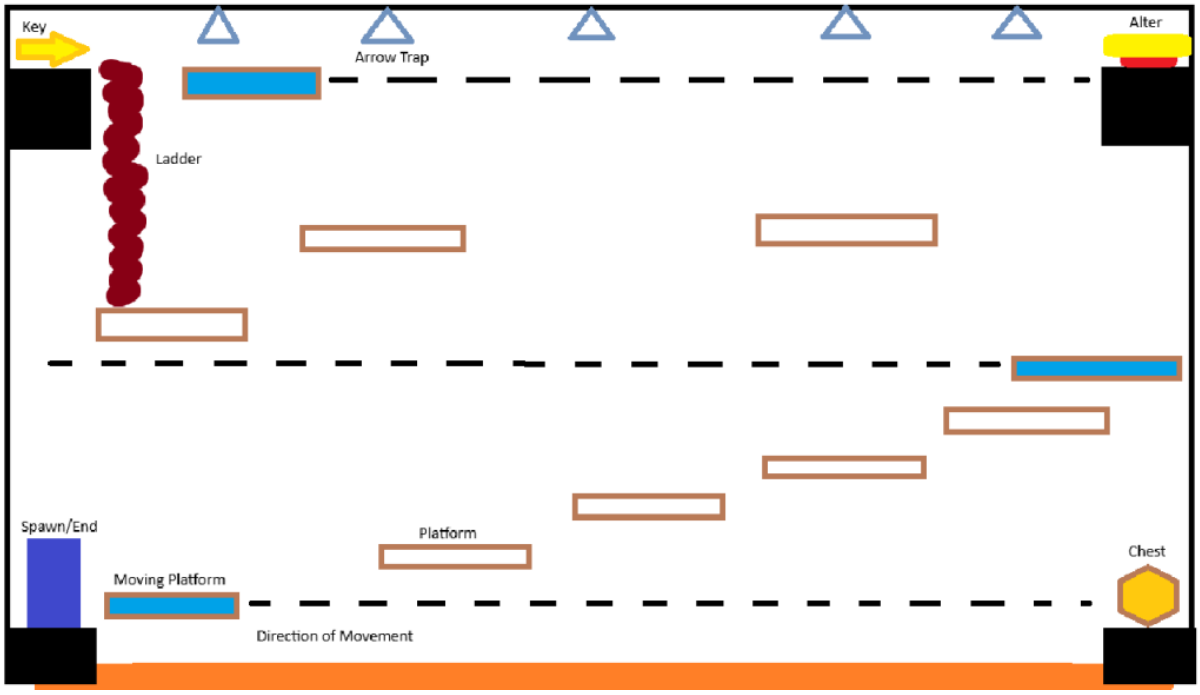
Floor 4:



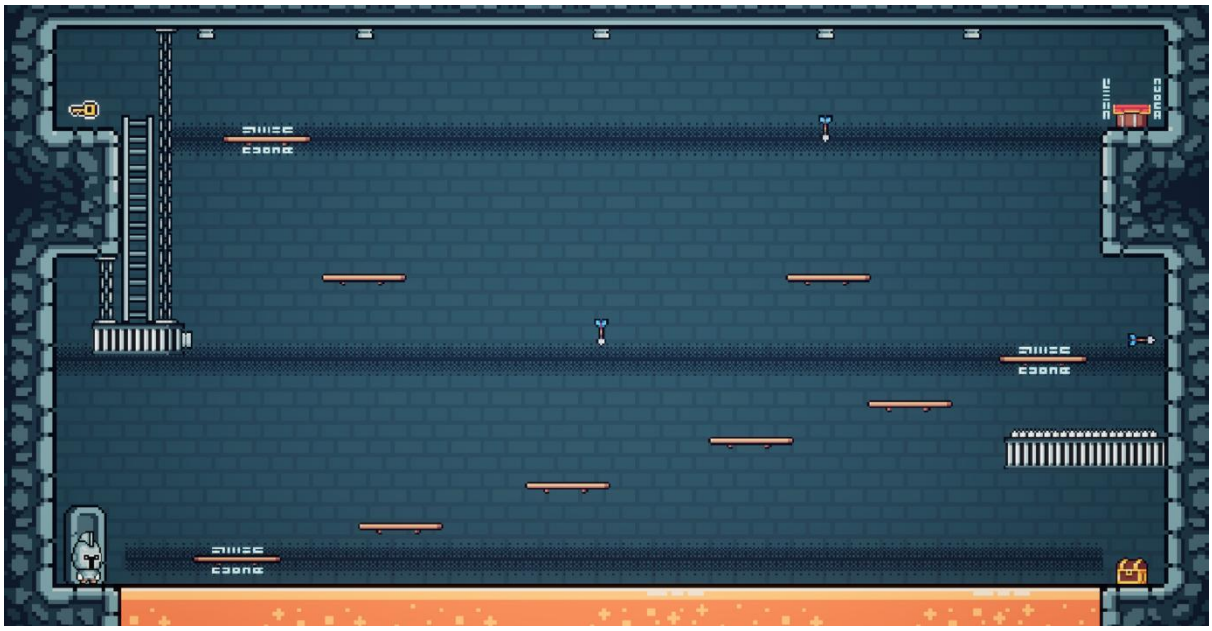
Level 5

For the fifth and final level it is a combination of all with dangers and mechanics with the addition of 1 new mechanic, the moving platform. I designed this level to where the player needs to make an N movement across the level as each key point is placed in all 4 corners of the level, so the player needs to make their way up and down the level at least twice avoiding the arrows on the moving platform and without falling into the lava. I had to make 1 change from the initial plan for the level as I overlooked the chest as once you reached the key you could easily ride the one of the moving platforms and land on the chest, so I added a spike platform to prevent this as well as an arrow trap in range of one the moving platform so the player has to jump over the arrow while riding the platform for slightly more difficulty.

Level 5 Plan:



Level 5:



The Win Level

With the final level complete the player will be transported to the Win level in which it tells the player that “You Win” and features several different decorative items as well as the Crystal and Alter so the player is able to finish the level, which would take them back to the Main Menu. The only design choice for this level is that I placed the Alter on the other end of the level on purpose so the player must walk through and admire the whole level before they can leave.

Level Structure

Since the game is 2D the sprites need to be positioned in a certain order as it focuses of the X axis and the position on the Y axis is important, since the player moves along the X axis which is 0 on the Y axis any sprites placed on 0 in Y will block the players path, which is good for the ground but not for decoration or key items. So, to prevent this I place everything on certain places on the Y axis:

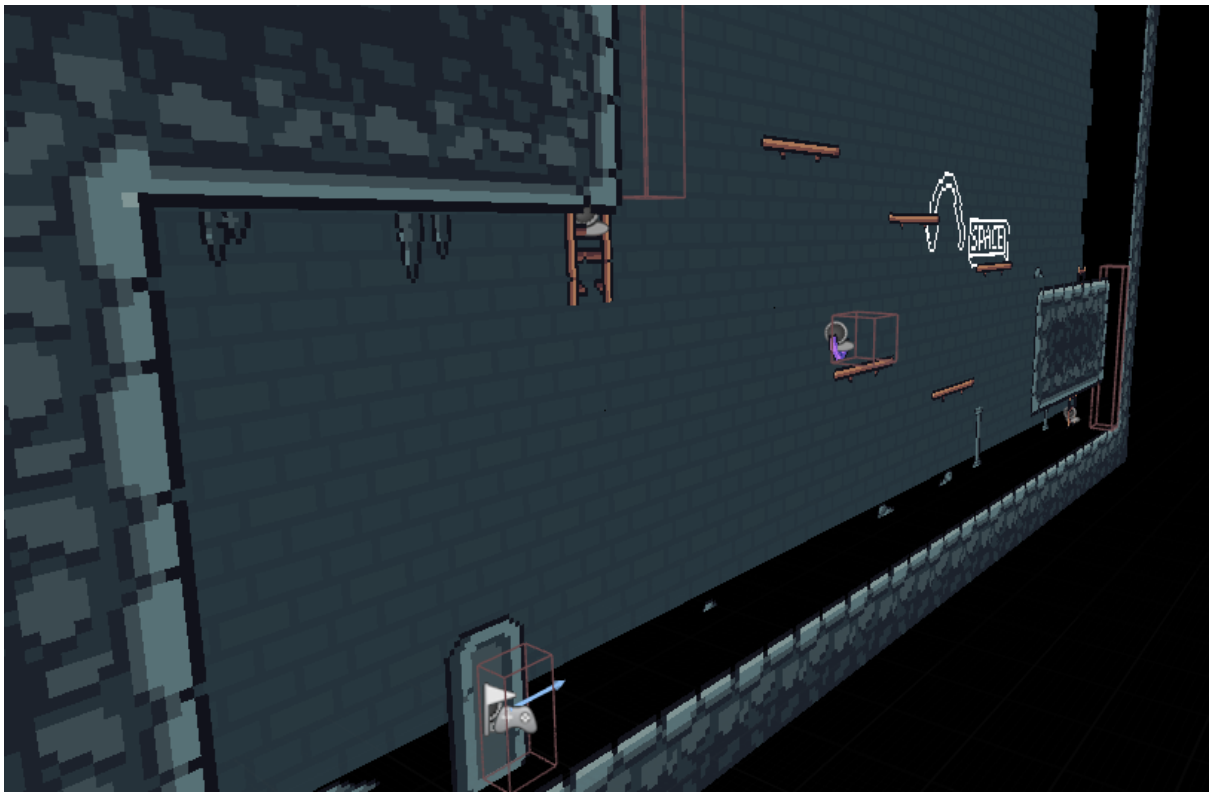
50. Foreground for anything the player walks behind, lava fall.

0. The player and Sprites such as the ground and platforms.

-50. Interactable such as Crystal and ladders.

-100 - -150. Decoration.

-200. Background tiles.

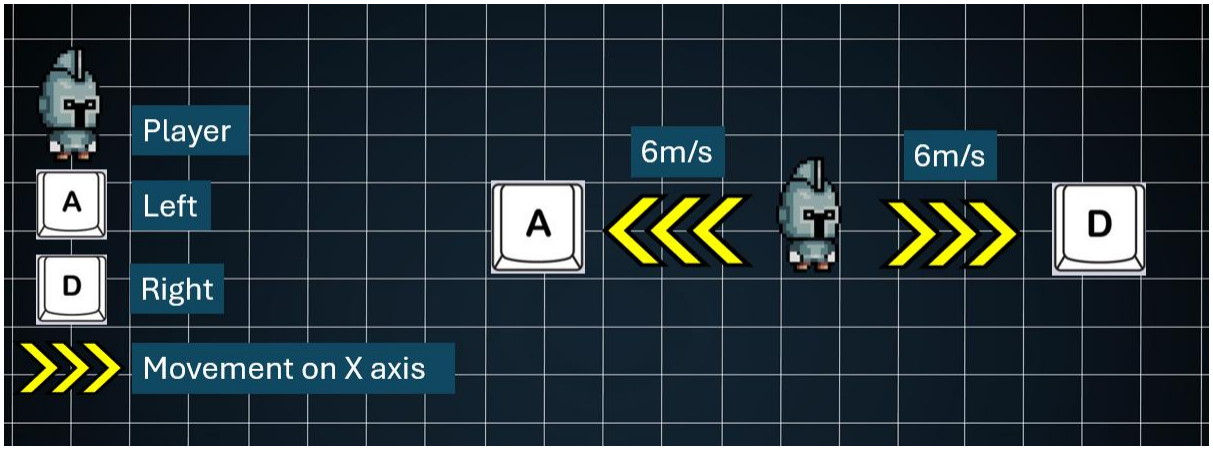


Mechanics

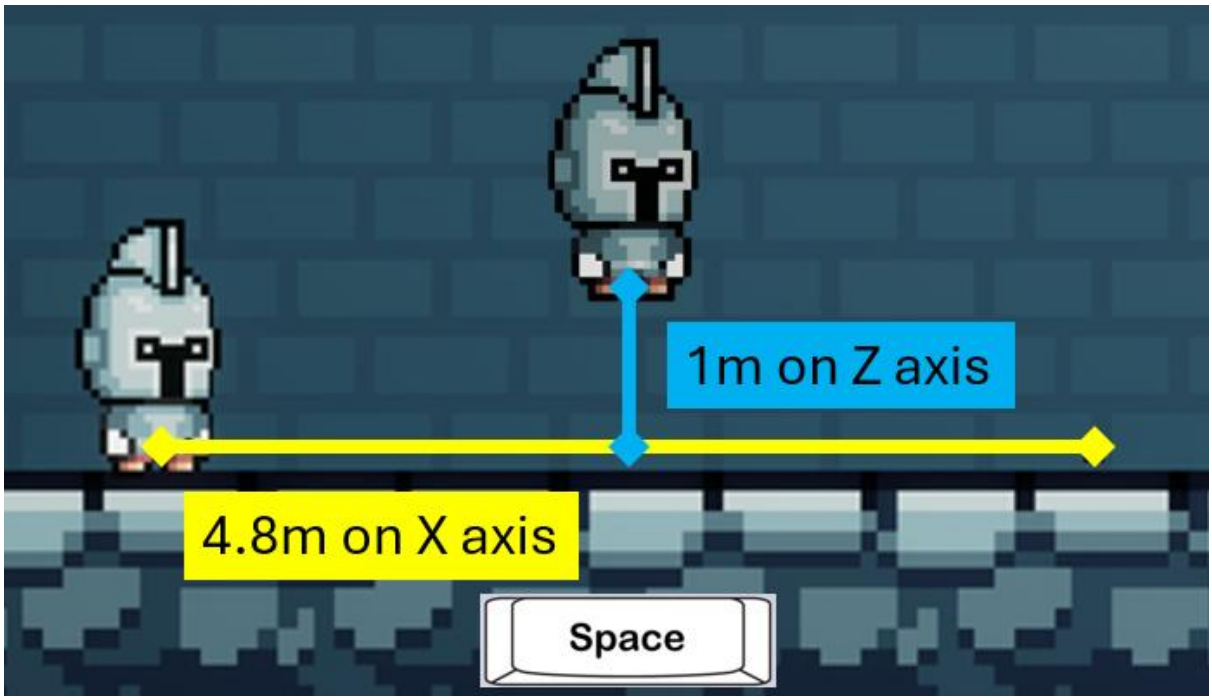
The Player Character/ BP Man

The character in which the player controls is a Knight with inputs, left, right and jump, which is just movement, with no interaction button, as I chose to make all interactions automatic rather than requiring input to make the controls simple for the player to understand.

For movement since it is a 2D game the player can only move left and right, using A and D to move, at 6 metres a second as the player is quite small compared to the tiles of the level as this is because I chose to have the camera stationary similar to portal 2D so the level size is attached to the screen so to make most of the room the player is slightly smaller than the world tiles so he can fit in the world and to compensate for this the player needs to move lightly faster so he doesn't feel tiny.

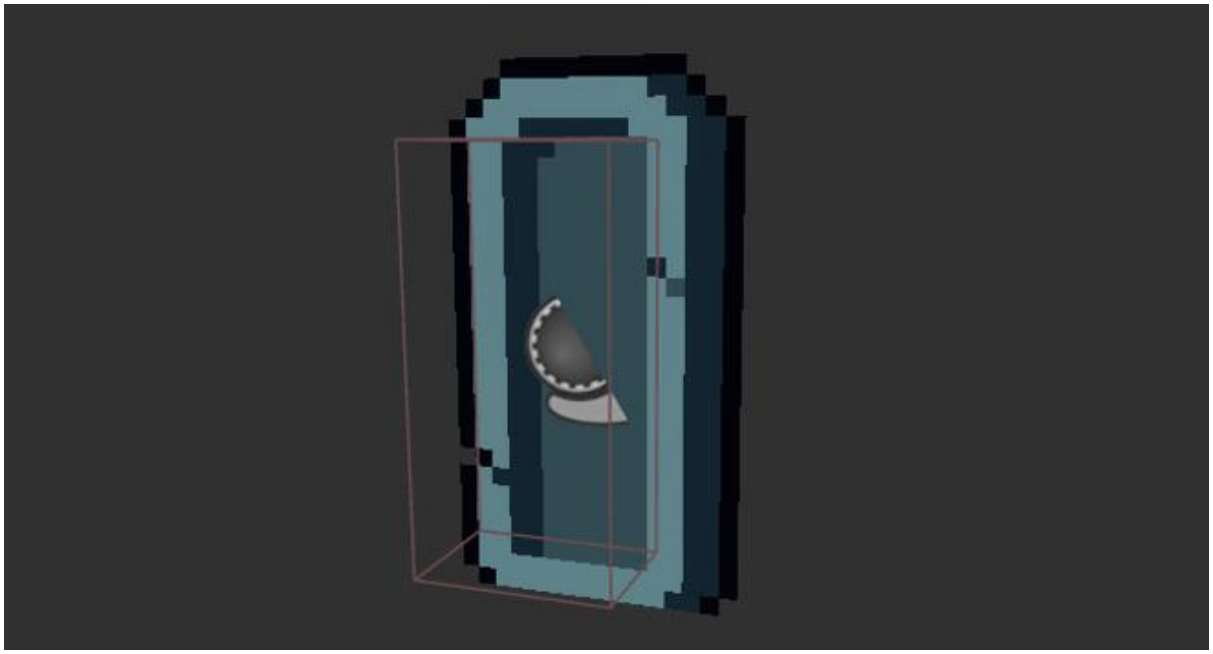


The player can also jump at 4.8 metres or 3 tiles on the X axis and can jump an upwards, on Z axis, of 1 metre or 2 background bricks because the levels are constructed to be vertical as by the stationary camera the levels lack horizontal room but have much vertical room, so the player can't jump quite high because it would bypass most of the jumping puzzles but the player can jump quite far to make the jumping puzzles more interesting by having either difficult long jumps or short precise jumps. Also I altered the Air control for the player character to be 0.2 so the player has enough control to move their character in the air to be able to land where they want to but not enough air control to be able to undo their jump or land somewhere else, as they jump to land where they aimed and if they miss they cannot undo their action.

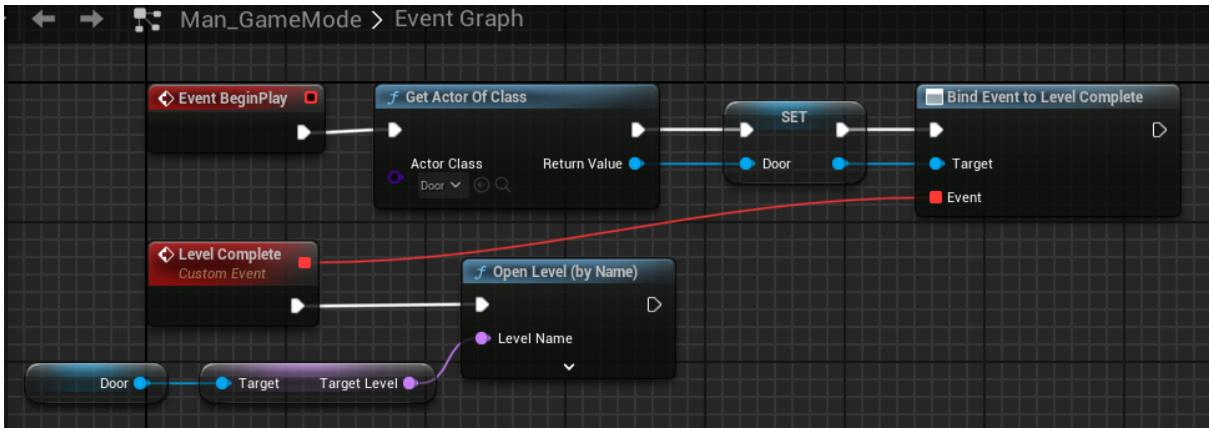


End Door

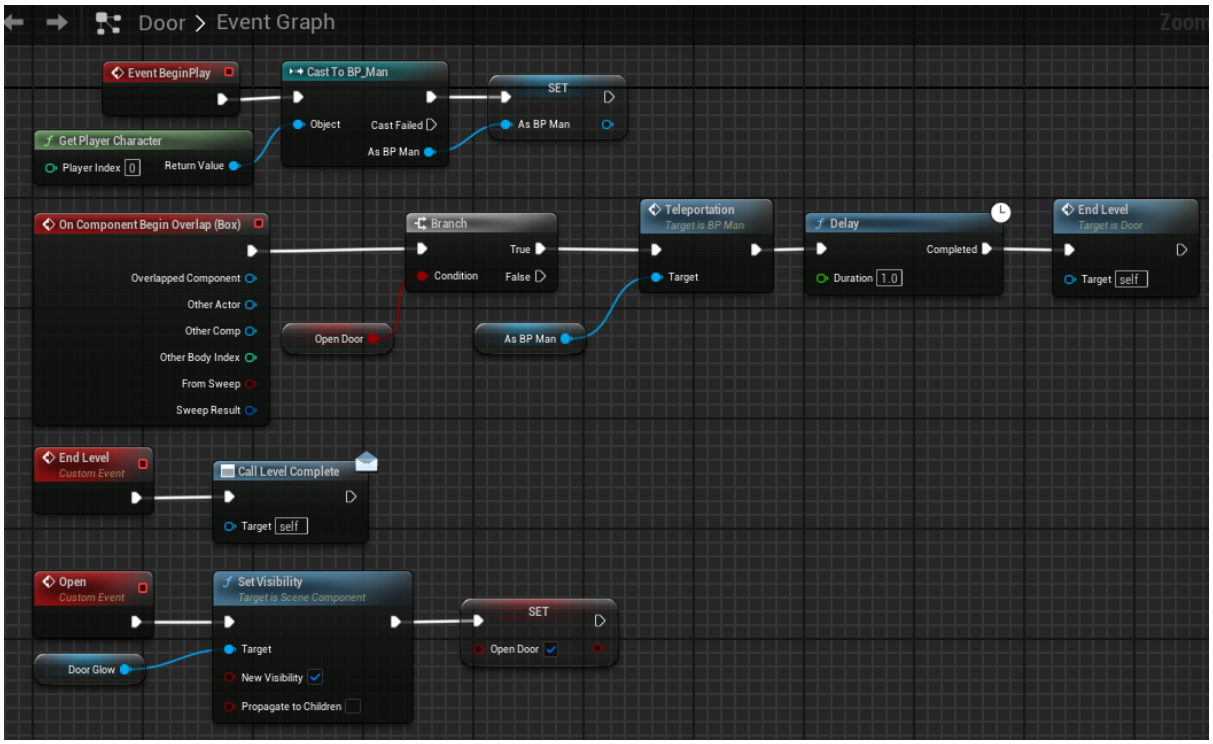
The Door works with the player character and the game mode to open the next level and triggering the animation. First the initial plan was the player starts at the Door, but the Door isn't the spawn point, the Player start is just placed next to the Door, so it looks like you spawn at the Door.

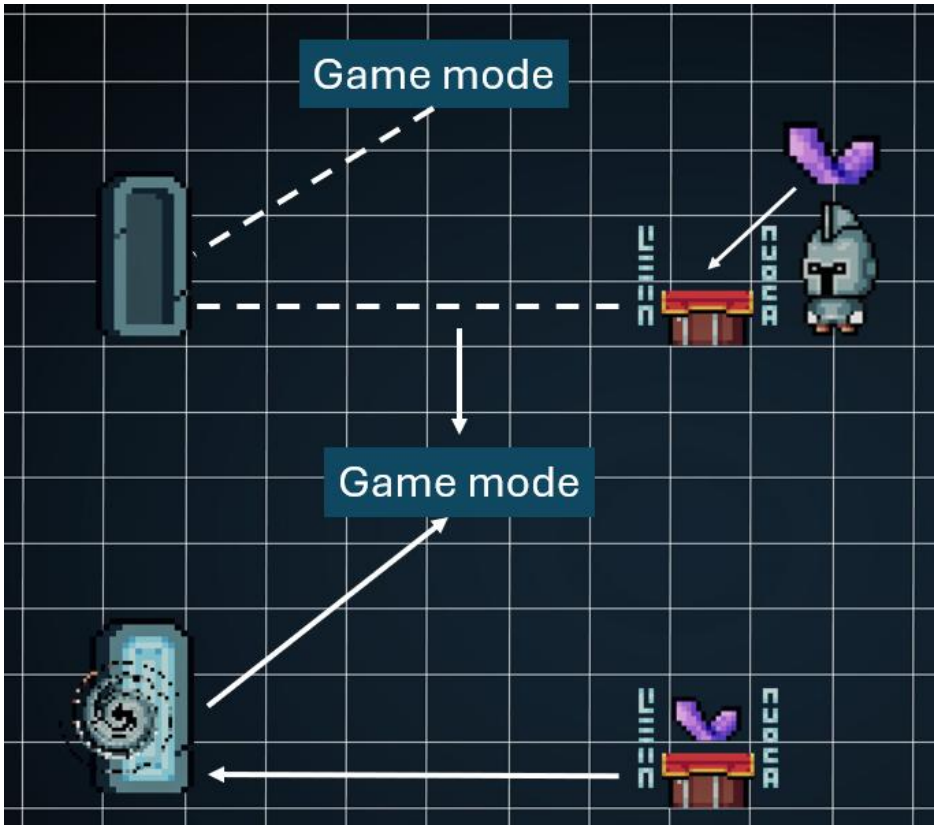


How the Door functions is the Game mode first referencing the Door by class, as this is done because there is only 1 Door in each level, except the Main Menu which has special Doors that are already open either to the first level or quits the game, so it doesn't cause issues using Actor of Class since there is only 1. What the Game mode gets from referencing the Door is the editable variable Target Level which is the name of the next level to open when the player completes the level, as each level needs to be manually inserted into the variable to open the next level.



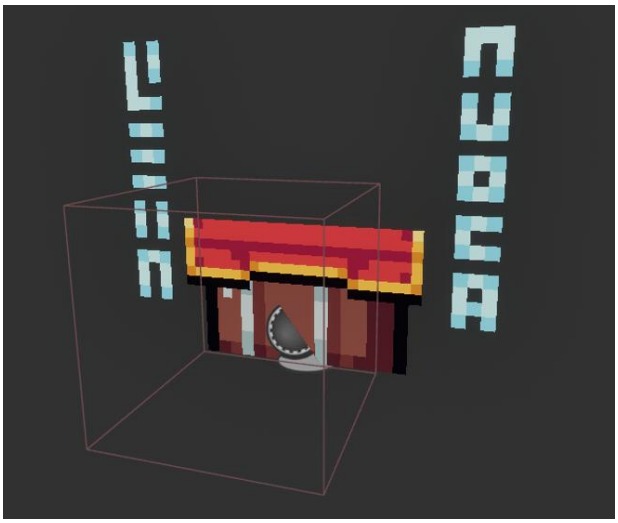
For the Door itself it only controls the animation for the player and itself as well as calling the game mode that the level is complete by an event dispatcher. How it works is the Alter triggers “Open” which shows the door glowing, so the player knows the door is open, and sets the Open Dor to true to where the player goes to the door, it will trigger the teleport animation in the player character before a 1 second delay then calling the level complete, the reason for the delay is to give time for the teleport animation to playout, otherwise it would open the next level immediately without warning once the player goes to the door, so it makes it look nice and smooth with the player completing the level.

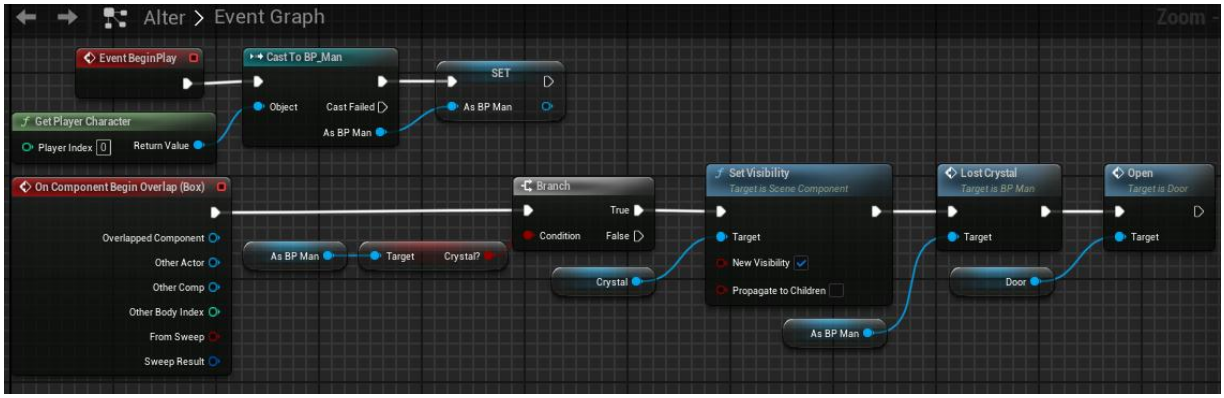


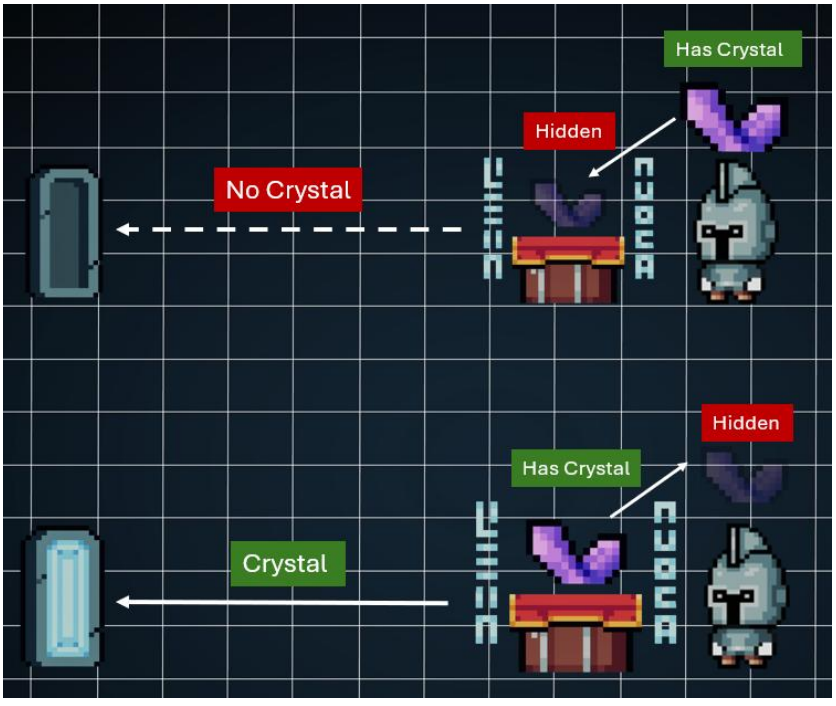


Alter

The Alter works by checking if the player has the Crystal via Boolean in the player by casting to the player and checking if they have the Crystal whenever they overlap the Alter, and if true it will place the crystal on the alter and trigger the Door to “Open” and will hide the Crystal on the player. The Crystal isn’t placed on the Alter it just a use of visibility changes on the Alter and the player, so it looks like the player places the crystal on the Alter, but it just shows and hides the Crystal on the player and shows it on the Alter as they both have the Crystal it is just not visible at the same time.

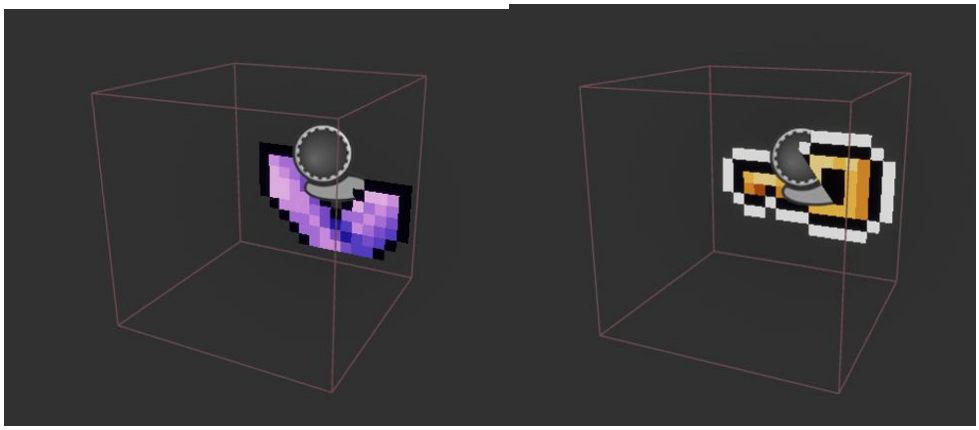


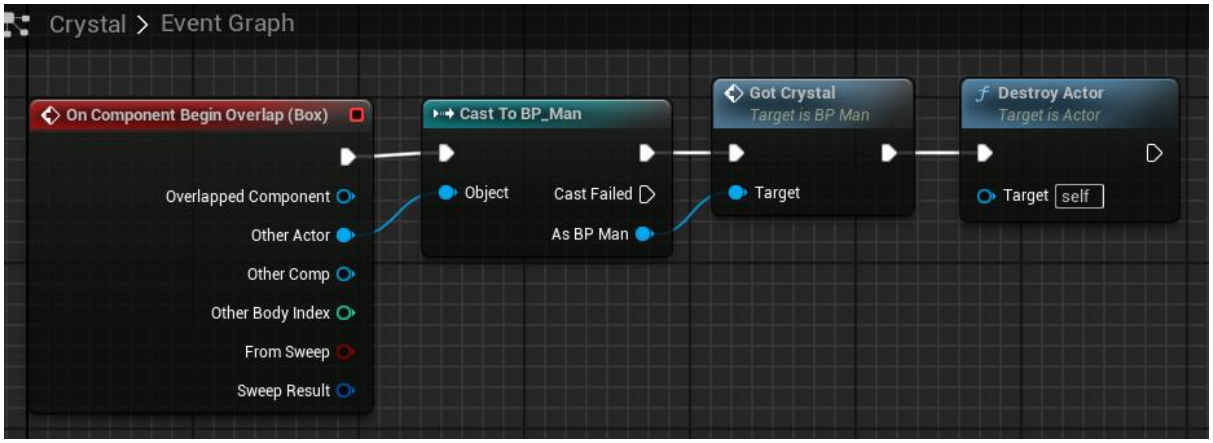


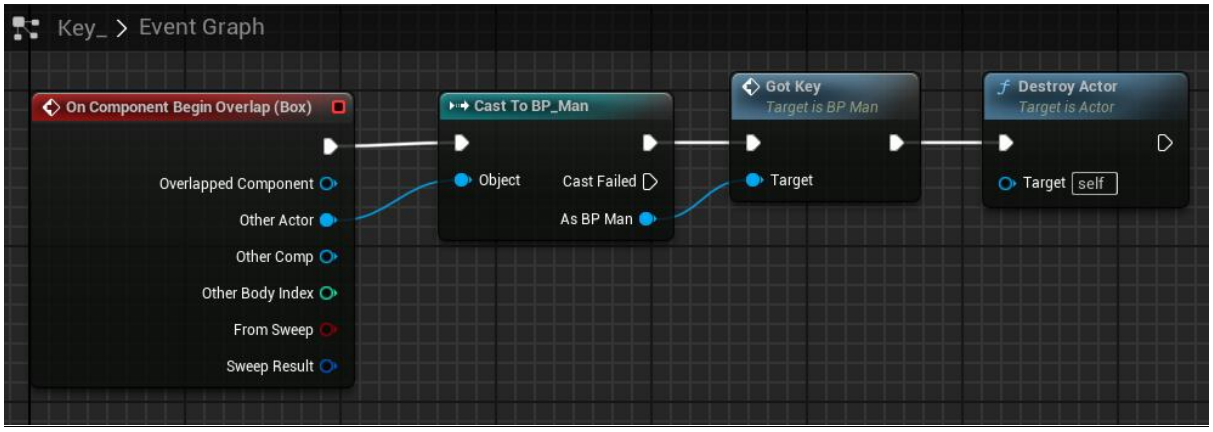


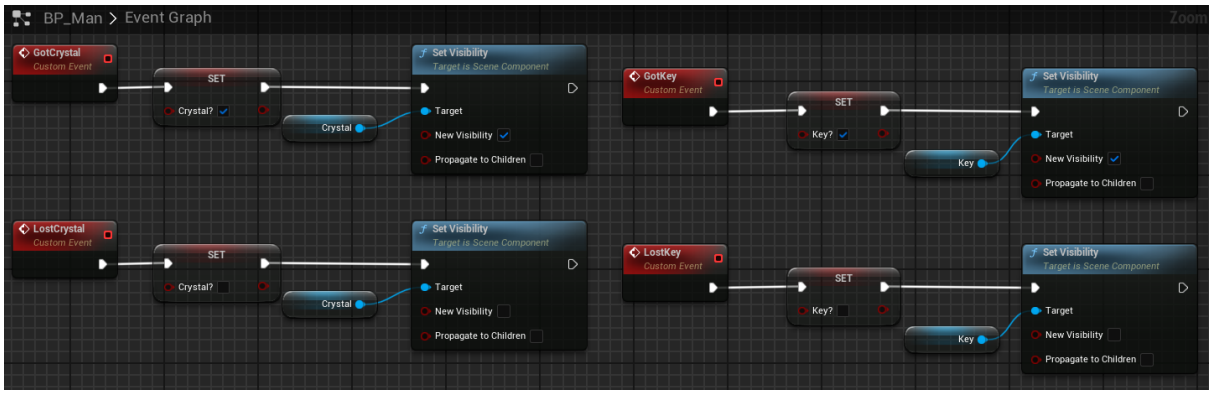
Crystal and Key

The Crystal and the Key work the same but trigger 2 different Booleans that are all controlled in the player to simplify communication between the Alter and Chest. How they work is by when the player overlaps them it casts to the player to tell them they have got the item, which sets the visibility to show the player is carrying it and sets the Boolean to true








BP_Man > Event Graph
Zoom
GotCrystal
Custom Event
SET
Crystal?
Crystal
Set Visibility
Target is Scene Component
Target
New Visibility
Propagate to Children
GotKey
Custom Event
SET
Key?
Key
Set Visibility
Target is Scene Component
Target
New Visibility
Propagate to Children
LostCrystal
Custom Event
SET
Crystal?
Crystal
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Target is Scene Component
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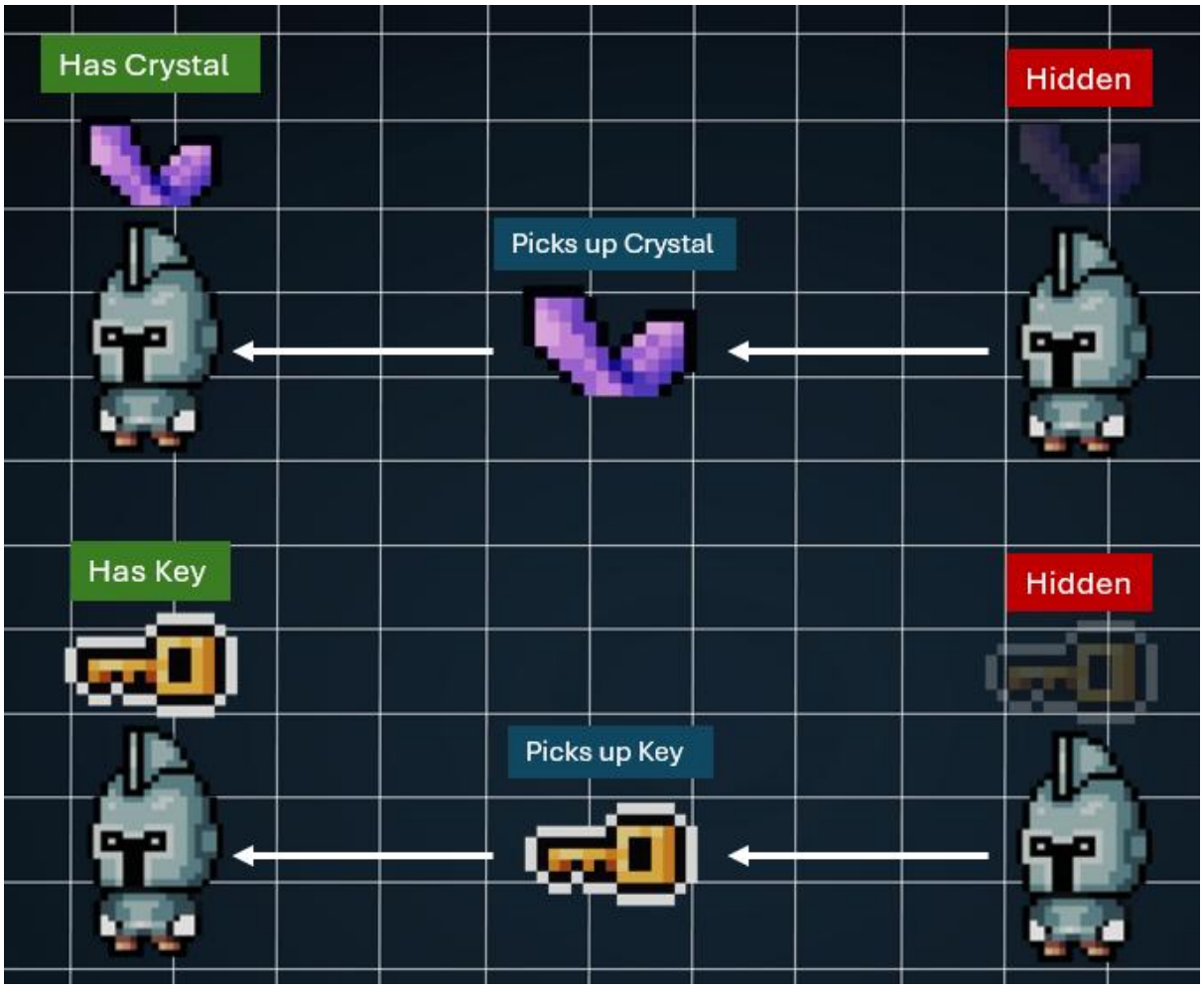
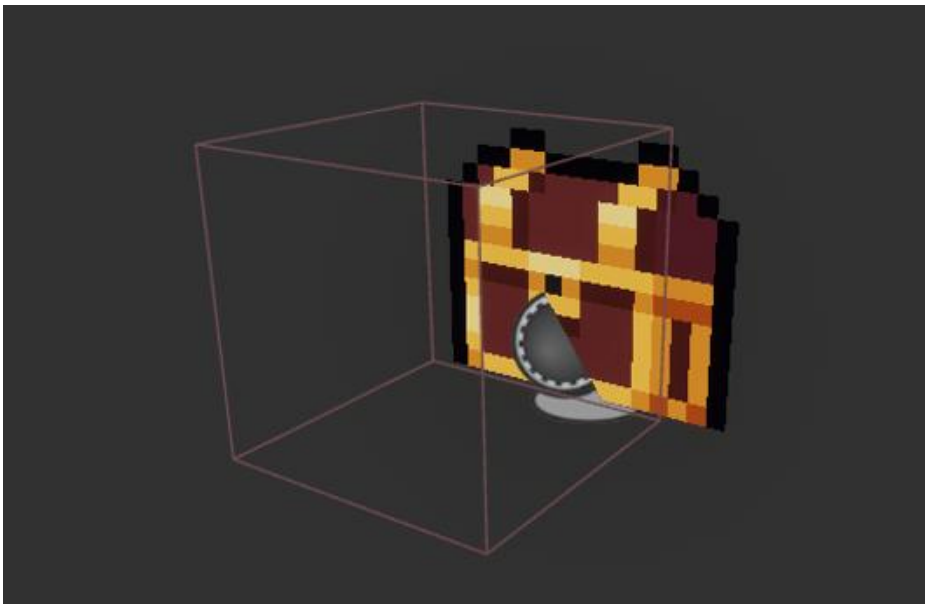
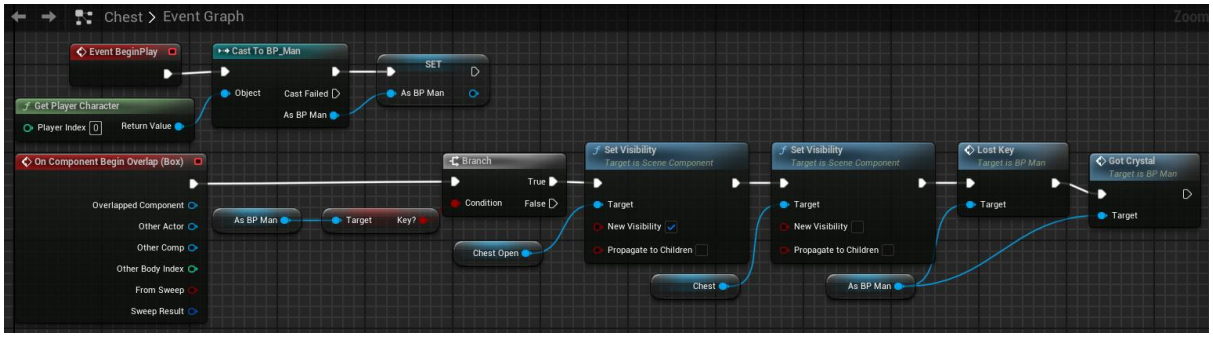
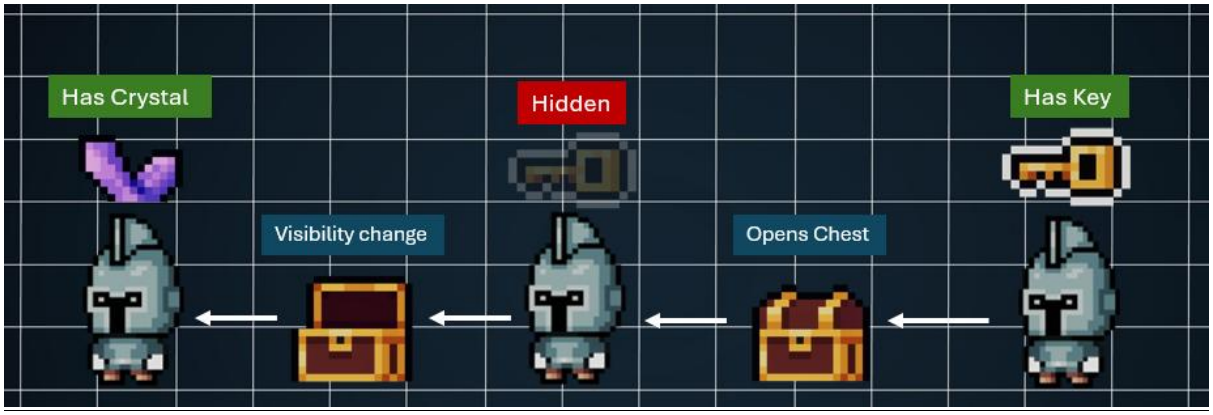

Has Crystal
Hidden
Picks up Crystal
Has Key
Hidden
Picks up Key

Chest

The Chest works like the Alter by instead of checking the player has the Crystal, it checks to see if hey have the Key and if true it will give them the Key. How this works is by casting to the player to see if they have the Key when they overlap the Chest, and if they do have the Key it will first switch the Chest to be open, as there are 2 Chest sprites in the Chest, one being closed the other open, and once the player “opens the chest” it switches the visibilities to the chest being open before rewarding the player the Crystal.



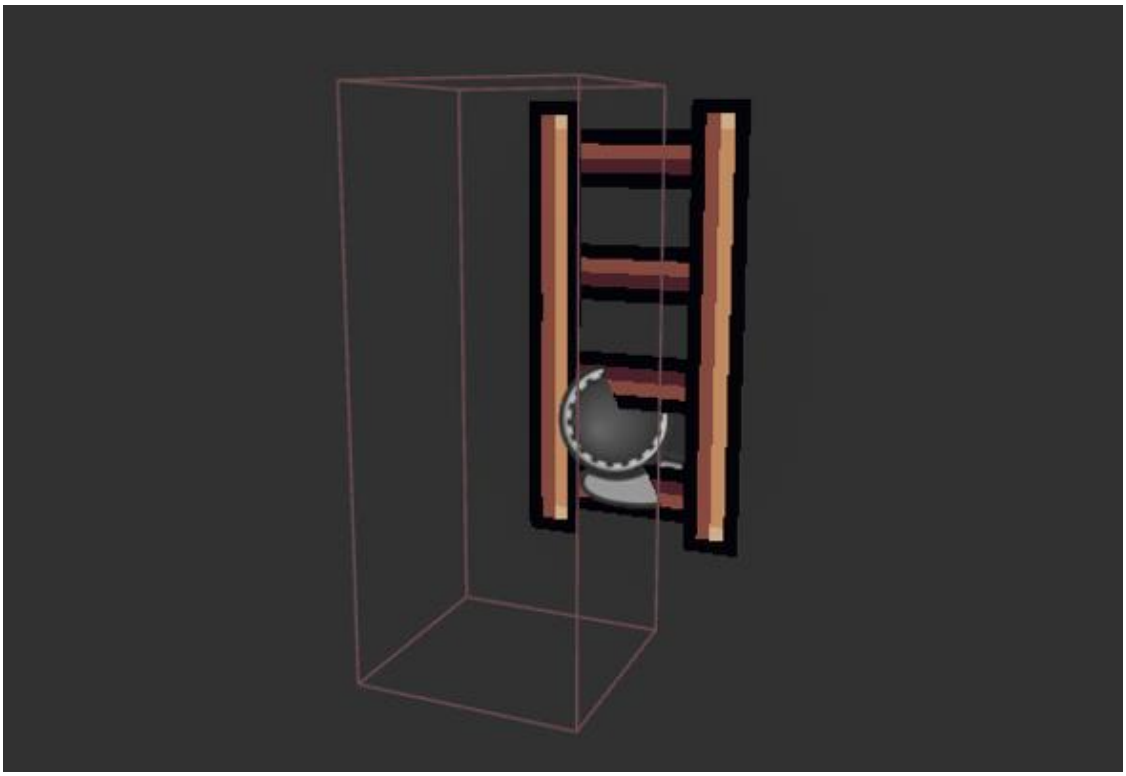


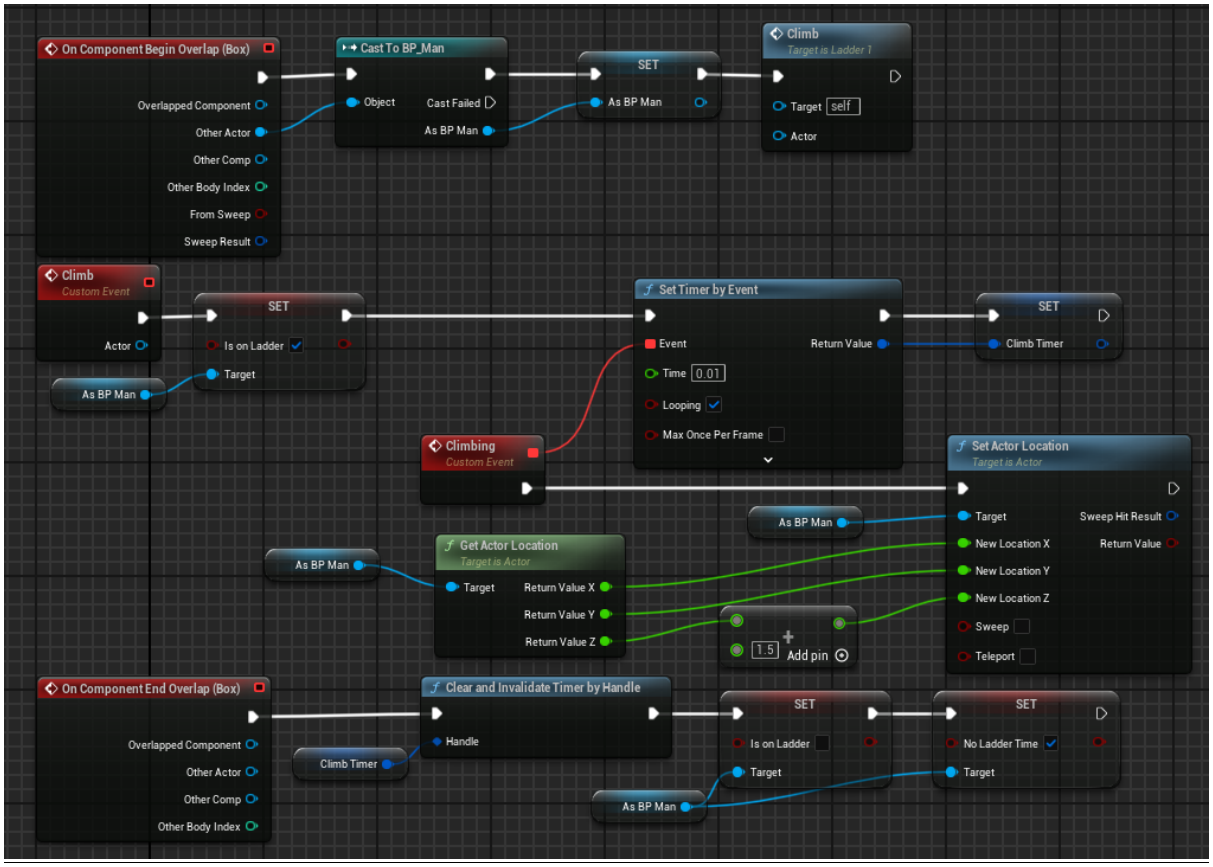


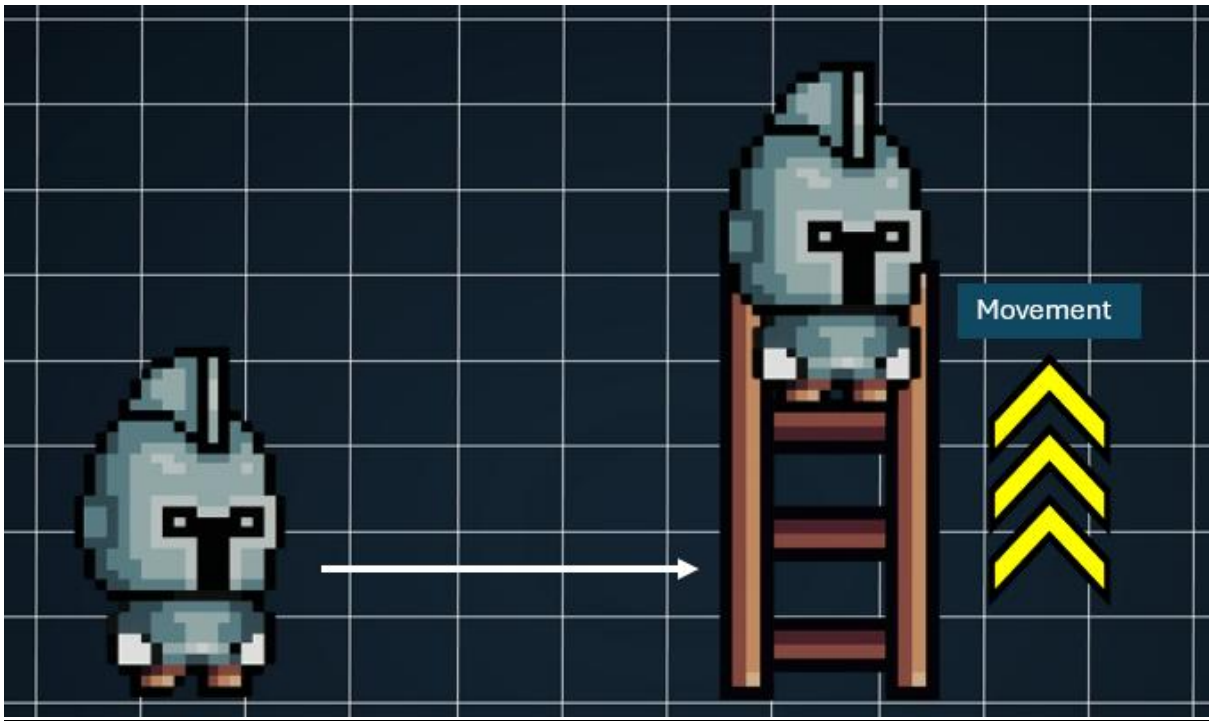
Ladder

For the Ladder it works by switching the player's movement mode to Flying so they float up the ladder until they reach the top or get off the ladder which switches them back to walking mode. I initial had some difficulty having the player climb the ladder as it would cause issues with axis alignment and launching the player, so I settled with altering the movement mode of the player so it lifts the player smoothly so it looks like they are climbing a ladder by this has the issue of that the player cannot climb down the ladder, which can be used to create 1 way paths, but the only way down is to fall somewhere else.

How the ladder works is when the player overlaps the ladder it switches the player to Flying, so they aren't effected by gravity as it would cause the player to shake violently from falling, it sets get the player's location and adds 1.5 to the Z axis every 0.01 seconds, so the player goes upwards on the ladder, on a loop which is cleared and invalidated once the player steps off the ladder. There are different variations of the ladder on length and sprites in the level which are just children of the ladder 1 as the only thing that is different is the length and sprite and all the code remains the same, so children work for the variations.

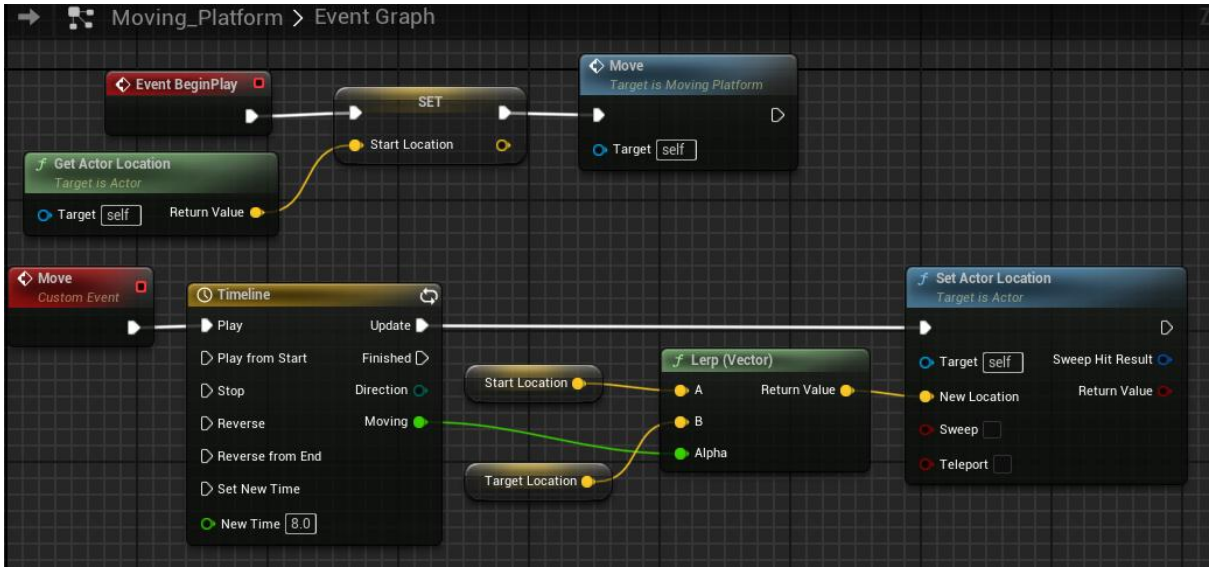


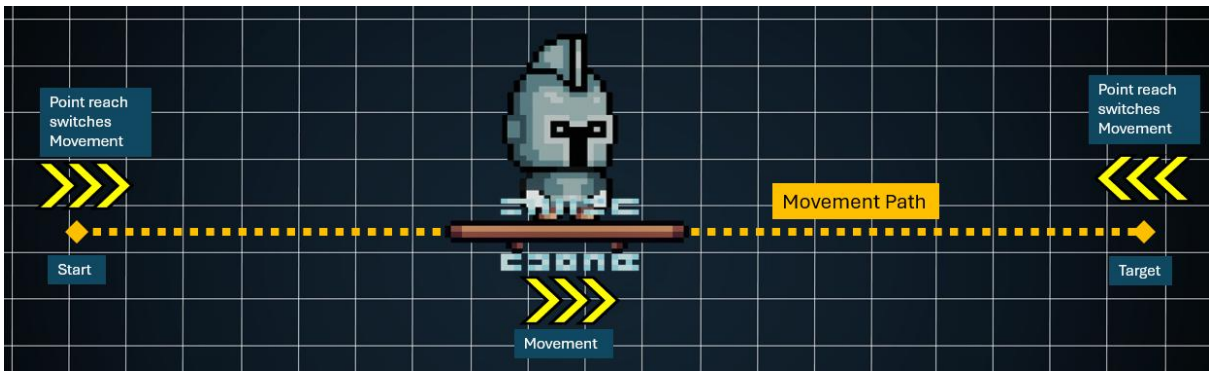

On Component Begin Overlap (Box)
Overlapped Component
Other Actor
Other Comp
Other Body Index
From Sweep
Sweep Result
Cast To BP_Man
Object
Cast Failed
As BP Man
SET
As BP Man
Climb
Target is Ladder 1
Target
self
Actor
Climb
Custom Event
Actor
SET
Is on Ladder
Target
As BP Man
Set Timer by Event
Event
Return Value
Time
0.01
Looping
Max Once Per Frame
SET
Climb Timer
Climbing
Custom Event
Set Actor Location
Target is Actor
Target
New Location X
New Location Y
New Location Z
Sweep
Teleport
Sweep Hit Result
Return Value
As BP Man
Get Actor Location
Target is Actor
Target
Return Value X
Return Value Y
Return Value Z
As BP Man
1.5
Add pin
On Component End Overlap (Box)
Overlapped Component
Other Actor
Other Comp
Other Body Index
Clear and Invalidate Timer by Handle
Handle
Climb Timer
SET
Is on Ladder
Target
SET
No Ladder Time
Target
As BP Man


Movement

Moving Platform

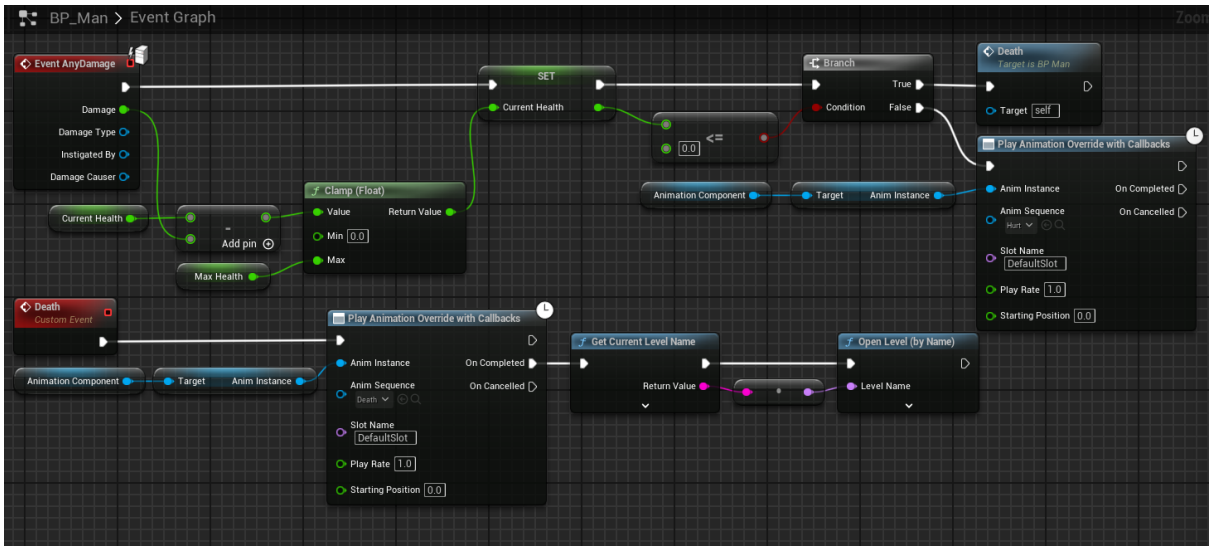
The Moving Platform is only seen in the final level of the game, seen in Portal 2D, and what it does it moves between 2 different set points along a straight line. How it works is by timeline and 2 vector variables, 1 being the Target Location which is editable and the other being the Start location, as it sets the start location to where it is placed at begin play and the Target Location is manually inserted and it will lerp across the Time line by switching between location looping forever, so it looks like it slowly moves between the start location to the target location.

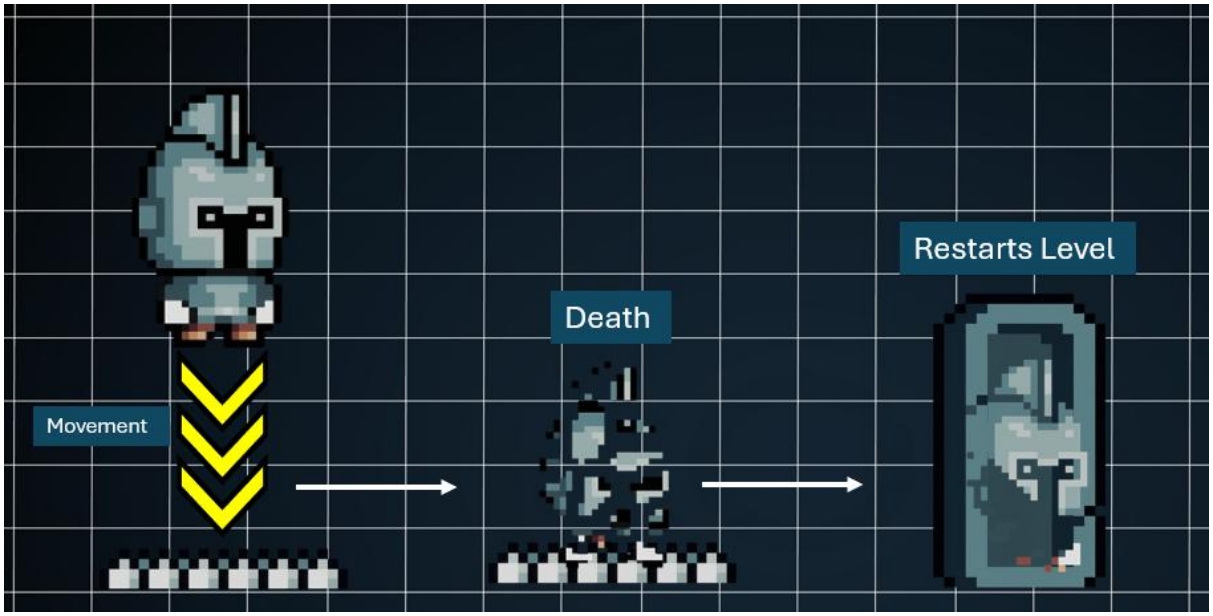




Death

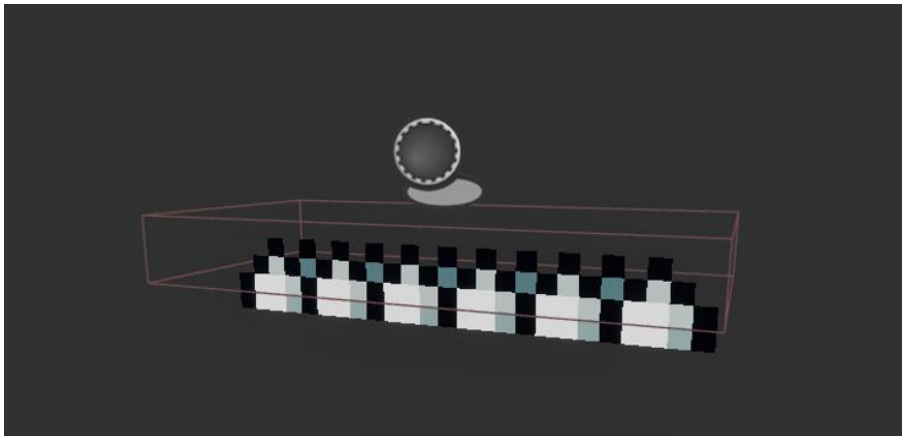
How Death works for the player is rather than them respawning in the level, it restarts the level instead as death results in the player having to try it all again, because falling causes them slight inconvenience with just a back track but dying will cause the player to start all over again. Ho it works is when ever the player takes damage it checks to see if the player's health has gone below 0, if not it just plays a hurt animation so the player knows that they have received damage, if true it will play the death animation, so the player knows they have died before reopening the current level, this method works because nothing is carried over between levels so reopening the current level doesn't mess with any other systems.

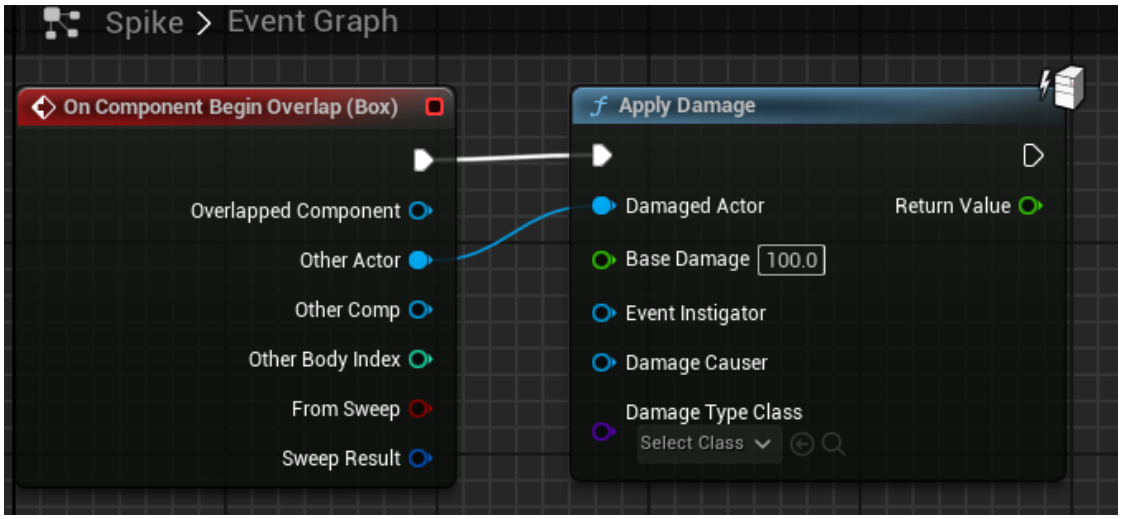


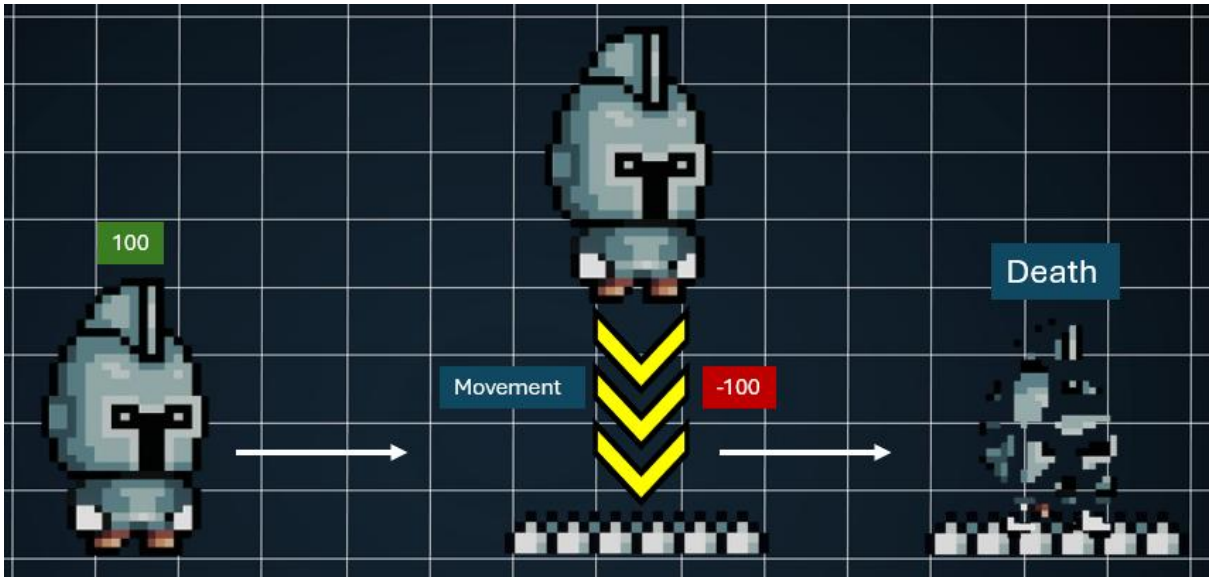


Spike Trap

The Spike Trap is a set of spikes on the ground which when the player steps on they die, like Spelunky. How they work is a simply box collision which the when the player overlaps deals a lethal amount of damage, in the blueprint the spikes are positioned to be in the foreground of the level and the box collision extends so when the player falls on the spikes it looks like from the camera they have been impaled on the spikes, for a touch of decoration.

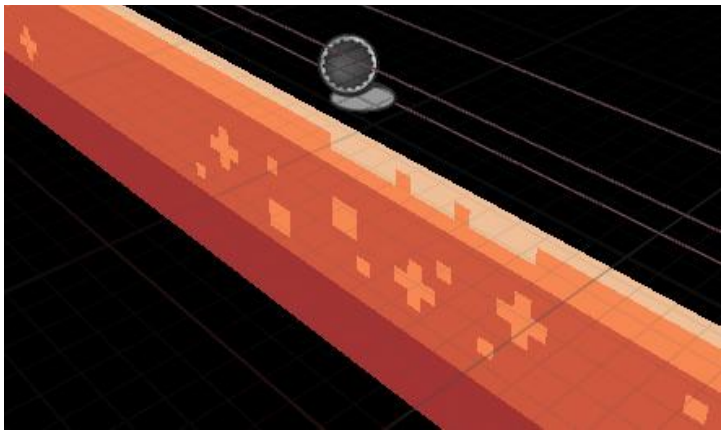


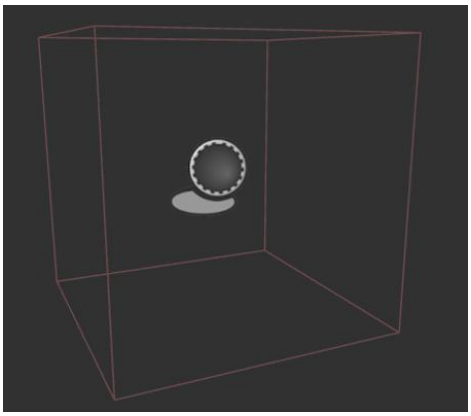


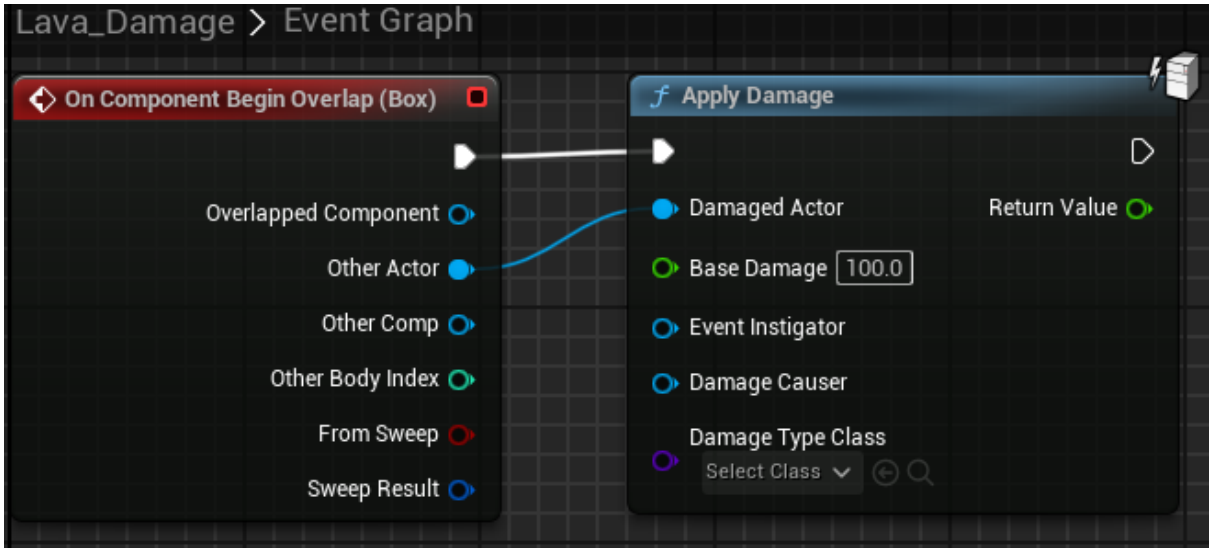


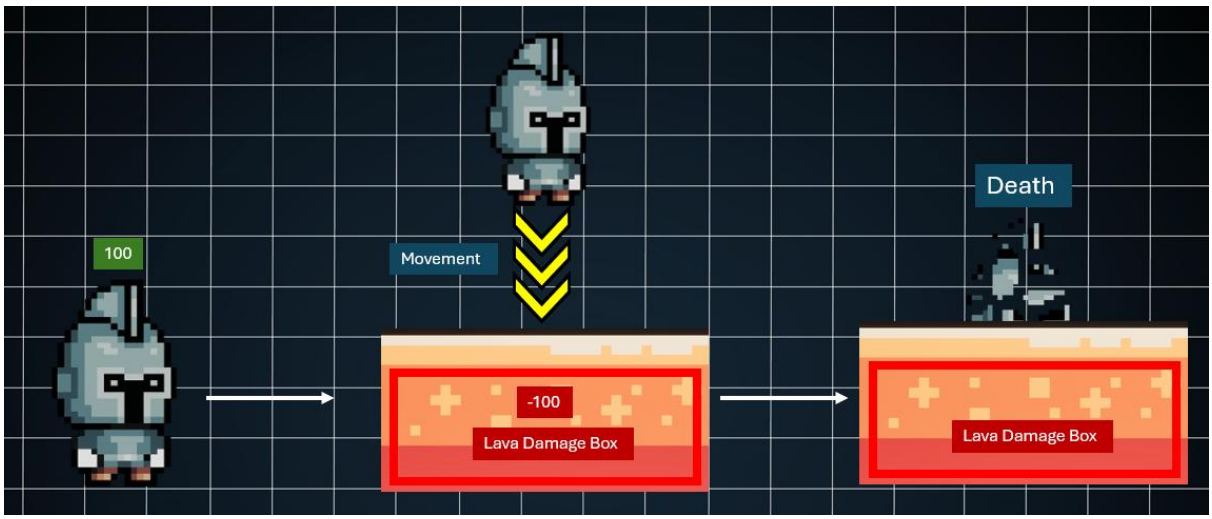
Lava

The Lava seen within the level just a regular sprite, what causes the damage is a sperate box collision placed behind the lava that kills the player when they overlap it. The reason why the damage collision is separate to the sprite is because there are several different lava sprites to use, so I they were combined it would be more inconvenient to add damage to each sprite, so to be more efficient I separated them so the damage collision is 1 separate entity which can be scaled to fit the other lava sprites. How it works is exactly like the sprites to when the player overlaps the damage box it will apply lethal damage, killing the player.



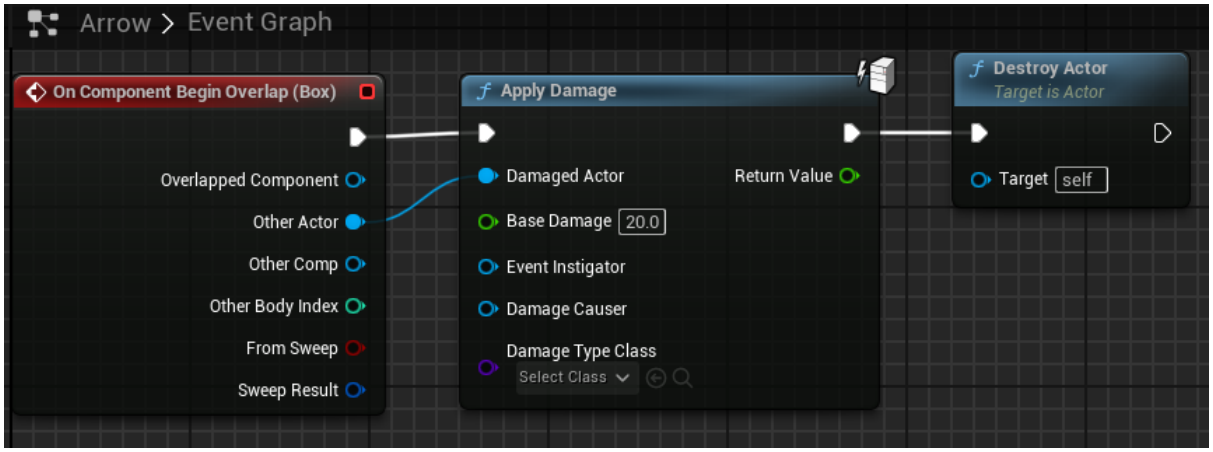


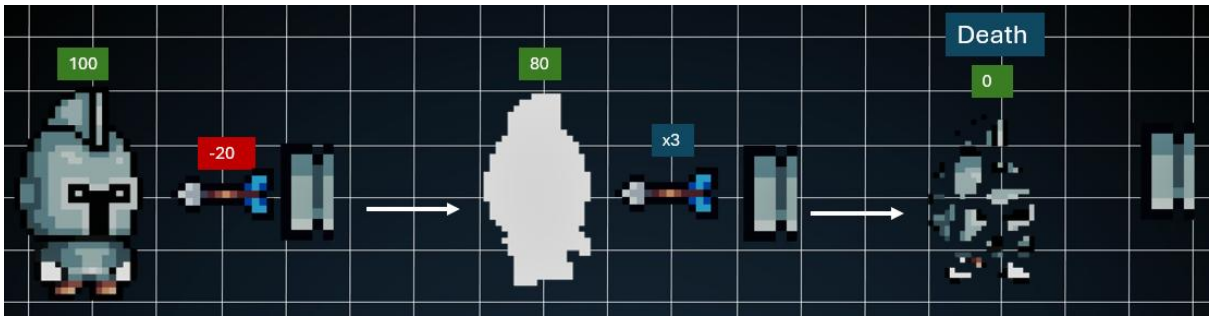




Arrow Trap and Arrow

The Arrow is an arrow sprite with a small collision box covering the arrow head which deals 20 damage on hit before being destroyed, as it makes the arow easier to dodge as only the head does damage and the player can get hit with at least 4 arrows before dying to give the player more leniency on dying as all other sources of damage are 1 hit. For the Arrow Wall Trap it spawns an Arrow on a loop with an editable Time variable so that each Wall Trap fires at a different times so there isn't a rain of arrows at once and that it is required to fire at different times on level 4.





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