CGP2010M – Game Design 2 Assessment- Report

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5. Analysis of Game

An important first step in analysing a game is to first choose a framework to judge it by, one such framework to analyse this game by is MDA (Mechanics, Dynamics and Aesthetics) (Hunicke, R. et al, 2004, 1-2).

Firstly taking a look at the ‘mechanics’ of the game, the primary focus is the manipulation of Boolean logic. In particular the game focuses on Boolean variables which, the outputs of, lead onto a variety of different logic gates. At its core the idea is to use Boolean variables and logic to pass a ‘true’ value to the end of the level (here denoted by a door, which will only open once that ‘true’ value is passed to it). The game also functions by having multiple levels, all with varying levels of difficulty. There are starter levels which introduce the concepts of Boolean variables and logic to the player, and these levels are intended to allow the player to mess around with the concepts presented to them at their leisure. The more difficult levels will also introduce a timer, in order to challenge the player to think quickly and compete on faster completion times.

In terms of ‘dynamics’ the player will manoeuvre through a room which presents them with a selection of Boolean variables to interact with (i.e. change their values between ‘true’ and ‘false’) down at their level. Above these variables lies a collection of cables that lead from these variables to different logic gates (i.e. AND, OR, NOT). This then causes the output of the gates to change, which lead onto further logic gates and onto the end of the level. The player will be able to see the entire path of all the values above them, therefore they’ll be able to plan what values these gates need in order to complete the level. Additionally, in the harder levels of the game, a timer is introduced at the top of the screen in order to encourage faster play and competing.

The final aspect to look at is ‘aesthetics’, the reaction we want to instil in the player. It is incredibly important to understand what may drive a player to continue playing a game, one such way we can try to identify this is through the ‘8 Kinds of Fun’ (Hunicke, R. et al, 2004, 2). One of the kinds of fun this game attempts to present to the player is that of ‘discovery’. This refers to the core concept of this game being to teach the player about Boolean variables and how they interact with different forms of logic. This is presented by slowly teaching the player what the output of the various logic gates are when they manipulate the variables going into them, by allowing them to take their time here the encouragement is for them to experiment and truly learn what the different types of logic do in relation to their inputs. From this gentle introduction to the concepts, the game then moves towards being more of a ‘challenge’. From the ‘8 Kinds of Fun’ this refers to games being an obstacle that the player then has to overcome, this game achieves this criteria by presenting the player with a variety of puzzles that make use of all of the logic that they have hopefully learned from earlier in the game. This requires them to think back and actually apply what they have learned, which will challenging at first but, so long as they properly indulged in the ‘learning’ parts of the game, they will be able to overcome these more challenging puzzles. Additionally, in these more complex levels of the game, a timer is introduced in order to encourage the player to think their way through the puzzles quickly. Also this provides an opportunity for the player to compete with others, by comparing their completion time of levels with other players.

1. High Concept

**Overview**

Logical Escape is a 2D side-on puzzle game, produced in the Unity 2D Engine for Windows.

**Features**

* Teaches the basics of Boolean logic
* Learn how to apply this logic
* Traverse your way through increasingly challenging puzzles
* Compete with your friends on hard puzzles to see who can complete them in the shortest time
* Simple to grasp, harder to master
* Easy to just pick up and play, with levels you can quickly jump into and out of

**Premise**

Trapped in a facility crumbling around you, everyone else is long gone. All the high level escape strategies have failed, time to fall back on the basics. Boolean logic. Break through the fail-safes and escape.

**Gameplay**

We follow our character Luke as he tries to solve Boolean logic puzzles to escape a facility that is crumbling around him. Luke only has authorisation to interact with the Boolean variables at the base level, flipping the switches to turn them ‘on’ and ‘off’.

Using this tool at his disposal, and his knowledge of logic gates that these variables connect to, he must pass an ‘on’ signal to the doors at the end of each room he enters. Eventually he will find his salvation and escape the facility.

The time is always ticking however, so Luke may find that he will not only need to solve difficult puzzles but will also have to complete them as quickly as possible.

1. Design Process

For this project, the most important first consideration for the design process were the constrictions put in place. The first of these related to the primary subject focus, in this case the concept to base the game around was the notable mathematician George Boole. This promptly brought to mind the idea of Boolean variables (i.e. Variables that have two states, ‘true’ and ‘false’). Though this, on its own, doesn’t immediately lead to an interesting idea for a game. However, due to the constriction on the game’s genre (puzzle), this opened a whole new bout of possibilities.

When considering both the Boole concept and the puzzle genre, the connection was made to perhaps use the idea of logic in order to create puzzles. The first thing done was to outline all the different logical concepts linked to Boolean variables (i.e. AND, OR, NOT) and their truth tables, then consider how this information could then be interpreted into a puzzle.

The final constraint on the production of this game was that it needed to be created using the Unity Engine, an extremely useful tool for the independent development of games. Though this did open a different avenue of choice for the development of the game, in particular that it could be created either using Unity’s 2D or 3D capabilities. The decision was made to develop the game in 2D as this would provide the best opportunity to create a game that would appear easy to pick up and play quickly to the casual player, as they will be able to see the entire level at a glance and will therefore immediately have all the information that they need in order to be able to solve the puzzles.

Another important factor used within the design process was to look at a framework for game design, in this case MDA was used in conjunction with the ‘8 Kinds of Fun’. Using MDA, the first aspect planned was the ‘mechanics’ at play in the game, in the framework’s sense this refers to the base components of the game. Given the Boolean subject matter and the puzzles at play, the mechanics will allude to the Boolean variables being used and the logic gates that they interact with at the base level. The next component of ‘dynamics’ relates to how the ‘mechanics’ behave at run-time, in particular how they act upon the player’s inputs and the outputs of other ‘mechanics’. In the case of this game the ‘dynamics’ were determined to be the way that the players’ manipulation of the Boolean variables and how changing these variables then impact the outputs of the logic gates. Then the final stage of thinking through the MDA framework is to examine the ‘aesthetics’, or the desired response that you garner from the player. The primary focus here, given the puzzle genre and the subject being of George Boole, was that the game could perhaps act as a useful tool to teach the player Boolean logic through the puzzles presented to them.

Another incredibly important consideration made in the design process here, and indeed a vital step in all design processes, is the original planning of the game concept. In particular it is essential to iterate the concept, as it tends to almost be a given that the very first idea come up with will have a lot of issues. Hence this was a pivotal process when the design work began on this game, so once an initial idea was thought up it was promptly dismantled in order to ascertain which parts of it may continue to be useful in further iterations and which detract from the game as a whole. In this particular case, the original idea was to feature a multiple room level setup, where each room would contain a set of Boolean variables and logic ideas, then there would be a door at the end of the room, above which would be a set of ‘goal’ conditions for the room. Essentially the player would’ve been presented with a selection of variables under different logic headings (AND, OR, etc.), and the ‘goal’ conditions would tell them to achieve a certain output for each form of logic. The idea was to attempt to teach the player Boolean logic through these puzzles.

[DIAGRAM?]

This concept was promptly torn apart however as the game simply didn’t seem fun. The problem stemmed from that the game was simply giving the player a set of instructions to carry out, and not really allowing the player any agency in the world presented to them.

An additional thought process that went into the design of this game came as a result of Jane McGonigal’s ‘Reality is Broken’, a book which delves healthily into the core design elements of games and what these design decisions can mean for the player. One approach to design outlined by McGonigal is that games inherently must have ‘four traits’, these being goal, rules, a feedback system and voluntary participation. ‘Goal’ relates to the outcome that the players must work to achieve; in the case of this game the ‘goal’ comes as the Boolean logic puzzles that the player has to solve. ‘Rules’ then refers to how the game imposes limitations on how players can achieve said goals; this is accommodated in this game by only allowing the user to have minimal input in the world, in particular here they are restricted to interacting with just the basic Boolean variables and not with the logic gates or signal pathways themselves. The ‘feedback system’ at play within

1. Post Mortem
2. Reference List

Hunicke, R. et al (2004) *MDA: A Formal Approach to Game Design and Game Research*. Northwestern University.