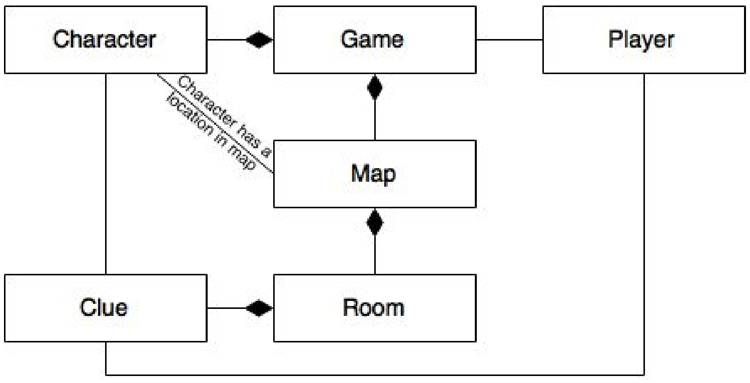
Architecture

To explain the architecture of our game we decided to use UML 2.X [1] as this allowed us to create a clear diagram of how our game should be architected. We have annotated where possible explaining the relationship between objects and explained some of the attributes. The tool we used to design the diagram was initially pen and paper however we later decided upon the use of Draw.io[2] as this allowed us to collaboratively design the achitechture online.

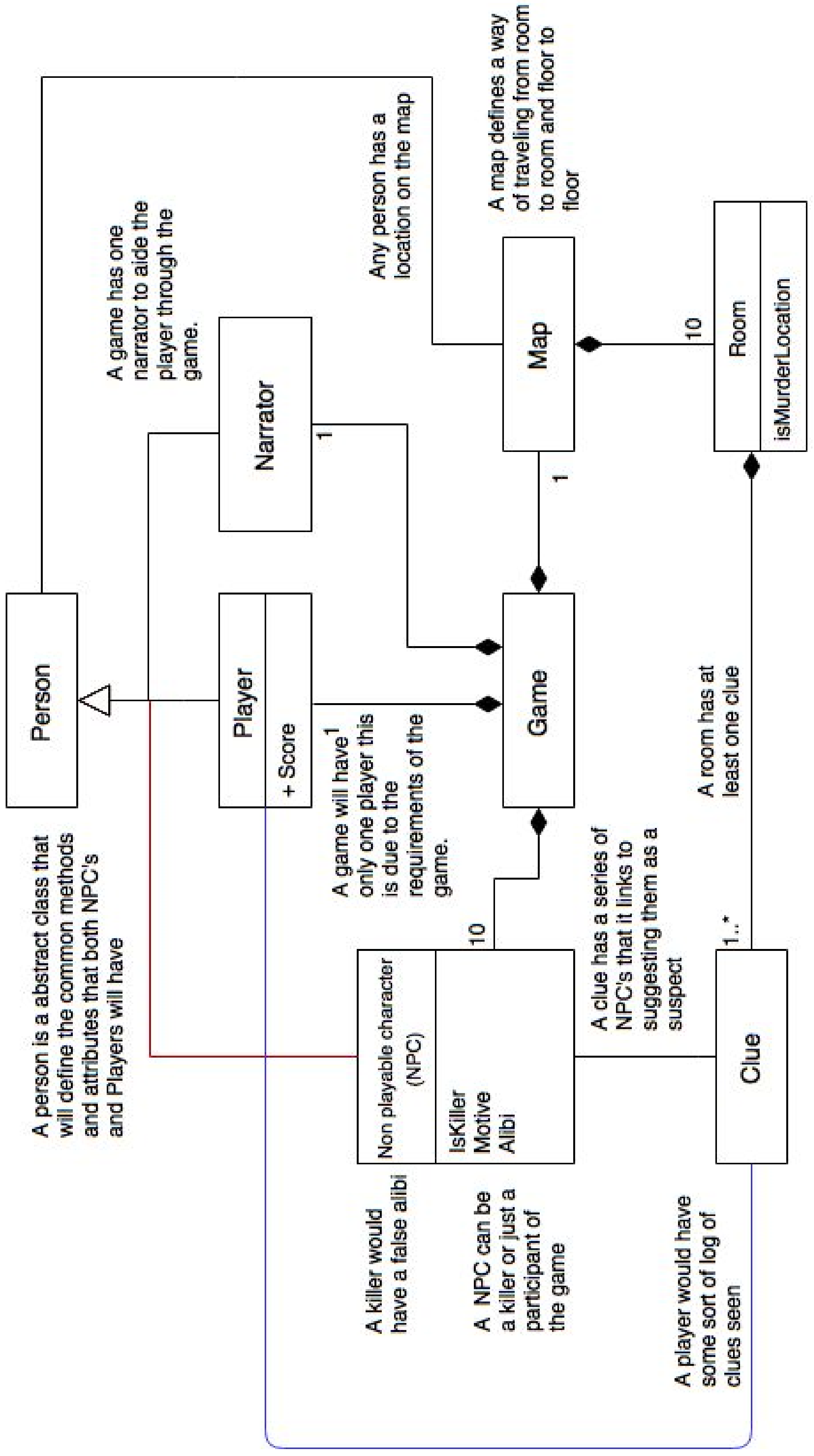
Before starting the design of the architecture we first sat down and worked out how the game would work in practice. Creating scenarios and planning how the game would play through with each scenario. This helped us decide what the main objects of the game would be.

We began designing a simplified UML diagram, showing only the classes and high level relationships, as this allowed us to work out the different objects we needed for the game, and clearly visualise how they relate to each other. This diagram was intentionally kept simple for clarity, and it allowed us to start thinking about the structure of the game in the simplest terms possible. This then gave us a clearer picture of how the structure of the game worked, and allowed us to move on to producing a more complex UML diagram that we can use for reference later on when implementing the game.



The structure that was presented by the simplified UML diagram served as a base for our final UML diagram. The UML diagram was produced based on our previous thinking, and it expanded upon the detail about the components and objects of the game we had planned before. We started map out the key classes and properties, and worked out how we could use abstract classes and inheritance to improve code reuse and aid with the implementation process.

On the following page is our UML diagram. We've used a few non-standard additions to the diagram to clarify our thinking. We've put comments across the diagram alongside relationship lines and classes to explain what we meant by the relevant parts. Also we have colour coded intersecting lines to show the differentiation between the two (we were unable to get "bridges" over the lines in our diagramming tool!)


Person
Player
+ Score
Narrator
Game
Map
Room
isMurderLocation
Non playable character (NPC)
IsKiller
Motive
Alibi
Clue
1
1
10
10
1..*
A person is a abstract class that will define the common methods and attributes that both NPC's and Players will have
A game has one narrator to aide the player through the game.
Any person has a location on the map
A map defines a way of traveling from room to room and floor to floor
A game will have1 only one player this is due to the requirements of the game.
A room has at least one clue
A clue has a series of NPC's that it links to suggesting them as a suspect
A killer would have a false alibi
A NPC can be a killer or just a participant of the game
A player would have some sort of log of clues seen

Justification

The game will be made up of many classes, and these classes will have relationships to each other, as described previously. This structure is useful for the implementation process, as it allows relevant parts of the game to be isolated and available for reuse elsewhere. Having a strictly defined structure also aids with maintainability and ability to add new features, as developers can find the code they are looking for.

Game

A game is a class that provides the entry point to the game logic. It contains methods that render and initialise the game ready for use by a user, and manages the state of the game as it progresses. This class is necessary to contain the game logic, and will provide a common area to place shared game logic.

Person

A person is an abstract class that will define the common methods and attributes that both NPC's (see below) and a player will have. These include a relationship to the map to allow for common location attributes and methods to be shared, and other rendering methods. This will help prevent unnecessary code duplication, this will also allow us to expand the game further in the future if required adding new people that require the same functions.

Player

The game has one player, which represents the user interacting with the game. The player class extends the person class to allow for code reuse. The player contains attributes such as their score, and contains a list of clues the player has picked up. A player can also be in a room within the map. This class is necessary to contain logic related to the user, and to keep relevant user details and status for use within the game.

The player will contain details about previous types of questions asked to NPCs, this is to allow the development his/her personality as the game goes on.

Non-Playable Character (NPC)

A non-playable character (referred to as NPC) is one of the fictional people represented within the game. There will be 10 NPCs in the game. All NPCs have associated clues that point to them as a suspect.

At the start of a game, each NPC will be associated with a room within the map, and they can be questioned in that room by the player. The NPC contains the questioning data, including the possible questions that a player can ask and the NPC’s response.

For every game, an NPC is selected as the killer from a subset of the NPCs that can be killers. The same process happens for selecting the victim. A subset of all the NPCs can be possible killers or victims - this is to reduce the number of storylines that need developing, and can be expanded later on.

All NPCs have a motive (a reason why they would kill the victim) and all NPCs except the killer have an alibi (what they were doing at the time of the murder). This is to allow the game to change the murder scenario every time it is played.

Narrator

There is one narrator in the game, we chose not to have the narrator as another NPC in the game as the narrator serves a different purpose, requiring different methods and attributes to a NPC. The purpose of the narrator is to introduce the game to the player, the control scheme and instructions on how the game works.

Map

This is a representation of the map within the game that a player can navigate around. A map contains many rooms arranged in a specific way, and provides methods and attributes that allow for navigation. There will be 10 rooms in a map, however the way the map class is designed it will allow more rooms to be added or taken away easily.

Rather than giving the game a series of rooms we decided to create a map class that would handle how these rooms linked to each other, this makes it easy to provide methods to the game and the player that mean if we were to add new rooms or change the map the game logic wouldn't need to be altered.

Room

A room is a place within a map that a player can visit. This class will contain methods and attributes that will allow other parts of the game to interact with the room where necessary.

At the start of the game, each room has a random NPC assigned to it, and one or more clues associated with the killer NPC assigned to it. The player can visit the room to gather information by talking to the assigned character, or finding the clues located in the room.

Clue

A clue is an object within the game that allows the player to narrow down their list of suspect NPCs. Every NPC has a set of clues, and these point to the NPC as a suspect. Some of these clues are shared amongst multiple characters, for example "a blond hair", that will allow the player to narrow down the set of suspects.

At the start of each game, every clue associated with the killer NPC is assigned to a room, so when the player visits a room they can collect any clues located in the room.

The clue class is essential to the game as it provides the mechanism for deducting which NPC is the killer in the game.

Bibliography

[1] OMG Unified Modeling Language TM (OMG UML) Version 2.5 [Online] Available http://www.omg.org/spec/UML/2.5/PDF/ [Accessed 25/10/2016]

[2] Draw.io, “Flowchart Maker & Online Diagramming Software” [Online] Available https://draw.io/ [Accessed 25/10/2016]