

# **Time Warp Final Report**

## **Overview and Game Description**

### **About Time Warp**

The story of the game takes place in medieval times and is focused around a dangerous criminal that has been locked up at the bottom of a multi-floored (multiple levels) dungeon. The criminal longs to escape and through unique means acquires the ability to travel to the past to when the dungeon was being constructed, for a limited time. The player will play as this dangerous criminal and have to use their wits to solve puzzles, figure out the maze of each floor, and stealthily maneuver past guards to reach the end of each floor.

You are imprisoned in an underground dungeon of a medieval-age castle. It is the area's most complicated dungeon with the tightest security and the best trained guards. You have become entirely trapped inside this dungeon; however, you have a special ability. You are able to travel through time, but are only able to go back to the past and return to the present. To escape the dungeon, you must solve puzzles while avoiding the guards that eternally roam the dungeon. In order to escape each floor of the dungeon, you must find the one door that is on that floor; however, the door needs a key to unlock it. You must travel back in time and find the key and bring it back with you into the present in order to unlock the door to each floor and eventually escape the dungeon. But be careful, sometimes the dungeon can be very dark and you do not want to be suddenly attacked and captured by the guard or he will put you back into the cell on that floor. Also, use your wit and intellect to find your way through the maze that is each floor of the dungeon.

### **Two Timelines**

There are two timelines. There is the present timeline as well as the past timeline. In the present timeline the criminal is in jail and is trying to escape the dungeon. He must hide from the guards and try to find the door to where he can escape to the next level of the game, which is the next floor of the dungeon. In the past timeline, the dungeon is different since they are still fixing up and building the dungeon so some things are moved around. However, both the maze/map are the same in the past and the present. The maze just gets more difficult and changes as you move forward and onto each level. In the past timeline, the criminal (you as the user) have to find the key to be able to open the door in the present once you time travel back and be able to finish the level and escape the dungeon at the end of all levels. The past timeline is also where the criminal has to solve puzzles that you interact with in order to get the key. The past timeline is also where the criminal solves the puzzle of what to do or interact with and where to go in order to alter the present timeline in order to be able to get to the door in the present timeline to escape that level since the criminal would be stuck otherwise. The present cannot be altered to affect the past nor can you just alter the present while you're in the present; you must travel into the past and do something in the past that alters the present. There are also guards in the past timeline as well that the criminal has to avoid. In both the past and present timelines, there are objects that the criminal can crouch and hide behind so that the guard does not see the criminal as they are walking their path and route in that level and that specific timeline. The guards are spawned and start their paths at different places in the past and present timelines per level. The guards also, therefore, have different paths in the past and present timelines of each level. The different timelines also have the guards' path to be different lengths where usually the past timeline has the guards having longer paths. Also, the different timelines usually have a

different amount of guards where usually the past timeline has more guards. The guards walk the same path and when they get to the end of their path they turn around and walk back to the beginning of it and so on. They do this forever until they are triggered and see the criminal and have to go and chase, attack, and capture him to put him back into the cell of that floor/level. The length of the paths of each guard is different as well and the lengths increase as the levels increase.

### **Guard and Criminal**

The guards are triggered and begin to chase the criminal if they see him. They only cannot see the criminal if he is behind them so the criminal has to be smart and patient and wait for the guard to pass and for them to sneakily go past and walk to the rest of the level and to not get caught. The criminal can also crouch and hide behind the objects and in that way be stealthy to also not get caught by the guard when they pass by. The criminal can also hear the guards getting closer or further by the sound and loudness of the guards' footsteps. The criminal cannot be in the guard's vision. The criminal cannot attack or interact with the guard. When the guard sees the criminal, he will start chasing and trying to catch the criminal. The criminal can run away from the guard and may be able to lose him by running away far enough and hide behind an object and wall so when the guard comes up and looks around he does not see him and is not triggered to catch him. The criminal's speed is constant. He can walk/run faster or slower. The guard when he is going through his usual path he is walking slower, but when the guard is chasing the criminal he is running and is faster. The player can hear the music get loud and faster paced when a guard/guards spotted him so he knows to run away and then the music will go back to normal once he has lost the guards. However, luckily the criminal is a bit faster than the guard so when the guard does chase him, the criminal can lose him by being smart and stealthy. When the guard catches the criminal, he will attack him and send him to the cell on that floor of the dungeon; so the criminal will have to start that level again from the beginning.

### **Time Travel**

When the criminal goes back to the present from the past, he goes to the spot that he was at in the present right before he time traveled to the past. When the criminal goes back to the past from the present, he goes to the spot that he was at in the past right before he time traveled to the present. The criminal begins each floor/level in the present timeline and the criminal starts at a specific point on the map/maze. The first time the criminal time travels from the present to the past the criminal just ends up at the beginning position of the past. There is a cooldown meter. When the meter is full, then you can time travel again. There is also a duration meter that shows you how much longer you have left to stay in the past timeline before it runs out and automatically sends you back to the present timeline. There is no duration for how long you can stay in the present timeline. These add a bit of difficulty to the game and makes it more fun, exciting, and interesting since the character has to be in a certain timeline for the period of time it takes for the cooldown meter to get full and can only be there for a certain duration of time; so the criminal cannot just time travel as they please at any given moment nor can the criminal stay in a certain timeline for a long period of time and they have to deal with the guards and situations in the timeline they are in. Both of these meters allow the criminal to use that puzzle solving skills and think about how to go about each level to use the time travel ability optimally so they do not lose the level. When the criminal travels to the past timeline, he sees a blue illuminated figure shaped like him that shows where he is in the present timeline since when you travel back to the present timeline you will go back to the initial position from where you traveled to

the past timeline. This also happens when the criminal goes from the past timeline to the present timeline so he sees the blue illuminated figure of where the criminal was when he traveled to the present timeline.

### **Game Design**

Time Warp is a first person 3D game that implements levels, problem and puzzle solving, object interaction, and character teleporting abilities.

### **Character Design**

There are two types of characters: the player plays as the criminal and the non-playable character is the guard. The guard is designed to look like a medieval knight. He has armor, a sword, and a helmet. They also sometimes carry torches, usually in the past timeline. The criminal's character design was also supposed to look like the medieval times, but because Unreal was charging us for any other character, we were not able to change the character's design. For reference, if you look at our logo that was our idea of how the criminal should look like. However, the default free character is just wearing a t-shirt and shorts.



### **Art Design**

We used Low-poly for all the art design of the levels and the dungeon.

### **Game Level Design**

Each of the levels of the game will take place in a floor of the multi-floored dungeon the player is attempting to escape from. Each floor is set in a medieval dungeon theme, meaning rock walls, and various medieval decorations such as torches to set the mood and the feeling of being trapped. The criminal (player) must be stealthy in each level to avoid the guards so they are able to crouch behind objects to be less visible as well as there are objects specifically placed near the guards' paths in each level for the character to hide behind and wait in order to pass without the guard seeing them.

As you move up to the next level, there will be more guards than the previous level and their paths will be longer in order to make the level more difficult. Also, as you move up in level, the difficulty of the map/maze of the level increases. This, therefore, makes it more difficult to find the key in the past timeline and to find the door in the present timeline. There is also a pause menu to pause

the game and it gives you an option to quit which restarts the game or to resume from where you left off. There is also a screen that plays when you win the game. We have 3 levels in the game.

Level 1 is simple and easy so that the player can adjust to how the game works. It is a simple map with a couple of rooms and one guard. It is really easy to find the key and door since it is right there and it is easy to not get caught by the guard.

Level 2 has a bit more difficult map/maze. This is the only level with a puzzle and interactions. The key is more difficult to find. One of the puzzles is that the player has to somehow figure out that they have to climb onto some stacked boxes in order to find and retrieve the key in the past timeline. So the key is out of sight at ground level so the player has to figure out the puzzle of jumping onto the boxes. The other puzzle is that the player has to figure out that in the past timeline they have to go up to this parchment and interact with it by picking it up and that ends up being a blueprint. Then the player will have to see that when they go back to the present timeline that the room that they were stuck in with four walls and no exit now has a hole in one of the walls that leads to the rest of the map and level to find the door in the present time to move onto level 3. So they are a bit further away from the beginning of the maze/map where the player spawns in each of the timelines than they were in the previous level.

In level 3 of the game, the maze/map is very difficult. The key is very difficult to find in the past timeline and the door is very difficult to find in the present timeline. Both the key and door are a lot further away from the beginning of the maze/map where the player spawns in each of the timelines than they were in the previous two levels. Also, to make the level a bit more difficult, the past timeline is a lot darker since there are less torches. So it is more difficult for the player to see the guards coming and run away from them or for the player to see clearly where they are going.

## **Equipment**

The player is not equipped to fight the captors inside the dungeon. However, the player is not helpless, the player has an ability that allows him to jump into the past to solve problems that pose an obstacle in the present. The player can jump to the present timeline at a whim with a bit of an ability cooldown as well as a duration with how long he can be in the past.

The guard is able to attack the criminal once he catches up to him. You will see the guard hit the criminal with his sword. The guard is able to run after the criminal and spot him.

## **Implementation**

The majority of the game will be developed using Unreal Engine which is a game development engine that can handle everything from animation to scene lighting, rendering, and physics.

We will be using online sources such as: OpenGameArt, Itch.io, and GameDev Market.

[https://www.reddit.com/r/gamedev/comments/dwqsl9/ive\\_made\\_50\\_free\\_rigged\\_and\\_animated\\_lowpoly/](https://www.reddit.com/r/gamedev/comments/dwqsl9/ive_made_50_free_rigged_and_animated_lowpoly/)

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We started by making sure we could make a movable character. We added the default First Person Character from the templates. We changed its speed and its height to match the assets.

However, we were quick to realize that first person was not the narrative we wanted since we wanted to be able to spot the guards using a third person point of view. We began experimenting and finally came to accept a perfect view. We designed levels during our 2 hour periods during Friday and worked on them during the week.

One of our most difficult but elegant algorithms we're proud of is the AI guard. The guards patrol a set path in a loop until they find the player. The player can try to lose the guard by losing its line of sight... so it's not game over just yet! Unreal Engine packs AI out of the box but it was up to us to implement it... We used what was called a Blackboard and Behavior Tree to paint the picture of what we wanted the guard to do. We used basic arrays to hold coordinate locations that the guard should go to next.

After this we decided to make the Key and Door. The key and door both have bounding boxes next to them that trigger once the player overlaps them. At this point, an event is fired and the pickup key SFX is played (if you overlap the key) or the door opening SFX is played (if you have the key! ALSO, this triggered the next level playing). Not many data structures were used here other than to keep a reference to the object in memory.

We needed to figure out how to keep track of the cooldown and duration so we set some variables that decremented when we were on the past timeline. We also added a super cool emitter that spawned a particle on a random "triangle" of the skeletal mesh to make a ghostly feel! We were definitely proud of this since it took us a long time and it reminded us of CS130. The tool was called Niagara Particle System and it's definitely a powerful tool in which you can make any particle you want.

We needed to make each level feel unique so we added more twists in each. Finding the key is definitely your primary goal, but it may be possible that you have to do other things in order to beat the level! Take for example, our level 2! You need to alter the past in order to progress the current timeline. Definitely was fun making an interact button and we wish we did more unique stuff on this level.

To make the game even more immersive, we created many light types like torches and candles which had their own timeline (a function) to flicker randomly. It added a true to life feeling and added more to the ambience.

All of our work was made up with OOP practice in mind. For instance, we have a Guard and a Guard with a Torch. Both objects inherit the Patrol\_BP object which defines the 'chase the player' and 'patrol' behavior.

## **Project Post Mortem**

### **What tasks were accomplished?**

We were able to implement everything that is mentioned above in the Overview and Game Description category of this report.

### **What planned tasks were not done?**

We did not implement obstacles in our game for the altering the past timeline to help the present timeline aspect. We initially thought of implementing obstacles that would be in the present

timeline and the player would go to the past timeline and remove the obstacle in order to proceed forward in the present timeline such as a pile of rubble/stones.

We also did not implement Level 4 and 5 because we ran out of time. We did the level design and drawing of the map and maze as well as the paths of the guards in both levels, but we were not able to actually code and create it and implement it into our game.

We were only able to implement the puzzle solving aspect as well as the altering of the past timeline to help the future aspect only in level 2. We wanted to have both aspects in all 3 levels, but we ran out of time and were not able to implement it in levels 1 and 3.

We also were not able to implement a save feature where you can save your game and leave and then come back and resume the game where you left off with all the progress you made. You would have to start the entire game over again.

We were not able to make it so that the criminal could hide in dark or unlit areas or corners to not be seen and hence caught by the guard because we ran out of time.

We were not able to implement having chests or cabinets throughout each level for the criminal to be able to open it and check to see if the key was in there in the past timeline, but we could not find assets and animation that matched the goal we had in mind.

We were not able to allow the player to be able to change the keys that they wanted to play with so we were not able to customize our main menu to allow the player to do key mapping.

### **How did scrum work for you?**

The scrum spreadsheets worked really well to keep what we need to do and what we have done organized. It was a great way to jot things down like a to-do list everytime we thought of something we needed to do or fix and have it all in one place and organized. Once we were done with tasks we were able to move them to the archive sheet and so it was nice to have the tasks that were done and the tasks that needed to be completed organized separately. We also liked that it was also categorized easily if the task was completed or tested or both or neither so we could easily keep track of everything we had to test or still do. It was also a great way to evenly assign tasks and make sure we split the amount of tasks and story points evenly within our group and per member.

### **What would you do differently?**

If we could have, we would have liked to pay for Unreal Engine for the exclusive designs to make our game look more aesthetically pleasing and more authentic of the medieval time. This is especially for our criminal character because we were only able to get the default playable character for free, which was a character with a t-shirt and shorts, which definitely did not fit the medieval theme of the game.

We would also clean-up our code more because it did end up getting messy especially with so many people working on it.