

Exploring Iterative Revelation in Storytelling

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Abstract

This project develops an interactive mystery game which explores the idea that we can never know what really happened in the past. Inspired by games like *The Last Express* and *Her Story*, movies like *Rashomon* and books like *Pale Fire*, the detective-themed story will use an iterative revelation mechanic to increase the ambiguity of the player's understanding of events on successive playthroughs. A secondary goal is to expose the loneliness in each character's heart, and encourage players to reflect on what loneliness can do to people. The project will be built with the Unity engine, and evaluated based on player feedback and user surveys.

The written work first introduces iterative revelation of storytelling in other media, such as books and movies. Then it will illustrate how iterative revelation is achieved in this interactive mystery game.

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1. Introduction

People judge their experiences based upon perceived facts. We make assumptions based on our judgments, and base our memories on these assumptions. When we later recall an experience, we may subconsciously suppress any parts that feel harmful to us, and modify the story we tell ourselves and others. In this way, we may selectively overlook or “forget” the actual events we experience.

For example, if we lose a valuable personal belonging, we may assume it has been stolen; however, it usually turns out that we put it away somewhere “safe” and forgot about it. A similar situation can happen when we talk about a past event that happened among friends. Each person may recall a different version of it, and some aspects of each version may be true or false. After discussing the event and verifying our memories with others, we may come up with a description that is close to what actually happened, but we may never know if our agreed-upon story is 100% “true.”

This “what actually happened” confusion is one of the most intriguing problems that we face in our everyday life. The author has decided to create an interactive story that explores how big the difference can be between what we believe and the truth.

In this project, the author is going to create an interactive narrative which would present this “what actually happened” confusion. The narrative itself will be a detective story, and the players will play as a detective trying to figure out “what actually happened” in a murder case.

The first part of this thesis discusses the context of iterative revelation in interactive narratives, including precedents and the way that the story is told in this game. These are covered in the Critical Context. The Critical Context gives a basic idea and a few examples of what the author is trying to achieve in this project.

The experience design, art design and technical design parts of this thesis illustrate how the interactive narrative was designed and built. It describes the whole process of experience production.

The development part is followed by an evaluation section. This section illustrates how the playtesting sessions were made and how evaluation was done.

In the last part of this thesis, the conclusion section works as a post-mortem discussion of the whole production of the game as well as the production of this thesis.



Figure 1. Illustration of the death of Sherlock Holmes (1893). [URL](#)

2. Critical context

2.1. *Truth-finding*

Among the most well-known fictional studies of truth-finding are the detective stories based on Sherlock Holmes (Arthur Conan Doyle) and Hercule Poirot (Agatha Christie).

Sherlock Holmes is not the first fictional detective, but he is arguably the most well-known. The story talks about a detective, who has preeminent intelligence, solving mysterious cases that couldn't be solved by local police officers. The more difficult it is to solve the case, the more interested Sherlock would be in the case. [1]

Sherlock Holmes is a beyond-human figure who doesn't really exist, since his intelligence is unreal. The mysterious cases that appear in the story were designed to reflect Sherlock's intelligence. Most of these cases are not meant to be solved by normal humans, and even the readers couldn't figure out what the truth is. This is why Sherlock's intelligence seems so magnificent. In order to balance Sherlock's super intelligence and to make the story look more challenging, the author designed a villain with super intelligence, Professor Moriarty. [2]

While the Holmes stories tend to focus on the minute details and curiosities of different cases, the Poirot series seems to reflect more deeply on the dark side of human nature.



Figure 2. Scene from 2017 movie of *Murder on the Orient Express*. [URL](#).

In the Poirot story *Death on the Nile* (1937), a rich lady was murdered by her husband. [3] The murder was planned by her husband and her husband's mistress. They murdered the lady in order to get the heritage from her. The case itself was not complicated, yet it was elegant. It was hard for readers to guess what has actually happened, but the method of the murder was not the main point of Poirot series. Instead, it focuses on the dark side of human nature. The facts behind a mystery may be difficult to establish if one or more of the people involved are lying (or "forgetting") for their own benefit. This idea is pushed to an extreme in Christie's *Murder on the Orient Express* (1934). In this classic Poirot story, *every* suspect plays a role in the murder, and all of them lie about it to hide their guilt.

After comparing these series, I chose Christie as my chief inspiration, since I believe the truth does not need to be hidden behind a complicated puzzle. What is more important is the truth behind the cover, and the meaning of that hidden truth.

2.2. Iterative revelation

Among famous mysterious narratives, some of them are meant to be watched twice or even more times to discover the truth behind the scene. These narratives will not show the audience “what really happened” directly. They tend to show the truth by revealing it slowly in different playthroughs. The more times readers or players go through a story, the more details and aspects of the story they will find.

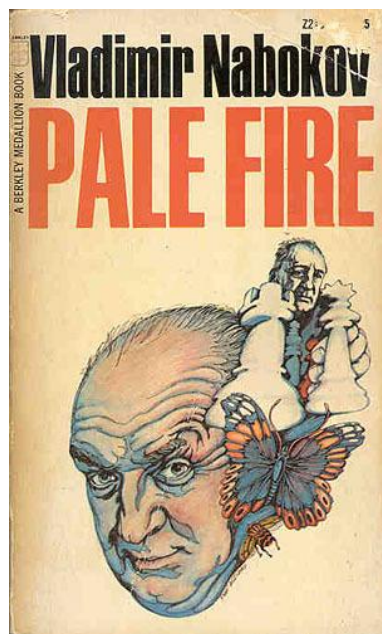


Figure 3. *Pale Fire* (1962). [URL](#).

Nabokov’s novel *Pale Fire* (1960) and Sam Barlow’s game *Her Story* (2015) are filled with clues yet completely open-ended, forcing readers to draw their own conclusions about what actually took place.

Pale Fire is a novel written by Vladimir Nabokov in 1962 [4]. The main characters of the novel are John Shade and Charles Kinbote. It consists of a 999-line poem attributed to John Shade, with a foreword, commentary and index completed by Charles Kinbote. The whole foreword and commentary of *Pale Fire* are actually about Charles Kinbote's personal life, while the right of publishing of the book, *Pale Fire*, should have belonged to John Shade. Basically, all that Charles Kinbote wrote in the commentary was about himself. In the book, he tried to disguise his past and mislead the reader about what actually happened to him and John Shade. Different readers may have different opinions on what actually happened because the whole book is a puzzle and a myth. Some readers believe that Charles Kinbote is a liar, psychopath, and thief; however, for those who read the book only once, it looks like a normal fiction book about Charles Kinbote himself.



Figure 4. *Her Story* (2015). [URL](#).

In *Pale Fire*, iterative revelation is done by reading it more than once and taking notes for the parts that look suspicious. In the game *Her Story*, however, it's different.

Her Story (2015) is a game that consists of a computer interface and a bunch of video clips. Players have to go through those clips to figure out what has happened. After they go through a clip, they will find new keywords to search for other videos. The more videos they find, the more information they will get. After gathering enough information, players will have a basic idea about what has happened.

However, the video clips themselves are broken. That means even if players gather all the clips, they will still not be able to know exactly what has happened. They can only guess, and different players will have different versions of the story. [5]

The story was told by layers in *Pale Fire*, and the truth is laid beneath those layers. “What actually happened” depends on which layer the player believes in. In *Her Story*, the story was told in pieces, and the truth is put together by players, and “what actually happened” in this game depends on how the players put those pieces together.



Figure 5. *The Last Express* (1997). [URL](#).

Other games, such as *The Last Express* (Brøderbund, 1997, shown in Figure 5) and *Phoenix Wright: Ace Attorney* (Capcom, 2001; Figure 6), not only present multiple perspectives of a story, but it also allows players to reach different endings by replaying the game. [6] These endings are typically characterized as either “true” or “bad.”



Figure 6. *Phoenix Wright: Ace Attorney Trilogy* (2014). [URL](#).

Although *The Last Express* can be played multiple times to get different endings, the underlying facts never vary. Players always see a version of the truth; which version players experience is determined by how they make their choices. [7]

The truth in these games is not really revealed in different playthroughs, since there will always be a “true” ending which tells players what has happened directly. It is different from what I’m trying to achieve in the game for this thesis. Although it is a classic way to tell stories, it gives out the juiciest part of the story quickly. It also tells the player what is “correct” and what is “wrong”. This is not how our daily life works. Truth is usually hidden beneath its cover which looks ordinary, and we tend to ignore it. This is why *Her Story* and *Pale Fire* are different from *The Last Express* and other interactive mysterious narratives. The important thing is what we see and what we believe, not which end we fall into.

2.3. Evidence in murder cases

There are four types of evidence, including real evidence, demonstrative evidence, documentary evidence, and testimonial evidence. [8] Among all these evidences, only real evidence could be used to prove or disprove an issue in a trial. Examples of real evidence includes fingerprints, DNA, a knife or a gun. This is the type of evidence that would be used to accuse a suspect in the game.

3. Interactive design

3.1. Summary

A Detective Story is a game created in Unity Engine about storytelling. The experience of this game is designed referring to many precedents, including Poirot series, Pale Fire, and Her Story. The design of the game is also heavily influenced by research in murder cases and crime movies.

The gameplay of *A Detective Story* consists of two parts. In the first part, players move through the scenes to confront each suspect in order to get more information and evidence. When they gathered certain evidence, they will be able to enter the second part of the game, which is the final confrontation, and a suspect will be arrested in the end.

There are five suspects in the game, and all of them have an equal chance to be arrested in the end. Who players arrest in the end depends on the players' choices, which are made while they are not aware of it.

This part mainly discusses the experience goal of the game *A Detective Story*, and how this game was designed from scratch.

3.2. Experience goals

The experience goals of *A Detective Story* are:

Engaging: The story and gameplay should be attractive enough so that players will stay focused until they reach the ending. While players are playing the game, it is acceptable for them to pause and think for a moment, but they should never quit playing the game.

Mysterious: The truth should not be given directly to players. Players need to think hard in order to figure out what has happened. The more endings they reach, the more information they will know. In fact, they should not realize “what has happened” until they have reached all the endings.

Finishable: The game should be easy to finish. It shouldn't be too hard for players to finish one playthrough, so that players would be likely to play the game more than once.

Deterministic: No matter how many times players play this game, they will get the same ending if they made the exact same choices each time they play.

Satisfying for one-time players: If players play the game only once, they will be satisfied with the “truth” they have found.

Below are the objectives that could be evaluated for each experience goal in a survey:

Engaging: How many players think the game is engaging? How many of them think it’s boring? If at least half of the players think that the game was engaging or interesting, then this goal would be achieved.

Mysterious: How many players think this game is mysterious? How many of them think it’s too hard or too easy? How many of them get the truth behind the story? Did they play the game more than once to check if there are other endings? If over half of the players think the game is mysterious, then this experience goal would be achieved.

Finishable: How many players finish the game? If they cannot finish it, what stopped them from doing so? If more than half of the players finish the game at least once, this goal will be achieved.

Deterministic: If players play the game more than once, then they should realize that “what actually happened” in the game does not change according to their choices. This could be reflected in the comment section of the questionnaire.

Satisfying for one-time players: Players should be able to enjoy the game even if they play the game once. If over half of the one-time players think the game is boring, then it means this experience goal is not achieved.

3.3. Inspiration

The core design of *A Detective Story* is inspired by the movie *Rashomon* (1950) [10]. Every person involved in the same event has a different impression of it. The way a player interprets a scenario influences what they believe.

Developing this idea further, the author figured that the order of getting information about a story will influence how people think of the story. For example, a person loves helping others, however, he also has a criminal record of stealing. If others hear of his criminal record before knowing that he is a helpful person, they may tend to judge this person as a criminal no matter how well this person is acting now. However, if they get to know this helpful person better before they hear of his criminal record, their point of view of this person is very likely to be different.

In *A Detective Story*, this idea is developed to an extreme, and implemented into the narrative of this game. Which ending players reach in the end totally depends on their order of visiting suspects and the order of receiving different evidence in this game.



Figure 7. A low-rent, three-story rooming house. [URL](#).

3.4. Location

The story takes place in the 1970s at a three-story rooming house in a seedy neighborhood somewhere in the United States.

The rent in establishments like the example shown in Figure 7 is low. Turnover of tenants is high, and landlords don't ask too many questions, making them susceptible to crime. [9]

3.5. Characters

There are mainly nine characters in this game, including the detective who is played by the players. Among these characters, there are six of them living in rooming house which the murder case took place. Each of them occupies an apartment in the house, and all of them have their own secret that they don't want anyone else to know. The rest of the characters all come from outside the house, such as the detective and police officers.

The characters are designed based on a certain protocol. In the book *Better Game Characters by Design: A Psychological Approach*, the author mentioned that if characters have depth, complexity, and humanity, then they are going to feel real to the player [11]. Therefore, the characters in this game have to meet certain requirements to promote the development of the story [12].

These requirements are:

Appearance: How do the characters look like, and why do they look like that? For example, if they live in a cheap rooming house, what they wear shouldn't be expensive.

Background: What do they do for a living? What is their hobby? This will help to build a character, and it will look more real to the player.

Secret: What is the secret that each of them has? What are they trying to hide from others? Their secrets will also work as the motivation for them to murder the victim.

Following these rules, the author designed the main characters of this game.



Figure 8. The Landlord. Original art.

3.5.1. The Landlord

The landlord of the rooming house lives in apartment 101. He is about fifty years old. Twenty years ago, he robbed a local bank with a rifle. Then he bought this house and has lived there since then, concealing his identity. He sent his wife and daughter abroad, so that they wouldn't be affected if he got caught one day. Since robbing the bank was the proudest thing he has ever done in his life, he kept his rifle and maintains it every week.



Figure 9. The Blind Veteran. Original art.

3.5.2. The blind veteran

The person who lives in apartment 102 is a blind veteran. Ten years ago, he worked for the military and hurt his eyes during the war. He became blind and lived upon the pension from the government. A couple years later, his eyes magically recovered by themselves. He didn't tell anyone about it because he wanted to keep getting a pension from the government. Therefore, he pretended to be blind since then.

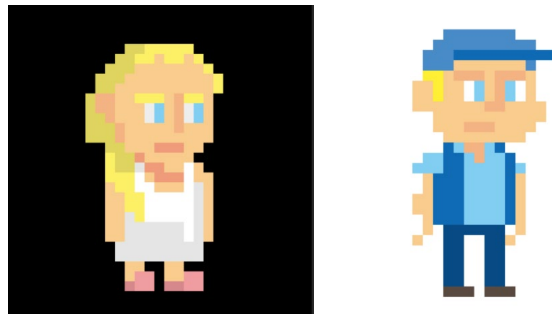


Figure 10. The Lady and the Mailman. Original art.

3.5.3. The lady and the mailman

There is a lady who lives in apartment 201 with her husband who is usually on business trips. They contact through mail, and that is how the lady met the mailman. She fell in love with the mailman and secretly met with him every week while her husband was not home. On the night when the victim was murdered, the lady was on a date with the mailman again in her apartment.

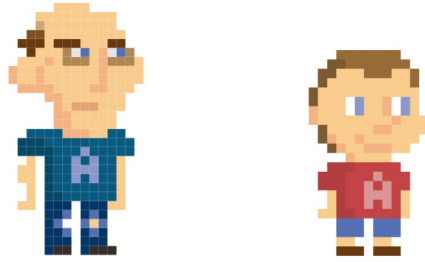


Figure 11. The single father and his son. Original art.

3.5.4. The single father and his son

Apartment 202 is occupied by a single father and his young son. His wife left him a couple years ago, and the kid was left to him as well. He smokes marijuana and bullies his child when he gets upset. The victim once called the police to report his domestic violence, and he started to hate the victim since then.



Figure 12. The Drug Dealer. Original art.

3.5.5. The drug dealer

In apartment 301, which is next to the victim's apartment, a drug dealer lives there. He sells marijuana and other illegal drugs to local customers, including the single father who lives in apartment 202.

3.5.6. The victim

The victim lived in apartment 302. When he was young, his parents were divorced, and he lived with his father. His father bullied him a lot, however, there was nothing he could do. He was addicted to drugs after he grew up, just like his father. After a few years of abstinence from drugs, he finally found a job in a local bank. However, a few years later, the bank he worked in was robbed, and he lost his job. Then he moved around the town, trying to find a job to make a living. As he became too old to work, he moved into the rooming house with his dog, his only friend. The others living in the house didn't treat him well. When his dog died, the last meaningful thing in his life was gone. He decided to commit suicide, and pretend he was murdered to take revenge on his unfriendly neighbors.

3.5.7. The detective

The detective, who is played by the player, is a pretty famous figure in this country. He came back to his hometown for a high school reunion. The victim in this murder case was his high school classmate, but the detective couldn't recognize him. They were not that familiar back then, and it has been too long since the last time the detective saw him. The victim was jealous of how successful the detective became, and this "murder" case was the last taunt he left for the detective.

3.6. Narrative design

3.6.1. What really happened

The victim and the detective were classmates in high school, though they had totally different lives after they graduated. The detective became famous, while the victim was still a nobody, just like how they were in high school.

Decades after they graduated, both of them received the invitation to a high school reunion. The detective decided to come back to hometown to attend the reunion, while the victim had another plan.

The victim lived a hard life. He lived in a rooming house and didn't have anything except an old dog. When his dog died, he was desperate, and wanted to commit suicide. Before he did that,

however, he decided to take revenge on everyone around him, including the ones who lived around him, the ones who didn't care about him, and the ones he envied, for example, the detective.

The victim hated the single father who bullies the child, because the victim was bullied by his father when he was young. He also hated the woman who cheated on her husband because his wife left him when he lost his job. He hated the drug dealer who lived next to his apartment the most, since drug addiction ruined his life as well. The victim also knew the landlord was the robber who robbed the bank because he worked at that bank when the robbery took place. He glanced at the robber's face while the robber took off his mask and he memorized the robber's appearance. He knew that the blind guy was not blind when he once saw the blind guy writing on paper. He decided to punish all of them by disguising his suicide as a murder and framing all of the residents for it.

He first blackmailed the landlord for free rent, which gave the landlord a motivation to murder him, and he intentionally let the mailman saw that blackmail so that a witness existed. He then stole the rifle, which was used in the bank robbery, from the landlord with the master key. He packaged it up and put it outside the house. On the package, it said it was for the drug dealer.

The blind guy always steals packages and no one knew that except the victim. The blind guy stole this package as usual. However, when the blind guy opened the package and saw that gun, he panicked and put the package back. He didn't touch the gun but he left his finger prints on the package.

Then the package was collected by the dealer. When the dealer saw that gun, he was confused, because he didn't know who sent him this gun. Although he thought he might be in trouble, he didn't call the police because of his dirty job.

On the night that the detective arrived at the town, the victim stole the gun again from the drug dealer's apartment with the master key. He stuck that gun on the door of his apartment and he pulled the string which was connected to the trigger of the gun when a train passed by the house. The gunshot was totally covered by the noise of the train.

At midnight, the blind guy quietly opened his door and went upstairs. He was blackmailed by the victim anonymously. In the blackmail, the victim wrote: "Go to apartment 302 at midnight, otherwise I will tell everyone that you are not blind." The blind guy therefore went upstairs to apartment 302 where the victim lived. As he opened the door, a gun fell into his arms, and the victim was already dead. The blind guy thought it was the drug dealer who framed him because the gun was in the package which belongs to the dealer. He quickly walked downstairs and saw a car that he was not familiar with nearby the house. The backseat window of that car was open, so he threw the gun into the car through its window. That car actually belongs to the mailman. The victim knew that the mailman would come that day to date with the lady. He has planned for everything.

On the next day, the detective came to solve this "murder case". The revenge of the victim would succeed no matter who the detective arrested in the end. This is also the revenge the victim took on the detective. The victim envied the detective for the easy life that the detective had. The invitation to the high school reunion reminded him of the famous detective again. In the end, the victim had his revenge.

3.6.2. Initial structure

The original narrative design of *A Detective Story* is to tell the story simply by visiting the five suspects in the game in the order chosen by the player.

In the original design, each suspect can be visited only once, and then the player will have to choose a suspect to arrest after confronting all of them.

The advantage of this design is that the game would be very short so that players are more likely to play it again to get another ending. The more times they play the game, the more information they will find. Since they can visit the five suspects in any order, there will be 120 combinations of orders, which means the game could be played 120 times and all the endings are different.

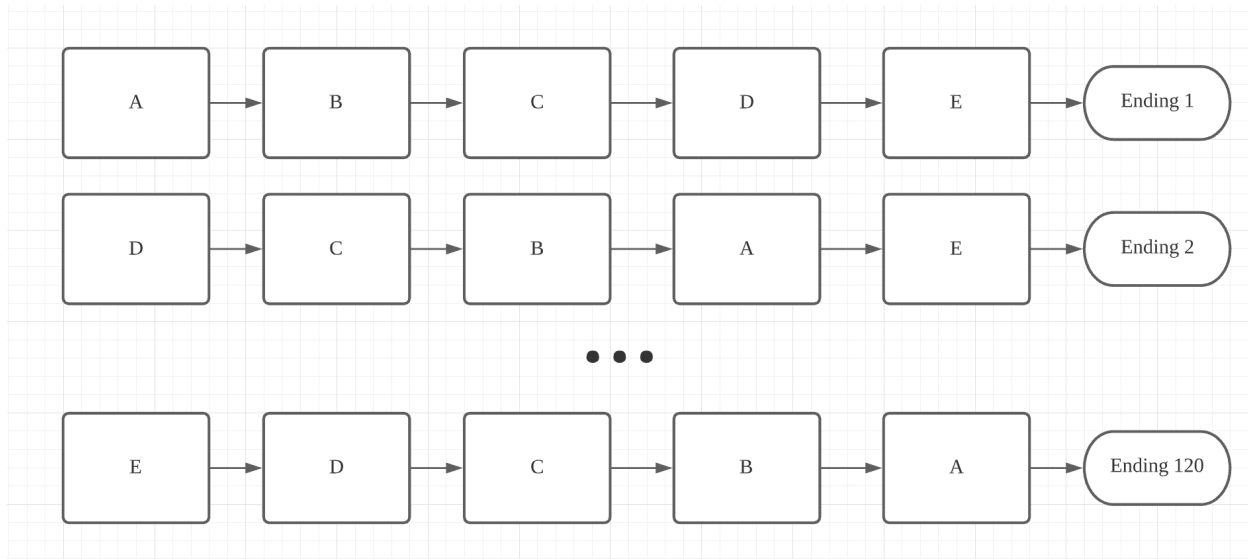


Figure 13. Flowchart of original narrative design.

Figure 13 shows how this design works. If players visit suspect A first and suspect B next, then they will get information 1 from A and information 2 from B. If they visit B first, however, they will get information 2 first, and they can confront suspect A with information 2 in order to get information 3. They can change their order of visiting the suspects, and therefore getting different information in each playthrough.

The disadvantage of the original design, however, derives from the advantage of it.

First of all, it doesn't really make sense that the detective, who is played by the player, can only confront each of them once in one single playthrough. There is not a way to make this setting reasonable in the story. It violates the traditional pattern of the detective story, which is confronting the previous suspect with the new information gotten from the current suspect.

Second, 120 combinations means 120 endings, and that would be too much work for a solo developer. It is not realistic to make so many endings by one person in the given period of time. Therefore, the original design was modified and finally a new design was developed.

3.6.3. Flashbacks

In the original design, there would be flashbacks in this game, just like the classic detective games. Flashback would appear while suspects tell their stories. However, this mechanic was

discarded in the later design, because there wasn't enough time to complete it, and it was not the main experience goal of this game.

3.6.4. Final structure

In the final narrative design of *A Detective Story*, the storyline is separated into five branches. Each of these branches leads to a unique ending, which means there are five endings in total.

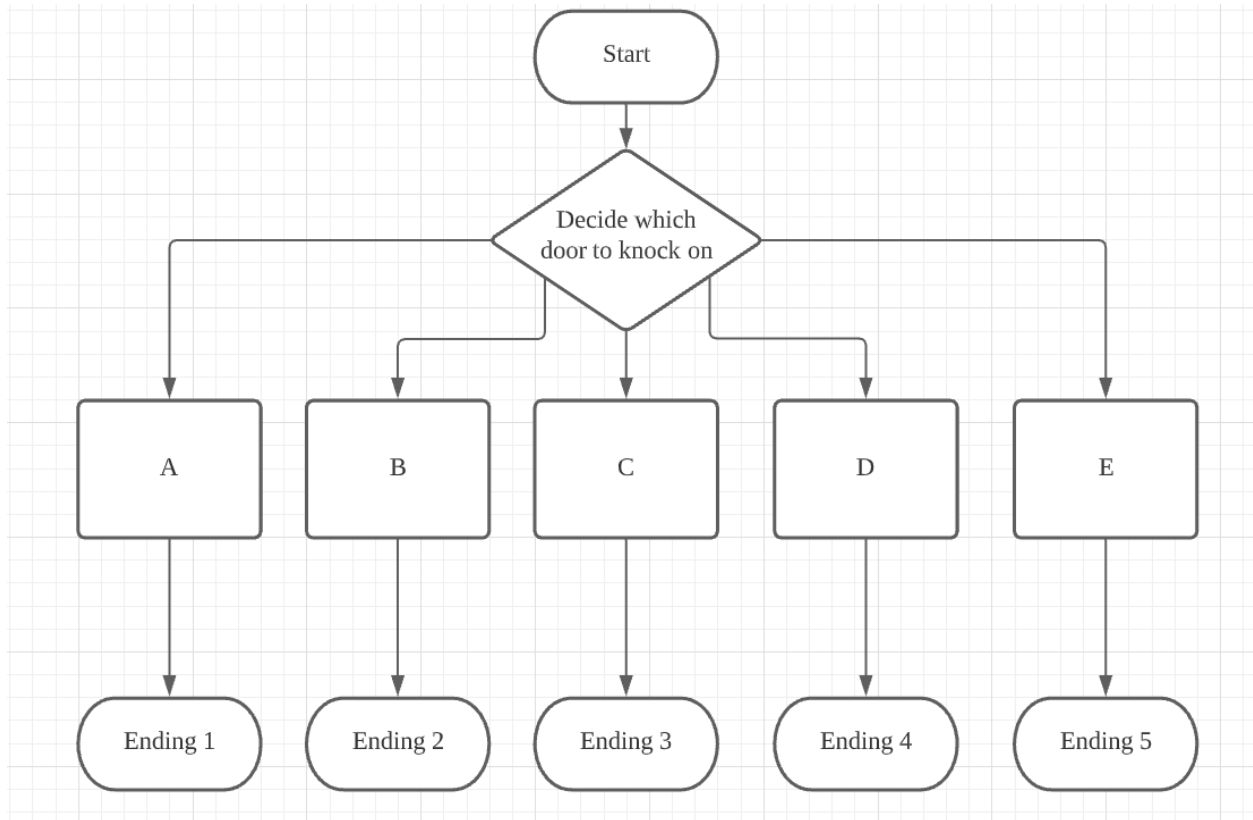


Figure 14. Flowchart of revised narrative design.

Figure 14 illustrates how the storyline works in the final design. The choice that decides which branch players are going to fall into is plotted in the very beginning of the game. In fact, it is one of the five doors they knock on in the beginning of the game that determines the branch and ending they will see later. What characters say in the story will vary according to which door players knock on first. For example, if players visit the landlord first, then the landlord will point out the dealer sells drugs in order to distract the detective's attention from investigating him. Otherwise, the landlord will not tell the detective that the dealer sells drugs. In addition, players

are not aware of the decision they are making when they knock on the door. They will notice it only if they play the game again and choose another door to visit in the beginning.

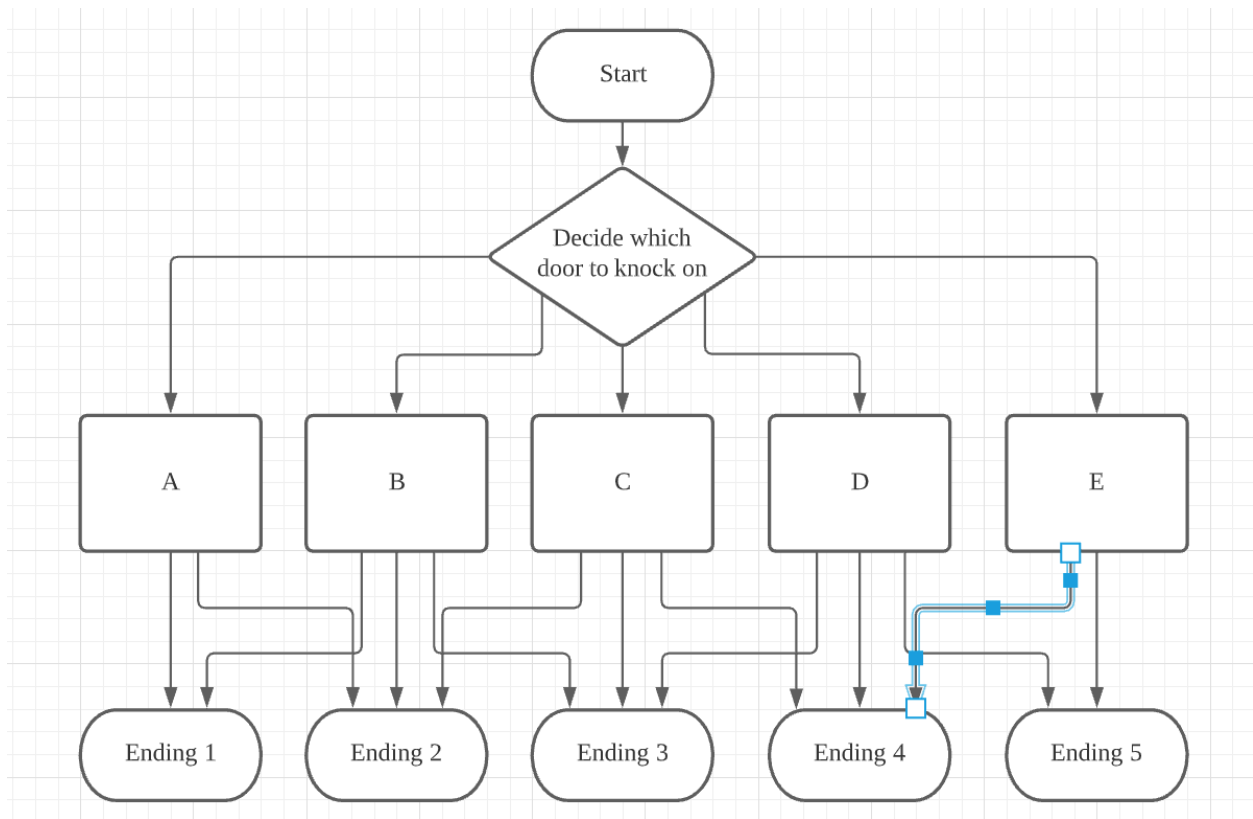


Figure 15. Flowchart of proposed “weblike” design.

During the design process, the author considered making the storyline into webs instead of branches, so that the ending that players reach in the end will be determined by several decisions. This means players can get different information, though they still reach the same ending. It adds more variety to the game, as shown in Figure 15.

However, this design was abandoned because it goes against the core experience goal, which is players should realize the truth they found was not true if they play the game more than once. If the storyline is a web, then they could fall into the same ending they got in the first playthrough even if they made a few different choices. This could go totally against the experience goal, and convince the player that they have found the truth. That experience is definitely not acceptable. Therefore, the design of the weblike storyline was abandoned.

In the final design, players will always get an ending, however, none of these endings will tell players the truth. What players get is only part of the truth, and some information they received from the ending could be lies. Ideally, players need to go through all the branches in order to gather all the information. Then they will need to think hard to examine all the clues they found to guess what has actually happened in this rooming house. The answer to the “what has happened” question will never be given directly to the players, just like the famous video game *Her Story*.

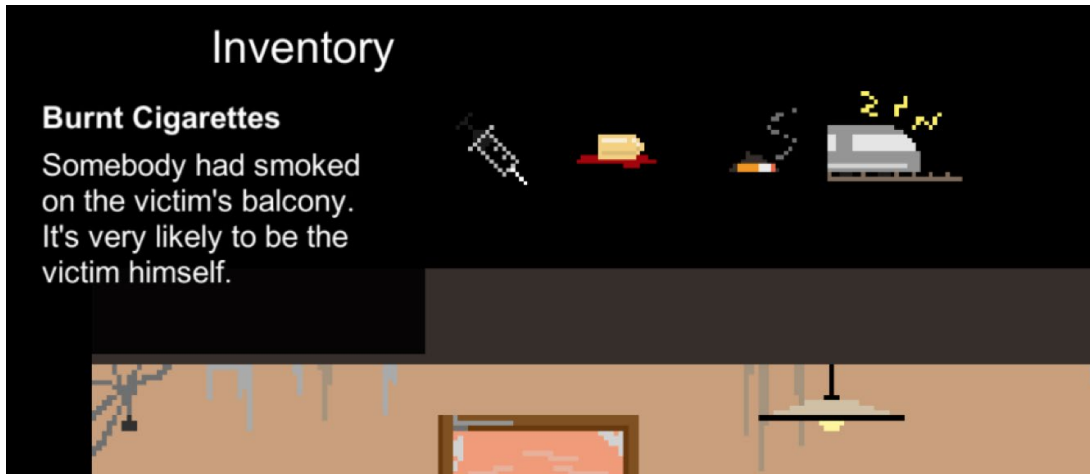


Figure 16. Info board. Screen capture.

3.7. *Inventory system*

There are three main functions of the inventory system.

The first one is it contains all the clues that players have already collected in the current playthrough. When players hover their mouse over an item in their inventory, they will see a small box on the left side, showing the details of that item, as shown in Figure 16.



Figure 17. User prompt for UI. Screen capture.

The second function is the clues that players collected can be dragged and dropped into the scene (Figure 17). This action works as confronting the suspect about the chosen clue. If the suspect doesn't know anything about it, they will not give any useful information. If the suspect does know something, however, players will get more information from the suspect. The correct clue to drag on the suspect is marked by a yellow exclamation mark.

The third function is that players can collect clues by clicking on clickable items. When the player's mouse hovers over a clickable item, a box that contains an exclamation mark will pop up, indicating that the item is clickable. For example, in the crime scene, if players click on the sofa, they will find a clue telling them the victim was shot in the head.

3.8. Dialogue system

The dialogue system consists of dialogue boxes and option boxes. Players can click on option boxes to question the suspects, and they can get clues from the answer of the suspects.

The story is told by dialogue. However, not every piece of dialogue will give players new clues.

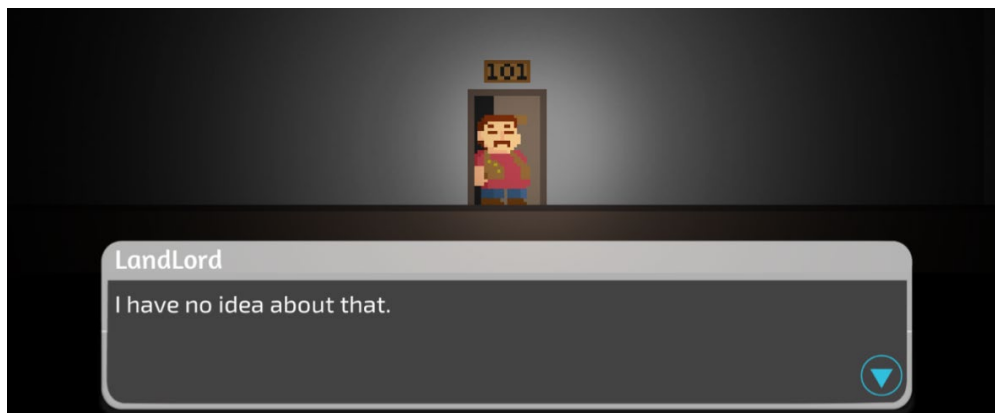


Figure 18. Sample dialogue box. Screen capture.

As shown in Figure 18, some dialogues only give more details of the story. They won't affect the game much. Players can reach an ending even if they never go into any of these dialogues. The reason these dialogues are there is just to make the story look real.

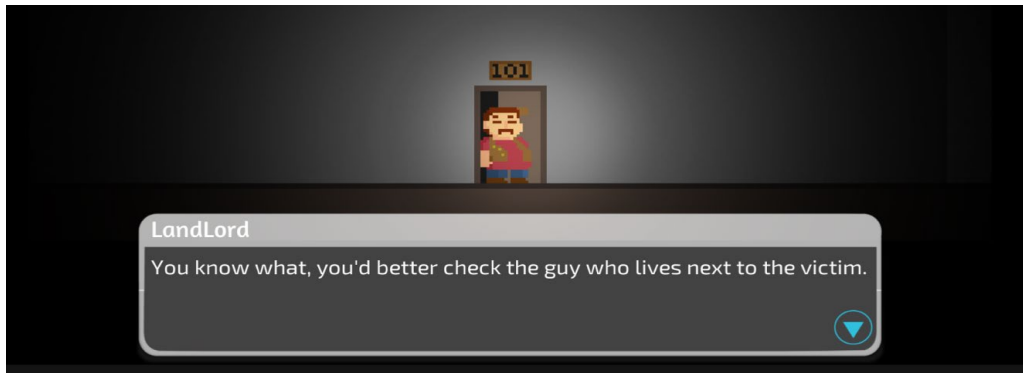


Figure 19. Dialogue hint. Screen capture.

Other dialogues will not offer players any clues as well. As shown in Figure 19, instead of giving players a clue, these dialogues will point the player to the correct suspect, so that players can continue their investigation smoothly.

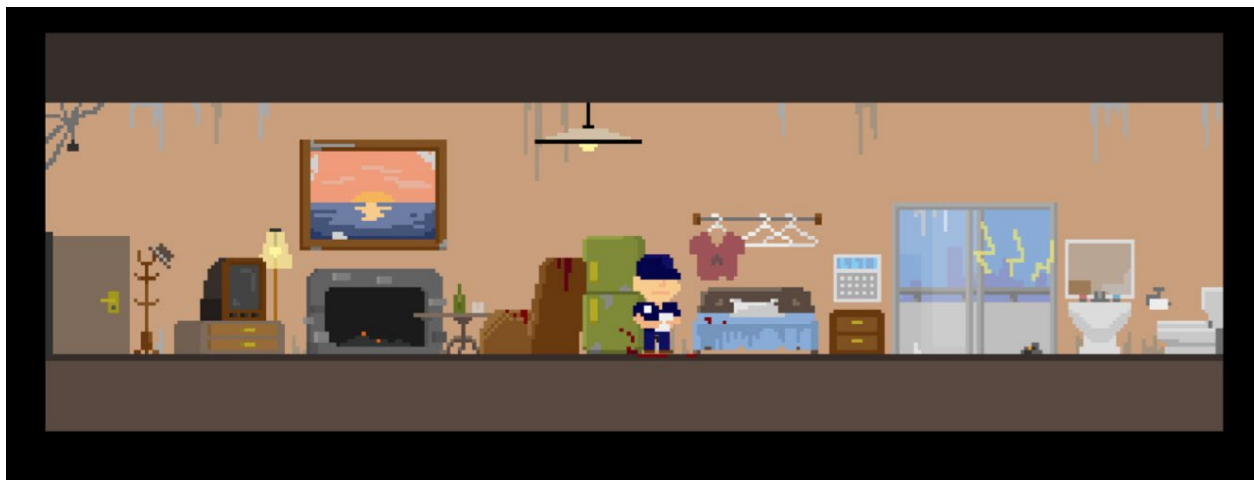


Figure 20. Initial crime scene. Screen capture.

4. Art design

Art design is an important aspect of a game. Although *A Detective Story* is a game focused mainly on narrative and storyline, appropriate art design will still help to build the environment and the story will feel more real to the player.

The author chose pixel art as the art style of this game. Figure 20 shows how the crime scene looks. Pixel art is capable of showing details of the scene, including bloodstains on the sofa. It is both appropriate and sufficient for a simple detective game.

Another advantage of pixel art is that it's less graphic, which means it will not look too horrifying to the players. After all, this is not a horror game, instead, players should focus on the story and mystery.

The characters and the environment are all created in a cute pixel art style. Heads of the characters are almost the same size as their body. Designing the characters in this manner not only makes characters look cuter, but also offers more space for the developer to add more details on the characters' face.

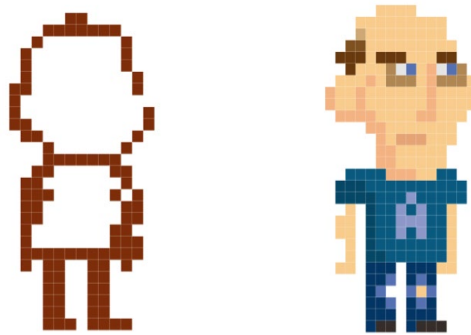


Figure 21. Rough and final character designs. Original art.

As shown in Figure 21, the head of the character occupies half of its body, which makes the character look less intimidating. There are many precedents of this art style in games, such as the popular indie title *Celeste* (Figure 22).



Figure 22. Celeste (2018). [URL](#).

5. Technical design

The whole game consists of different scenes, including the crime scene and each apartment which is occupied by a certain suspect. These scenes are connected through the dialogue system and the inventory system.

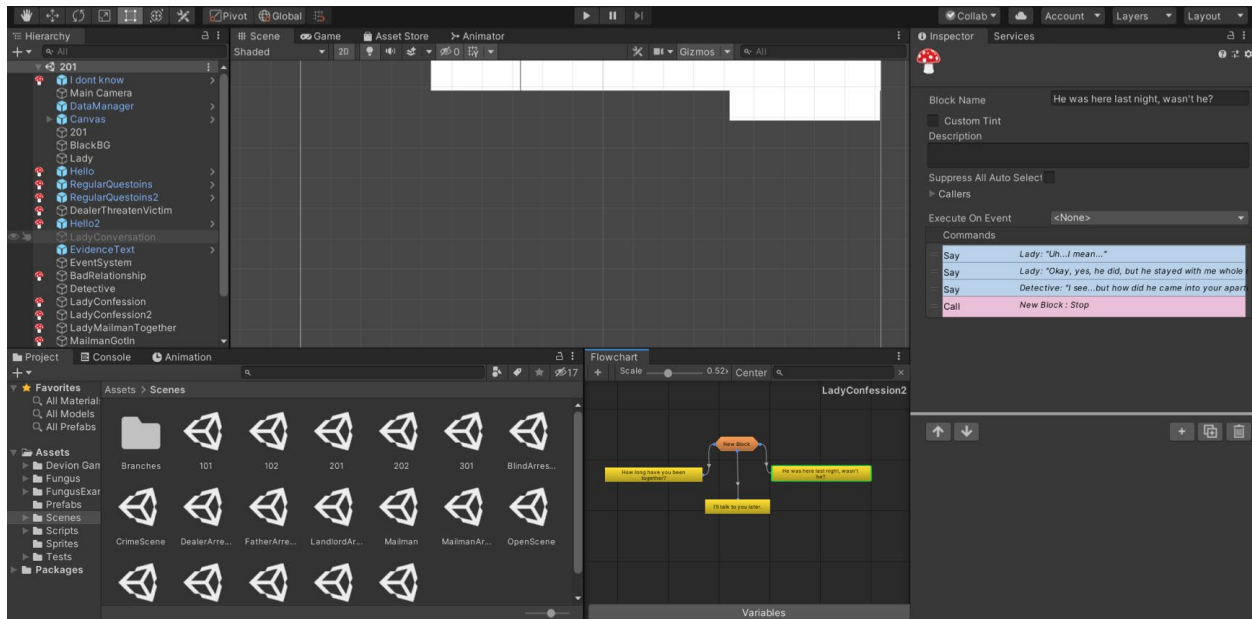


Figure 23. Fungus dialogue creation system. Screen capture.

5.1. Dialogue system

The dialogue system in *A Detective Story* was initially a plug-in software named Fungus (shown in Figure 23). It was downloaded from the Unity Asset Store, then modified to meet the requirements for this project.

The dialogue system was separated into different scenes in different dialogue branches, and each scene contains all the dialogues that will take place in it. Certain dialogue will be triggered only if a certain action was made. For example, in order to get the information that the dealer once threatened the victim, they have to drag and drop the correct clue into the dealer's apartment scene to trigger the certain dialogue.

5.2. Inventory system

The inventory system was totally created by the author. It consists of mainly two parts: the inventory UI system, and the inventory database.

The inventory database stores all the information of clues. Other than that, the database only stores the temporary data in one playthrough, since there is no save and load function in this game. For example, the database will record what clues has the player already found in the current playthrough. As the player restarts the game, this temporary data is lost. In addition, this temporary data saving function is done by saving the data into a static file. When there is a scene change, the data will be written into that static file and it will be read when another scene is on.

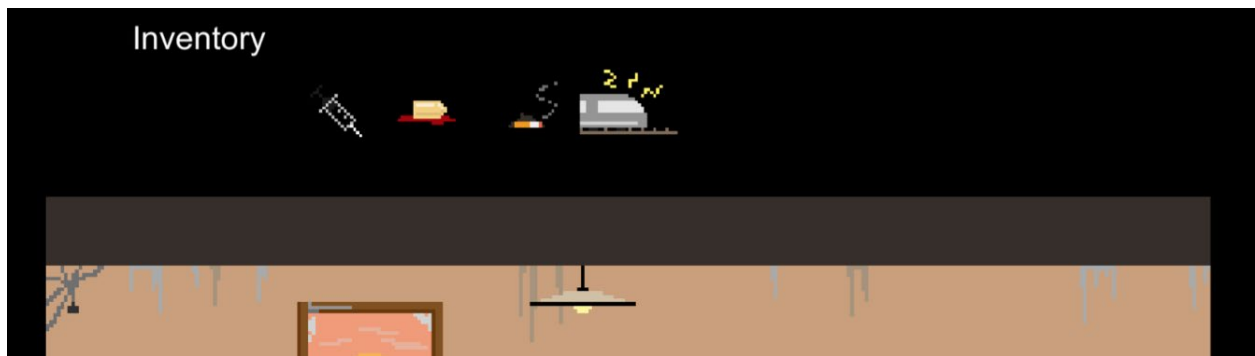


Figure 24. Inventory menu. Screen capture.

The inventory UI system can be divided into a few smaller pieces, which are the inventory box and the detection pool. The inventory box, shown in Figure 24, holds all the clues that the player has already gathered. If players hover over their mouse on those clues, they will see the description of that clue. If they click on the clue and hold it, they can drag it into the scene. If they drag it into the detection pool, which covers half of the scene, the pool will detect that clue and a certain dialogue will be triggered, and that is how the interaction was made between the inventory system and the dialogue system.

6. Development

This is an overview of the whole development process of *A Detective Story*, including the research phase, the design phase, and the actual developing phase.

6.1. Process

The original concept of *A Detective Story* was inspired by a few precedents, such as the movie *Rashomon*, the novel *Pale Fire*, and the video game *Her Story*. They all discuss the same idea which is “what has actually happened” is different in different people’s point of view, though these people are involved in the same event. This idea was set as the main idea of *A Detective Story*.

After the basic idea was determined, the author began to work on the design of the game. The whole story was first developed in Twine, a software specifically for making storytelling games. It is easy to use, but it can only present the text in a game. However, it is sufficient for building a demo of *A Detective Story*.

After the storyline was written, the author built the game with the Unity Engine. The Unity Engine is a much more powerful tool that supports all different kinds of game building, including storytelling games with graphics.

The sprites in the game were designed and drawn in Photoshop, a software for producing high-quality artwork. Some sprites were created with Aseprite, and this tool is specifically for creating 2D pixel art.

6.2. Issues

Numerous issues were encountered during the development of *A Detective Story*, including the ones that could cause the game to crash.

In the early version of this game, the dialogues were hardcoded into each scene. This means that whenever players get a new clue, they will get into a new scene which contains the certain dialogue. However, this will cause the game to crash when the player holds too many clues. This system was later modified by the author so that all the dialogues were saved in the same scene to avoid the series of scene loading, and the game crash was fixed since then.

However, there are still small bugs that haven't been fixed. For example, there is a small bug in the inventory system. While players are dragging the clue in their inventory, if the resolution of their screen is not 1920*1080, the clue they drag will not stick to their cursor. Instead of sticking to the cursor, the clue will float around the screen. It won't stop the player from playing the game, but it's still annoying for them.

6.3. Distribution

This project was packaged and zipped for Windows 64-bit operating systems. It was uploaded to Google Drive where it was shared with a post-play survey for playtesting.

7. Assessment

7.1. Approach and objectives

The main goal of this assessment is to see whether the actual experience of the game corresponds with the design of it or not. Various aspects need to be evaluated through this process, and the main ones are play testing and functional testing.

The primary objective of the post-play survey was to understand how players liked the game. This could be captured from the players' comments and their own comprehension of the experience. Another objective of the survey was to collect the data of gameplay. For example, how much time players spent in each play through and who did they arrest in the end.

In order to collect these data, the clarity of the questions in the survey and the answers given by the players should be sufficient. It should take players less than 5 minutes to complete the whole survey so that most of the players will be able to finish it.

7.2. Methodology

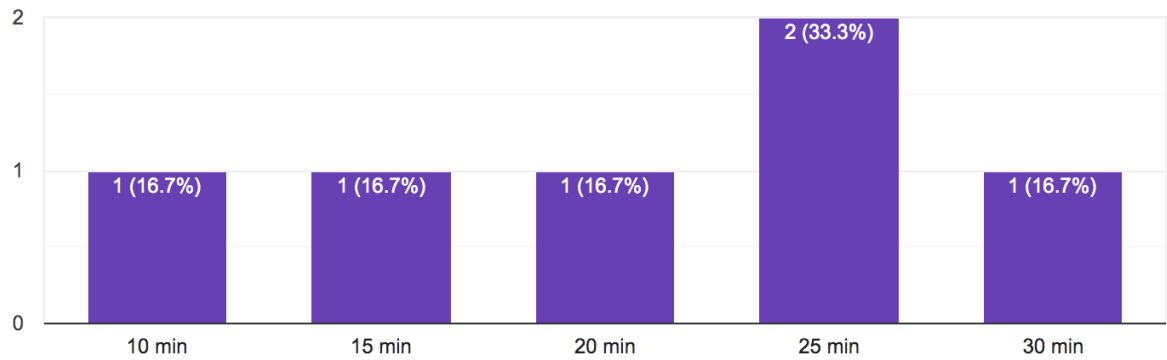
There were two rounds of playtesting. The first, based on a rough demo version of the game, was completed by seven players during the WPI AlphaFest event on 20 November 2020. A more polished build was evaluated by 25 players as part of a playtesting assignment in Prof. Moriarty's B20 section of IMGD 1001: The Game Development Process on 2-5 December 2020. All players were WPI students or faculty. Both rounds included a post-test survey, which took about five minutes to complete.

The two sessions had different objectives, although the survey questions were nearly the same. The objective of the first round of playtesting was to see if there are any issues in the design of the game. The second round of playtesting was focused on the game experience.

7.3. First round questions and results

Q1. How much time did you spend to finish one playthrough?

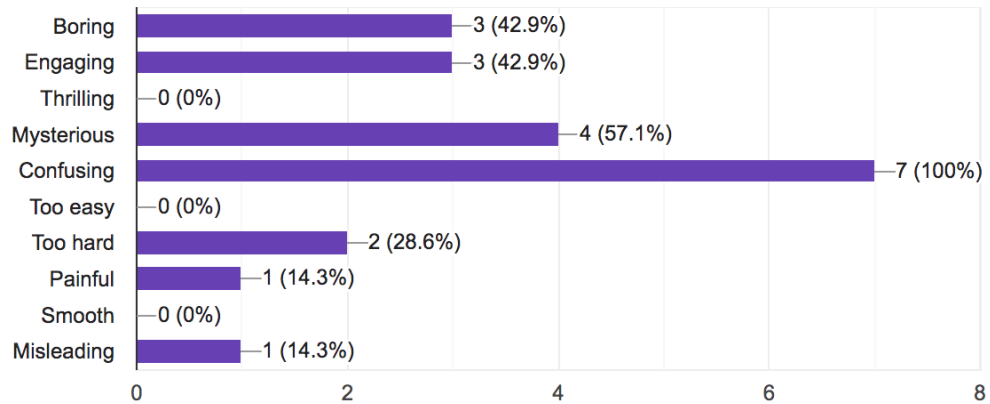
Choices offered: Less than 10 minutes, 10-15 minutes, 15-20 minutes, 20-25 minutes, 25-30 minutes.



Answer	Count
Less than 10 minutes	1
10 ~ 15 minutes	1
15 ~ 20 minutes	1
20 ~ 25 minutes	2
25 to 30 minutes	1

Q2. Please describe your game experience with 3 words.

Choices offered: Boring, Engaged, Thrilling, Mysterious, Confusing, Too easy, Too hard, Painful, Smooth, Misleading.

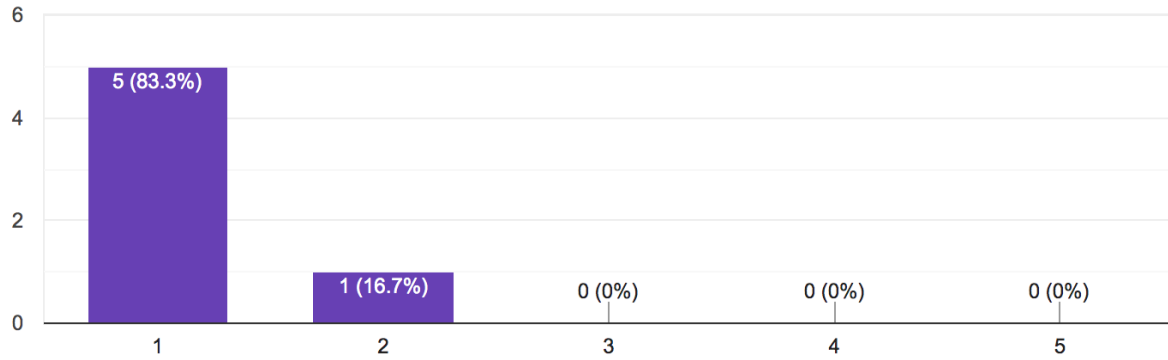


Answer	%	Count
Boring	42.9%	3
Engaging	42.9%	4
Mysterious	57.1%	4
Confusing	100%	7
Too hard	28.6%	2
Painful	14.3%	1
Misleading	14.3%	1

Thrilling	0%	0
Too easy	0%	0
Smooth	0%	0

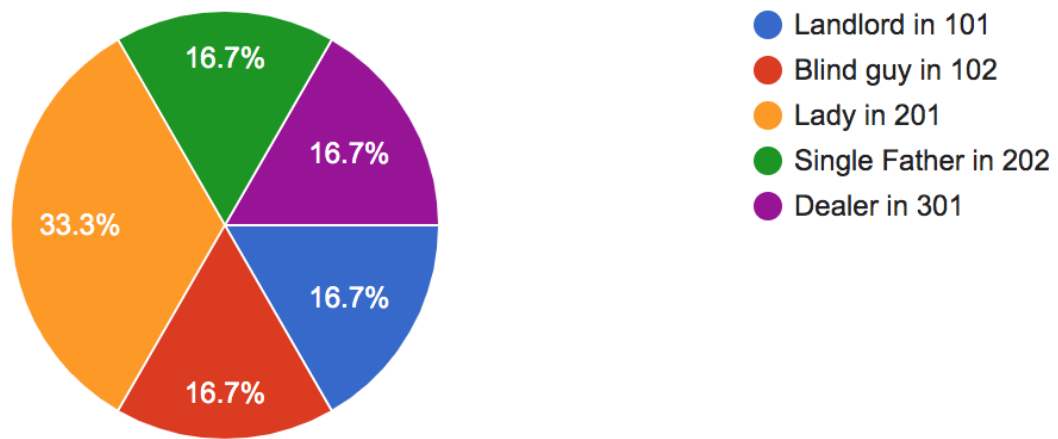
Q3. How familiar are you with the movie *Rashomon*?

Lickert scale: 1 = Never heard of it, 5 = Know everything about it.



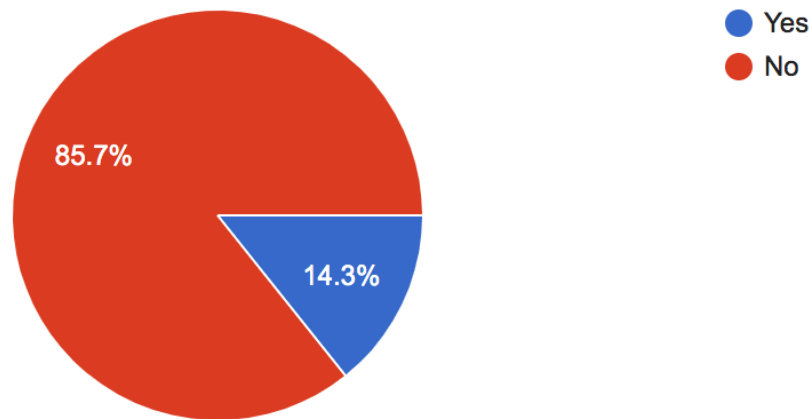
Answer	%	Count
1	83.3%	5
2	16.7%	1
3	0%	0
4	0%	0
5	0%	0

Q4. Who did you talk to first when you started your game?



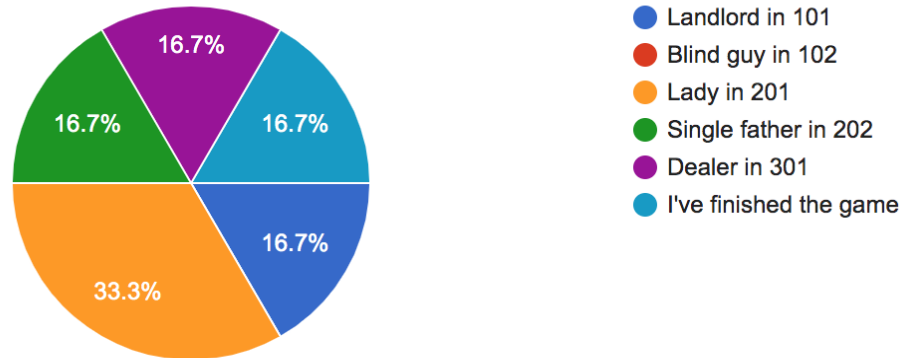
Answer	%	Count
Landlord	16.7%	1
Blind Guy	16.7%	1
Lady	33.3%	2
Single Father	16.7%	1
Dealer	16.7%	1

Q5. Did you reach any ending of this game?



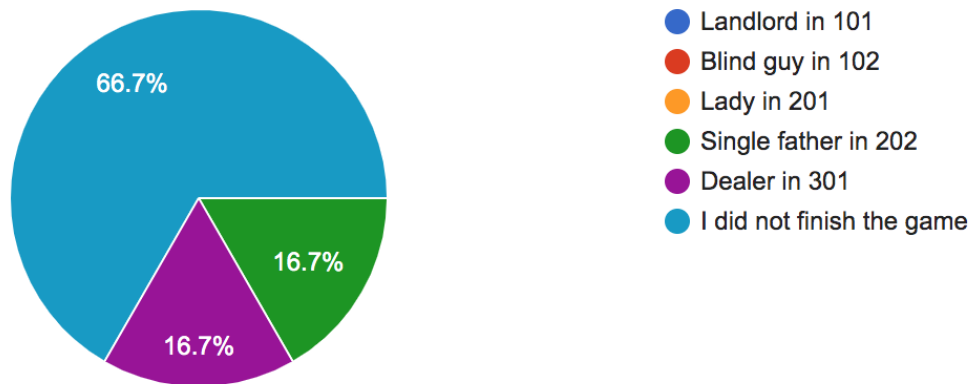
Answer	%	Count
Yes	14.3%	1
No	85.7%	6

Q6. If you did not finish the game, who was the last person you talked to?



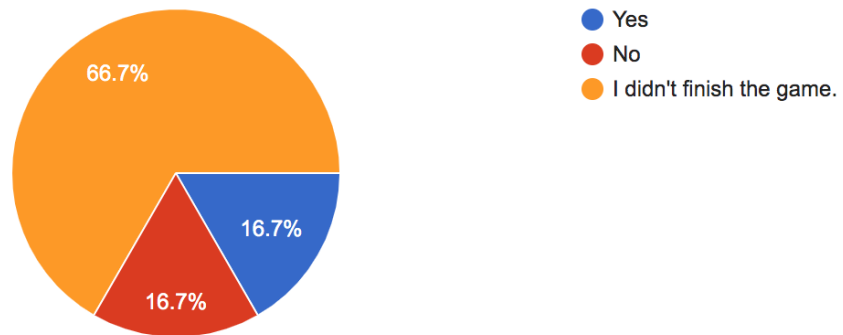
Answer	%	Count
Landlord	16.7%	1
Blind Guy	0%	0
Lady	33.3%	2
Single Father	16.7%	1
Dealer	16.7%	1
I've finished the game	16.7%	1

Q7. If you did finish the game, who was the last person you talked to?



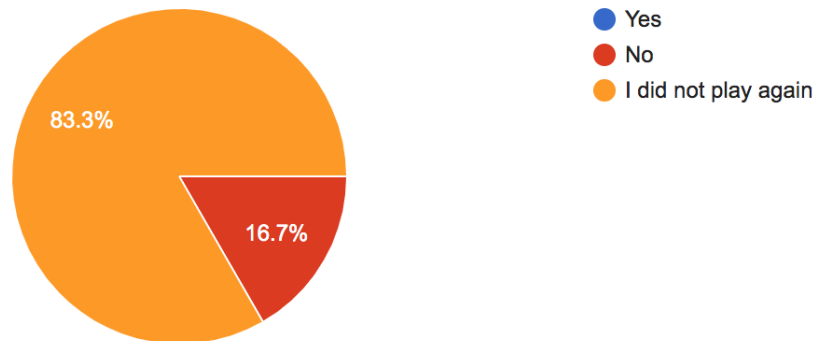
Answer	%	Count
Landlord	0%	0
Blind Guy	0%	0
Lady	0%	0
Single Father	16.7%	1
Dealer	16.7%	1
I did not finish the game	66.7%	4

Q8. If you did finish the game, did you try to play it again?



Answer	%	Count
Yes	16.7%	1
No	16.7%	1
I didn't finish the game	66.7%	4

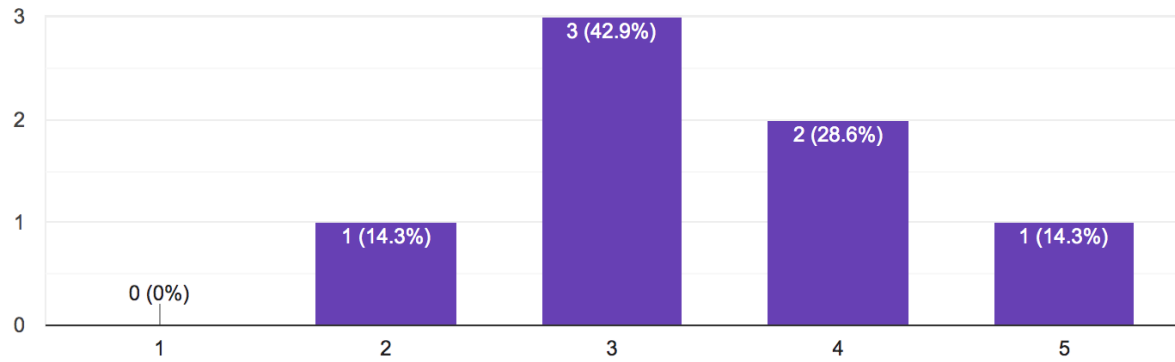
Q9. If you played again, did you finish it?



Answer	%	Count
Yes	0%	0
No	16.7%	1
I did not finish the game	83.3%	5

Q10. Did the UI system make sense?

Lickert scale: 1 = Not really, 5 = Very well.



Answer	%	Count
1	0%	0
2	14.3%	1
3	42.9%	3
4	28.6%	2
5	14.3%	1

Q11. In your opinion, what has really happened in the story?

Optional free text entry. Selected responses:

- “The lady in 201 cheated with the mailman, that's all I know. I couldn't get an ending.”
- “The last thing I did was confirm with the mailman and the lady that they were having an affair and that the mailman was at the house the night of the murder. After that, I couldn't progress any further because the dialogue choices were covering up the topics I could drag into the conversation to interact with so that's where I stopped.”
- “The single father was arrested in the end. But it was too easy to get him, and landlord seems suspicious, so I played again. However, I couldn't get to the ending in the second playthrough because I don't know what to do after getting everything I could get.”
- “I have no idea.”

Q12. How would you describe this game to someone else?

Optional free text entry. Selected responses:

- “An interesting detective story.”
- “Hard to finish the game, but it was fun.”

Q13. Is there any other comment you would give?

Optional free text entry. Selected responses:

- “It was really confusing. The mailman seems useless. I couldn't get anything from him.”
- “This game definitely needs to be polished.”

7.4. Second round questions and results

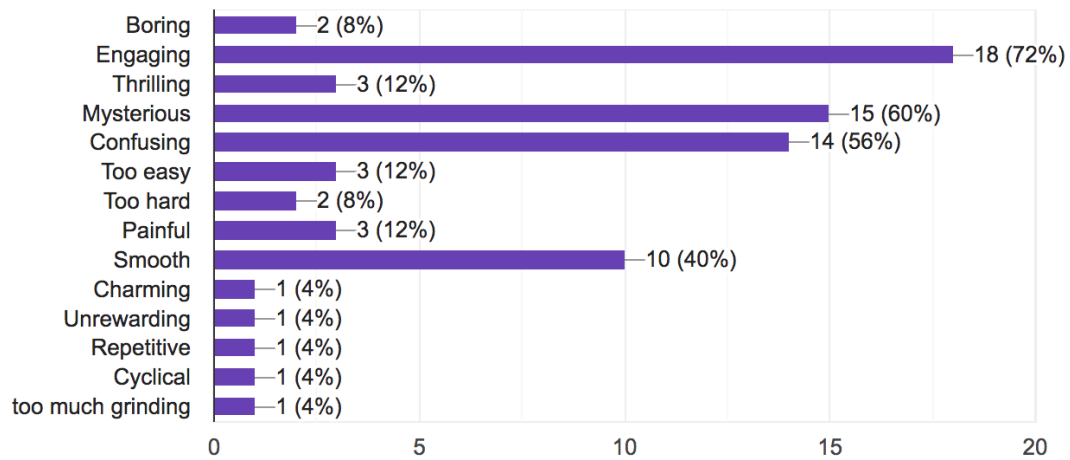
Q1. How much time did you spend to finish one playthrough?

Choices: Less than 10 minutes, 10-15 minutes, 15-20 minutes, 20-25 minutes, 25-30 minutes, Over 30 minutes, Did not finish the game.

Answer	%	Count
Less than 10 minutes	8.7%	2
10 - 15 minutes	8.7%	2
15 - 20 minutes	43.5%	10
20 - 25 minutes	8.7%	2
25 - 30 minutes	0%	0
Over 30 minutes	21.7%	5
Did not finish the game	8.7%	2

Q2. Please describe your game experience with 3 words.

Choices offered: Boring, Engaging, Thrilling, Mysterious, Confusing, Too easy, Too hard, Painful, Smooth, Charming, Unrewarding, Repetitive, Cyclical, Too much grinding.

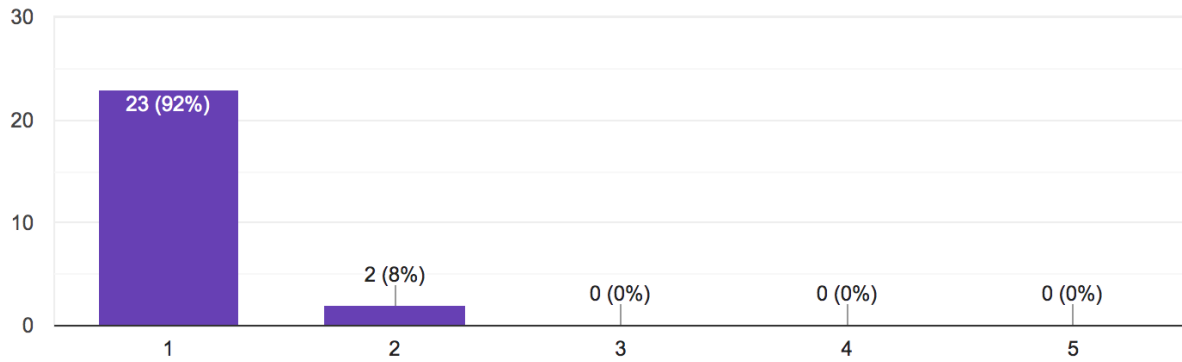


Answer	%	Count
Boring	8%	2
Engaging	72%	18
Mysterious	60%	15
Confusing	56%	14
Too hard	8%	2
Painful	12%	3
Charming	4%	1

Thrilling	12%	3
Too easy	12%	3
Smooth	40%	10
Too much grinding	4%	1
Repetitive	4%	1
Cyclical	4%	1
Unrewarding	4%	1

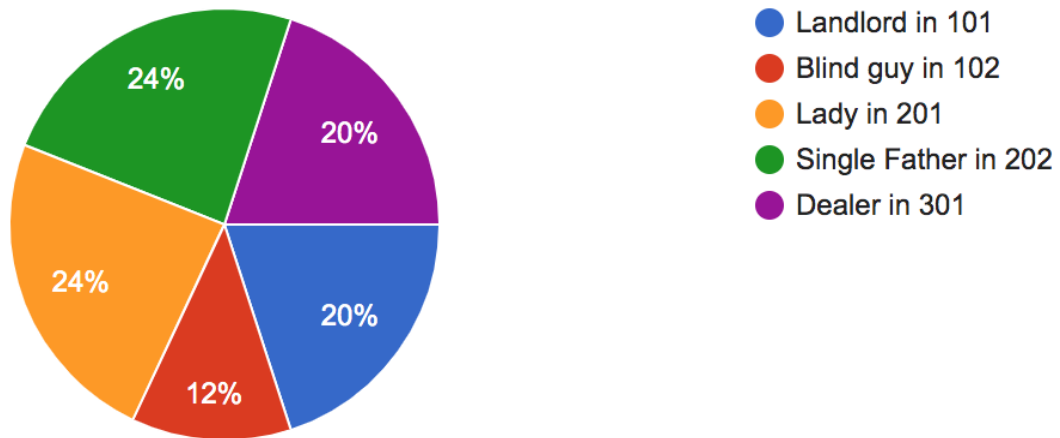
Q3. How familiar are you with the movie *Rashomon*?

Lickert scale: 1 = Never heard of it, 5 = Know everything about it.



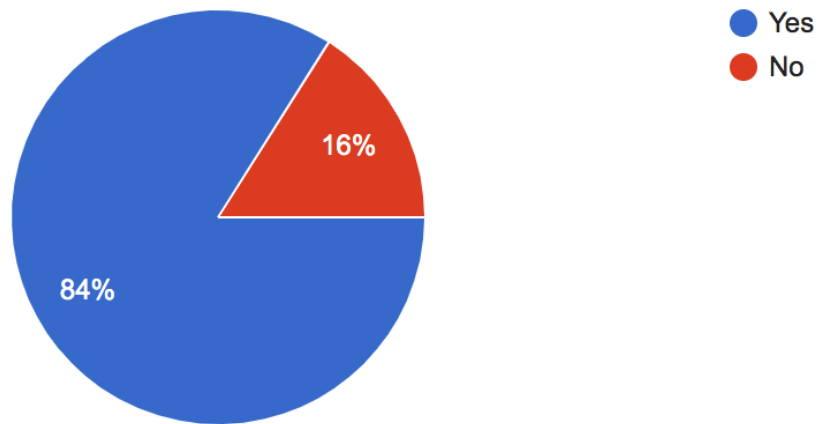
Answer	%	Count
1	92%	23
2	8%	2
3	0%	0
4	0%	0
5	0%	0

Q4. Who did you talk to first when you started your game?



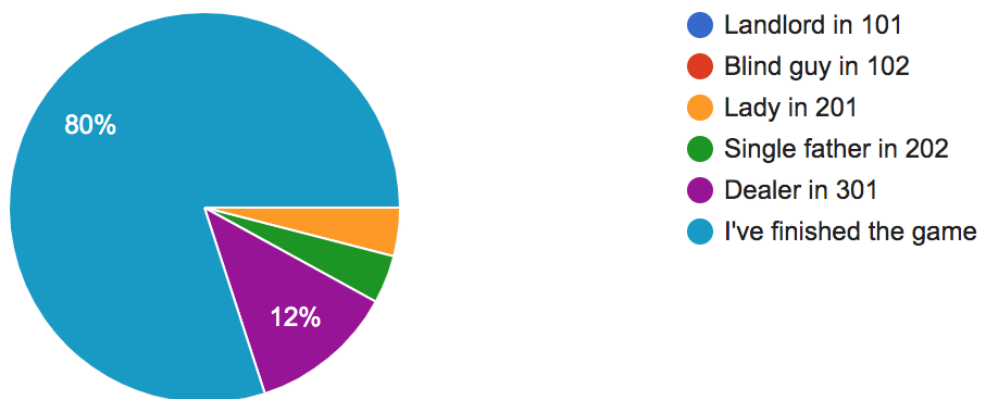
Answer	%	Count
Landlord	20%	5
Blind Guy	12%	3
Lady	24%	6
Single Father	24%	6
Dealer	20%	5

Q5. Did you reach any ending of this game?



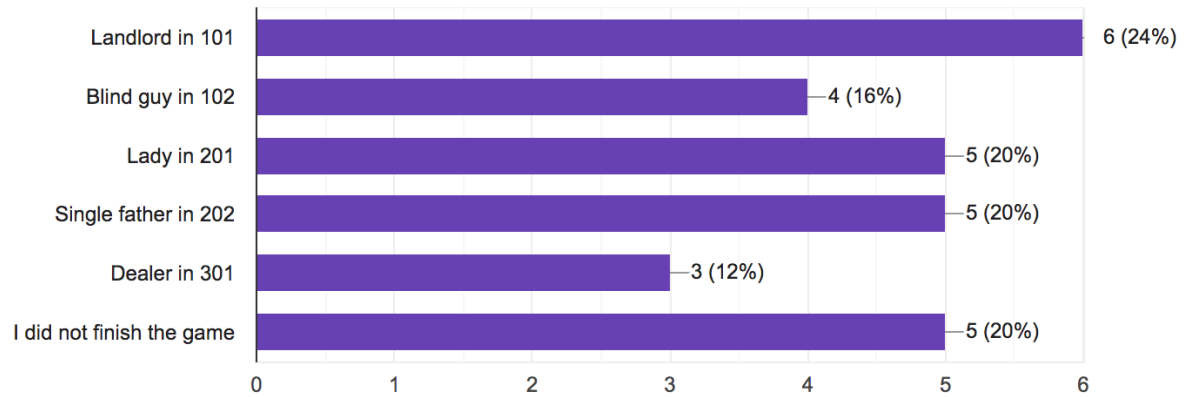
Answer	%	Count
Yes	84%	21
No	16%	4

Q6. If you did not finish the game, who was the last person you talked to?



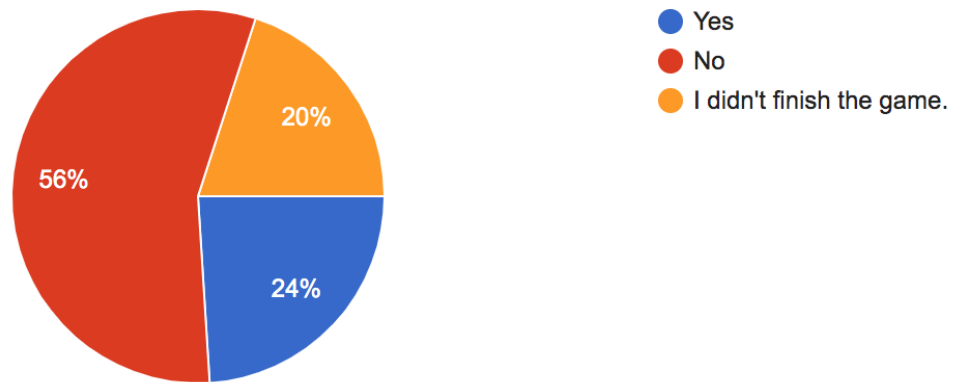
Answer	%	Count
Landlord	0%	0
Blind Guy	0%	0
Lady	4%	1
Single Father	4%	1
Dealer	12%	3
I've finished the game	16.7%	20

Q7. If you did finish a game, who was the last person you talked to?



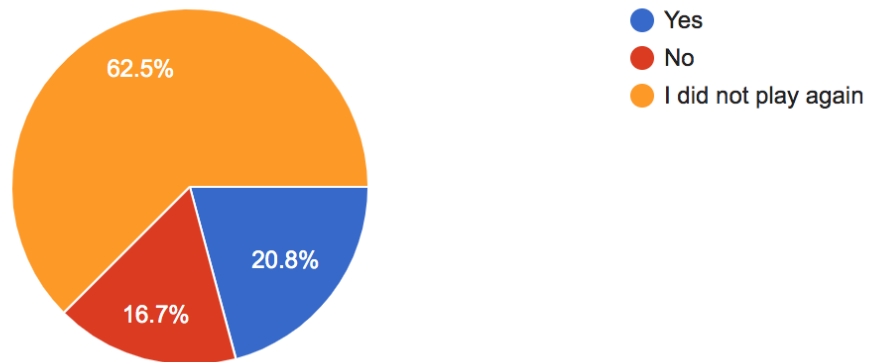
Answer	%	Count
Landlord	24%	6
Blind Guy	16%	4
Lady	20%	5
Single Father	20%	5
Dealer	12%	3
I did not finish the game	20%	5

Q8. If you did finish the game, did you try to play it again?



Answer	%	Count
Yes	24%	6
No	56%	14
I did not finish the game	20%	5

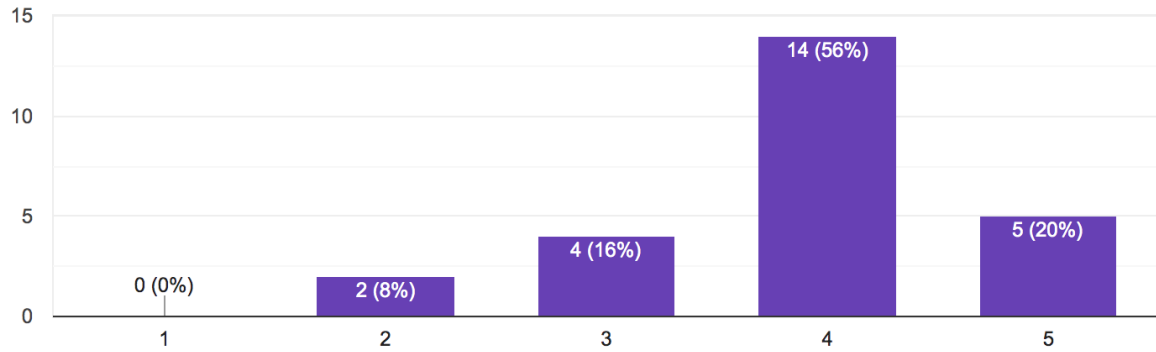
Q9. If you played again, did you finish it?



Answer	%	Count
Yes	20.8%	5
No	16.7%	4
I did not finish the game	62.5%	15

Q10. Did the UI system make sense?

Lickert scale: 1 = Not really, 5 = Very well.



Answer	%	Count
1	0%	0
2	8%	2
3	16%	4
4	56%	14
5	20%	5

Q11. In your opinion, what has really happened in the story?

Optional free text entry. Selected responses:

- “The old man was shot by the mailman, who was caught climbing up to the balcony to have an affair with the woman upstairs. He knocked on the old man's door and shot him while the train passed by. The blind man heard him drop the gun from his apartment.”
- “Everything points to the drug dealer, but it became so obvious. I expected a twist, but since I couldn't complete the game, I don't know.”
- “In my first playthrough it seemed pretty clear that by the end it was the father in 202 who murdered the old man. In the second playthrough, the evidence made it seem like the mailman, but it didn't really feel like he was the murderer. I feel like with more playthroughs, the absolute truth of who did it would become clearer.”
- “The woman and the mailman are having an affair, and they expertly frame the landlord for the murder that they committed. The other possibility is that the death was a suicide or assisted suicide, and that all the characters' wrongdoings, such as the drug dealer's business, the landlord's past, and the father's child abuse, made the residents seem suspicious.”
- “The drug dealer murdered the victim for trying to steal his drugs.”
- “I believe that it was the landlord who was behind the murder.”
- “The single father had somebody knock on his door, and under the influence of marijuana, killed the man in 302.”
- “Since the blind veteran heard someone yell “I'm going to kill you,” other people in the building had to have heard it too. I think the veteran lied about being blind, stole the landlord's key, and killed Peter Jones. The gun used to kill Peter was a rifle, and a war veteran would know how to use one. Also, even if the veteran couldn't check out what might have happened, why didn't he call the police, or at least try to find someone else who could? There are phones that blind people can use.”
- “I feel like there was a framing that happened. It ended by saying someone else's fingerprints were on the gun that the mailman used. I also heard from a friend that they had the veteran as the killer, so I'm not entirely sure on who really killed the old man.”

- “The veteran may have framed the mailman/ the landlord because he was smiling at the end.”
- “I couldn't get to the end of the game the first time and the second time I clearly arrested the wrong guy, but I assume that the detective probably had something to do with this based on the shirt and that his name was at the reunion, and that the string on the ground has to do with the way the guy died? I don't know. Maybe he managed to kill himself with an elaborate plot, although I wonder what happened to the dog...”
- “This guy was killed and depending on who you talk to, his murderer changes. At first I got the landlord as the killer but then in my second playthrough I got the mailman. Therefore, depending on who you talk to, the story is always changing.”

12. How would you describe this game to someone else?

Optional free text entry. Selected responses:

- “It's cool and I really want to know what **really** happened, but it's still unfinished.”
- “Interesting. It definitely requires you to pay attention and find clues that you would use to eventually prove someone's guilt.”
- A detective game where your perspective on the events may change drastically depending on who you talk to first.
- “I would describe this game as a game with an engaging story, that may be a bit hard to follow at times.”

Q13. Is there any other comment you would give?

Optional free text entry. Selected responses:

- “I think a UI that is consistent with the pixelated art style would go a long way. Also, a more dramatic opening sequence (maybe a cutscene or something along those lines) would also help to make the game more engaging.”
- “Sometimes when I would drag things into a scene they would glitch out and get stuck there not letting me use it again until I left the scene it happened the most with the gunshot wound but also happened with one of the infos once.”
- “It wasn't immediately intuitive what I should be doing with the stuff at the top of the screen, but after a second I figured it out.”
- “I thought the game was really fun. I would recommend taking another look at the dialogue because I noticed a lot of spelling errors, but other than that I think the game is pretty good.”

7.5. Analysis

The results of the two surveys are significant because they indicate not only whether the experience goal was achieved but also how much improvement was made between the two playtesting sessions.

In the first round of playtesting, there were only 1 out of 7 players finished the game, which means only 14.3% of players reached an ending. Most of them said the game was “confusing” and some of them thought it was “boring”. These are probably why they didn’t finish the game.

In the second round, however, 21 out of 25 players completed the game at least once. That means most of them have reached an ending and successfully arrested someone in the game. 72% of them thought the game experience was “engaging” and 40% of them thought it was “smooth”, while only 42.9% of the players thought it was “engaging” and none of them said it was “smooth” in the first round of playtesting.

Between the two sessions, a lot of improvements on the experience were made according to the response given by the first group of players, including but not limited to:

- Adding hints for the correct clue to use in the current scene.
- If players drop the wrong clue into the scene, the character will not only tell they used the wrong clue but also will imply where the player should use that clue.
- The rough UI system was substituted by a polished one.

These modifications significantly improved the experience of the game. For example, most of the players in the first playtesting session rate the UI system as 3 out of 5. In the second round, however, most players rate the UI system as 4 out 5.

What is more important is that the responses from the players indicate whether the experience goals of the game were achieved or not.

In the first round of playtesting, none of the players played the game more than once, which means none of them got the truth of “what has happened” in the game. In the second round, however, 84% of the players finished the game and 24% of them played the game more than once after they finished it. Furthermore, there are players who reached more than one ending, and two of them actually figured out “what has happened” in the game. One of them even played the game five times to try to find all the endings of the game. One player wrote: “ The death was a suicide or assisted suicide, and that all the characters' wrongdoings, such as the drug dealer's business, the landlord's past, and the father's child abuse, made the residents seem suspicious.” This is basically the truth that was shown in the story, and one of them got it. There are more players who figured that there was something wrong but couldn’t tell what was going on. For example, one wrote: “In my first playthrough it seemed pretty clear that by the end it was the father in 202 who murdered the old man. In the second playthrough, the evidence made it seem like the mailman, but it didn't really feel like he was the murderer. I feel like with more playthroughs, the absolute truth of who did it would become clearer.” This player’s answer was pretty close to the truth as well.

For other players who played the game only once, their response varied dramatically according to which story branch they fell into and which ending they reached. For example, one of them said: “The single father had somebody knock on his door, and under the influence of marijuana, killed the man in 302.”, while another player said: “The drug dealer murdered the victim for trying to steal his drugs.” They had a good time playing the game and they believed what they found was the truth. Their response completely matched one of the experience goals which is players should be satisfied with the truth they got even if they play the game only once. This is also what people usually do in daily life, which is we believe in the “truth” we get.

Overall, the experience goals of the game were achieved. Although a few of them didn’t get the true answer to “what has happened”, most of them got an answer that they are satisfied with, and this is also part of the experience goal.

8. Post mortem

The project as a whole worked fine, however, a lot of problems were encountered and plenty of aspects of this project could be improved.

First of all, the time management of this project could have been better. This is a big project, yet there is only one person working on it. It took the developer too much time to build a demo of the game that is sufficient for playtesting.

Secondly, the goal of the project was to make a game not only achieve the experience goals but also tell the story with interactive flashbacks. However, this mechanic was completely removed from the game due to the excessive workload.

Lastly, there are still minor bugs in the game. Although these bugs will not cause game crashes or other problems that would stop the player from playing the game, they still made the game experience worse than they should be. Some bugs could be really annoying.

These are the main problems of this project. More improvements could be done.

Of course, there are stuff that went well in this project as well. For example, all of the five experience goals were achieved. Most of the players finished the game and loved their experience. Furthermore, two players figured out “what actually happened” in the game by playing it multiple times. The game has achieved what the creator aimed for in the very beginning of this project.

8.1. *Future work*

There are still a lot of aspects of the game that could be improved and polished in the future, including the content of the game and bug fixing.

There are still a lot could be done before this game is published:

- Minor bugs which worsen the game experience need to be fixed. For example, when players drag and drop clue into the scene, the clue is not attached to the cursor. Instead, it float around the cursor, which made it annoying for the player to drag clues into the scene.

- More contents, such as the flashback mechanic, needs to be added. In order to create the flashback mechanic, the author will create more animations by Aseprite, a tool for creating pixel animation.
- The design of some details in the game should be modified. For example, after players made their only choice in the game, there should be some kind of feedback to imply that they made a choice. Though they should not be told directly that they made a choice, feedback are still necessary. It could be sound, or hints in the dialogue.

After these changes are made, *A Detective Story* would be officially published to all kinds of platforms for games, such as Steam and itch.io.

9. Conclusion

A Detective Story is a detective story telling game which discusses how people's point of view may affect the truth they see in an event. It presents a short but condensed experience that draws inspiration from precedents such as *Rashomon*, *Pale Fire*, and *Her Story*.

As shown in this thesis, the process of building *A Detective Story* was deeply related to the experience goal of this project. The author wanted to build a game that would be played by the player more than once, and players should be thrilled when they play the game again and figure out another layer of truth in this game. A lot of problems were encountered during this process, including the project management issues, and many of them were solved.

Evaluation of the game was made through playtesting and gathering post-play surveys. Satisfying results were collected and most of the players seemed to enjoy the game. The main experience goals, including engaging, mysterious, finishable, deterministic, and satisfying for one-time players, were all achieved.

Overall, *A Detective Story* is a successful project, because the main goals of it were achieved and more importantly I, the creator as well as the author of this thesis, like it. Throughout the development of this project, the author sometimes questioned himself whether detective story is the most appropriate theme of this game, because it doesn't have to be a detective game to present the main goal of this project. It could be simply a high school reunion where everyone talks about their own impression of an event that happened in the past, and players would get different impressions and endings according to the order they talk to the characters in the game. Eventually the author chose detective story as the theme of this game and he is glad that he did so. *A Detective Story* was not only a murder mystery, but also a story about loneliness, fate, and the connections between humans.

Works cited

1. Doyle, Arthur Conan. (1930) *The Complete Sherlock Holmes*. Garden City, NY: Doubleday & Co.
2. Giordano, C. (2013, April). Developing Character in the Nineteenth-Century Novel. Retrieved December 01, 2020, from <https://deepblue.lib.umich.edu/handle/2027.42/60743>
3. Christie, A. (2017). *Death on the Nile*. London: Collins.
4. Nabokov, V. (1962). *Pale Fire*. London: David Campbell.
5. Barlow, S. (2015) *Her Story*. Android, iOS, Microsoft Windows, Mac OS
6. Capcom. (2014)*Phoenix Wright: Ace Attorney Trilogy*. Nintendo Switch, PlayStation 4
7. Jordan Mechner. (1997) *The Last Express*. Broderbund
8. Real and Demonstrative Evidence. (2019, February 15). Retrieved December 01, 2020, from <https://criminal.findlaw.com/criminal-procedure/real-and-demonstrative-evidence.html>
9. Tierney, J. (1996, January 14). The Big City; Save the Flophouses. Retrieved December 01, 2020, from <https://www.nytimes.com/1996/01/14/magazine/the-big-city-save-the-flophouses.html>
10. Kurosawa, Akira. (1950) *Rashomon*. Tokyo: Daiei.
11. Isbister, K. (2018). *Better game characters by design: A psychological approach*. Boca Raton, FL: CRC Press.
12. Haglund, V. (2013, April 15). Character Development and its Utilization for Convergent Media Formats. Retrieved December 01, 2020, from <https://www.diva-portal.org/smash/record.jsf?pid=diva2%3A615435>
13. Adams, E., & Dormans, J. (2012). *Game mechanics: Advanced game design*. Berkeley, (CA): New Riders.
14. Jakub Dvorsky. (2019) *Pilgrims*. Amanita Design.
15. NEXT Studio. (2019) *Unheard*.
16. Dan Salvato, Satchely, VelinquenT. (2017) *Doki Doki Literature Club*. Team Salvato.
17. YGGDRASIL STUDIO. (2016) *Discouraged Workers TEEN*.
18. Pan, G., & Li, Z. (2004) *Wang Jiawei de ying hua shi jie*. Xianggang: San lian shu dian (Xianggang) you xian gong si.

19. Jiménez, Dayana, Gutiérrez, Paola, Yeisson, Villa, & Fernán. (2019, September 15). Preliminary study of mortality by cause and sociodemographic characteristics, municipality of San Francisco, Antioquia (Columbia), 2001-2010. Retrieved from <https://arxiv.org/abs/1909.06738>
20. Santaella-Tenorio, Julian, Magdalena, Villaveces, Galea, & Sandro. (2016, February 10). What Do We Know About the Association Between Firearm Legislation and Firearm-Related Injuries? Retrieved from <https://academic.oup.com/epirev/article/38/1/140/2754868>
21. Kurosawa, A., Hashimoto, S., Richie, D., Akutagawa, R., & Akutagawa, R. (1979). *Rashomon: A film*. Ann Arbor, Mich.: Reprinted for Grove Press by University Microfilms International.

Appendix A: IRB Informed Consent Agreement

Investigator: Brian Moriarty

Contact Information: bmoriarty@wpi.edu, +1 (508) 831-5000 x5638

Title of Research Study: Exploring Iterative Revelation in Storytelling

Sponsor: WPI

Introduction: You are being asked to participate in a research study. Before you agree, however, you must be fully informed about the purpose of the study, the procedures to be followed, and any benefits, risks or discomfort that you may experience as a result of your participation. This form presents information about the study so that you may make a fully informed decision regarding your participation.

Purpose of the study: The purpose of this study is to obtain feedback on the project in order to facilitate design improvements and find/address operational bugs.

Procedures to be followed: You will be asked to play a brief game lasting less than ten minutes. After completing the game, you will be asked to complete a brief, anonymous survey describing aspects of your subjective experience.

Risks to study participants: There are no foreseeable risks associated with this research study.

Benefits to research participants and others: You will have an opportunity to enjoy and comment on a new game under active development. Your feedback will help improve the game experience for future players.

Record keeping and confidentiality: Records of your participation in this study will be held confidential so far as permitted by law. However, the study investigators and, under certain circumstances, the Worcester Polytechnic Institute Institutional Review Board (WPI IRB) will be able to inspect and have access to confidential data that identify you by name. Any publication or presentation of the data will not identify you.

Compensation or treatment in the event of injury: There is no foreseeable risk of injury associated with this research study. Nevertheless, you do not give up any of your legal rights by signing this statement.

For more information about this research or about the rights of research participants, or in case of research-related injury, contact the Investigator listed at the top of this form. You may also contact the IRB Chair (Professor Kent Rissmiller, Tel. 508-831-5019, Email: kjr@wpi.edu) and the University Compliance Officer (Jon Bartelson, Tel. 508-831-5725, Email: jonb@wpi.edu).

Your participation in this research is voluntary. Your refusal to participate will not result in any penalty to you or any loss of benefits to which you may otherwise be entitled. You may decide to stop participating in the research at any time without penalty or loss of other benefits. The project investigators retain the right to cancel or postpone the experimental procedures at any time they see fit.

By signing below, you acknowledge that you have been informed about and consent to be a participant in the study described above. Make sure that your questions are answered to your satisfaction before signing. You are entitled to retain a copy of this consent agreement.

_____ Date: _____

Study Participant Signature

Study Participant Name (Please print)

_____ Date: _____

Signature of Person who explained this study

Appendix B: IRB Purpose of Study and Protocol

Title of Research Study: Exploring Iterative Revelation in Storytelling

Purpose of study

To obtain user feedback in order to determine if experience goals are being achieved, locate operational bugs, and identify opportunities for design improvement.

Study protocol

Participants are directed to a Web URL where they view the Opening Briefing (below), complete the Informed Consent Agreement and download the game software.

After completing the game, participants are directed to another URL and asked to fill out a short survey to characterize aspects of their subjective experience and solicit suggestions for improving the experience.

Opening briefing for testers (provided online)

“Hello, and thank you for volunteering to test our project. Before we begin, could you please read and sign this Informed Consent form? [Tester signs IC form.] Thank you. When your session is complete, we will ask you to complete a brief survey about your play experience. At no point during your test session, or in the survey after, will any sort of personal and/or identifying information about you be recorded. Please begin playing when you feel ready.”

Appendix C: Dialogue code samples

```
public Flowchart confront_dropGun2;
public Flowchart confront_mailmanCar;
public Flowchart confront_mailmanCar2;

private DropClue clue;
private EvidenceText etext;
private EvidenceUI eUI;

// Start is called before the first frame update
☞ Unity 消息 | 0 个引用
void Start()
{
    etext = FindObjectOfType<EvidenceText>();
    clue = FindObjectOfType<DropClue>();
    confront1 = false;
    confront2 = false;
    confront3 = false;
    confront4 = false;
    confront5 = false;
    confront6 = false;
    confront7 = false;
    eUI = FindObjectOfType<EvidenceUI>();
    DecideConversation();
}

// Update is called once per frame
☞ Unity 消息 | 0 个引用
void Update()
{
    clueName = clue.clueName;
    if (!clue.confronting)
    {
        ShowHighlight("Threatened Victim");
    }
    if (confront_threatenVictim.HasExecutingBlocks())
    {
        clue.confronting = true;
        highlight.GetComponent<Image>().enabled = false;
    }
}
```

```

public void OnDrop(PointerEventData eventData)
{
    if (clueName == "Threatened Victim" && !confront1)
    {
        if (GameObject.Find("MenuDialog"))
        {
            Destroy(FindObjectOfType<MenuDialog>().gameObject);
        }
        confront_threatenVictim.ExecuteBlock("New Block");
    }
    else if (clueName == "Victim's Drug Addiction" && confront1 && !confront2)
    {
        if (GameObject.Find("MenuDialog"))
        {
            Destroy(FindObjectOfType<MenuDialog>().gameObject);
        }
        confront_victimDrug.ExecuteBlock("New Block");
    }
    else if (clueName == "Someone Was Yelling" && confront2 && !confront3)
    {
        if (GameObject.Find("MenuDialog"))
        {
            Destroy(FindObjectOfType<MenuDialog>().gameObject);
        }
        confront_killing.ExecuteBlock("New Block");
    }
    else if (clueName == "Master Key Stolen" && confront3 && !confront4)
    {
        if (GameObject.Find("MenuDialog"))
        {
            Destroy(FindObjectOfType<MenuDialog>().gameObject);
        }
        confront_masterKey.ExecuteBlock("New Block");
    }
    else if (clueName == "Train Pass By" && confront4 && !confront5)
    {
        if (GameObject.Find("MenuDialog"))

```

```

void DecideConversation()
{
    if (etext.GetFirstDoor() == 301)
    {
        pointToFamily.ExecuteBlock("New Block");
    }
    else
    {
        normalHello.ExecuteBlock("New Block");
    }
}

```

7 个引用

```

void ShowHighlight(string name)
{
    if (eUI.FindEvidence(name) != null)
    {
        highlight.GetComponent<RectTransform>().position =
            new Vector3(eUI.FindEvidence(name).GetComponent<RectTransform>().position.x + 35.0f,
                eUI.FindEvidence(name).GetComponent<RectTransform>().position.y + 30.0f,
                eUI.FindEvidence(name).GetComponent<RectTransform>().position.z);
        highlight.GetComponent<Image>().enabled = true;
    }
}

```