Deliverable F

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Trello Board: https://trello.com/b/p8ZWMdHe/gng1103-project

Abstract

this deliverable presents an updated game design for the “unbeatable red-light green-light game” which focuses on prototyping the games mechanics though a flow chart and storyboard as well as the ethical concerns of the game. The game itself has been refined based on feedback from the design review. The game has a twist involving the robomaster having its own set of rules for eliminating players in which the players do not know, creating an unpredictable experience. The focus of prototype one is on the ethical concerns of the game. afterwards a detailed analysis of the Potential Cause Failure Modes and Effects (PCFME) for Prototype two, which addresses limitations in player detection, cue clarity, and game boundary recognition. Lasty a structured plan outlining the teams roles and deadlines, guiding the team forwards.

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3. Introduction

In this deliverable, a written, updated game design is produced, followed by a storyboard and flow chart of the game process. The deliverable includes an explanation of the diagram and flow chart of the game process. The deliverable includes an explanation of the diagrams and the tests that were performed on this prototype (the reason why the prototype was created). The tests for prototype one focus on the ethical concerns demonstrated by the project. This is done to allow us to visualize the physical steps of the prototypes' execution and to see where certain aspects may need to be changed in future prototypes. Finaly, a list of tasks is given to help organize the process and allow the team to finish on time.

4. Updated design

After lab 7 – Design Review, multiple changes were made after receiving great feedback from other groups in our lab session. The following is an updated explanation of our game in written form.

The game is an unbeatable, red-light, green-light game. The player will be told to walk on green, and stop on red, and if seen, they will be eliminated by the robot. The players goal is to retrieve a stuffed cat at the end of the playing area. The playing area is a 20-foot by 20-foot diamond, with the five players starting at one corner, and the robomaster and cat in the opposite corner. The twist is that the robot will be using different rules than the players are told. The robomaster will target the green players when the green light is on, and the red players when the red light is on. The robomaster will target the players based on numbered targets that the robomaster is designed to detect. When the infrared distance sensor detects a player moving when not supposed to, it will fire a laser at them, flash one of five other colours (matched to a small dot on their target), and announce that player "x" is eliminated. If a player manages to make it past the halfway point, the robomaster will change its targeting system and do the opposite of its initial rules. It will also target player at all times on one side of the board, or if they come within 1 meter of the robot.

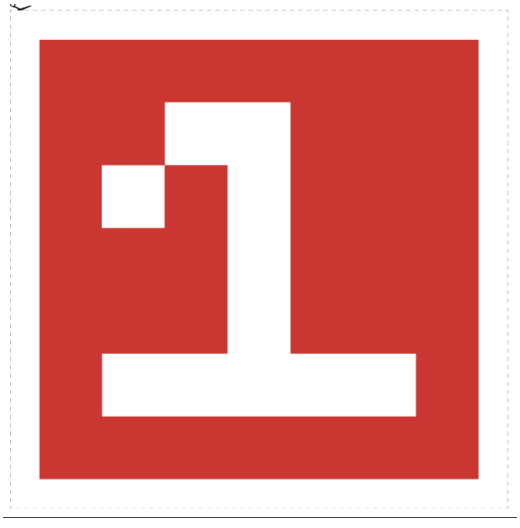
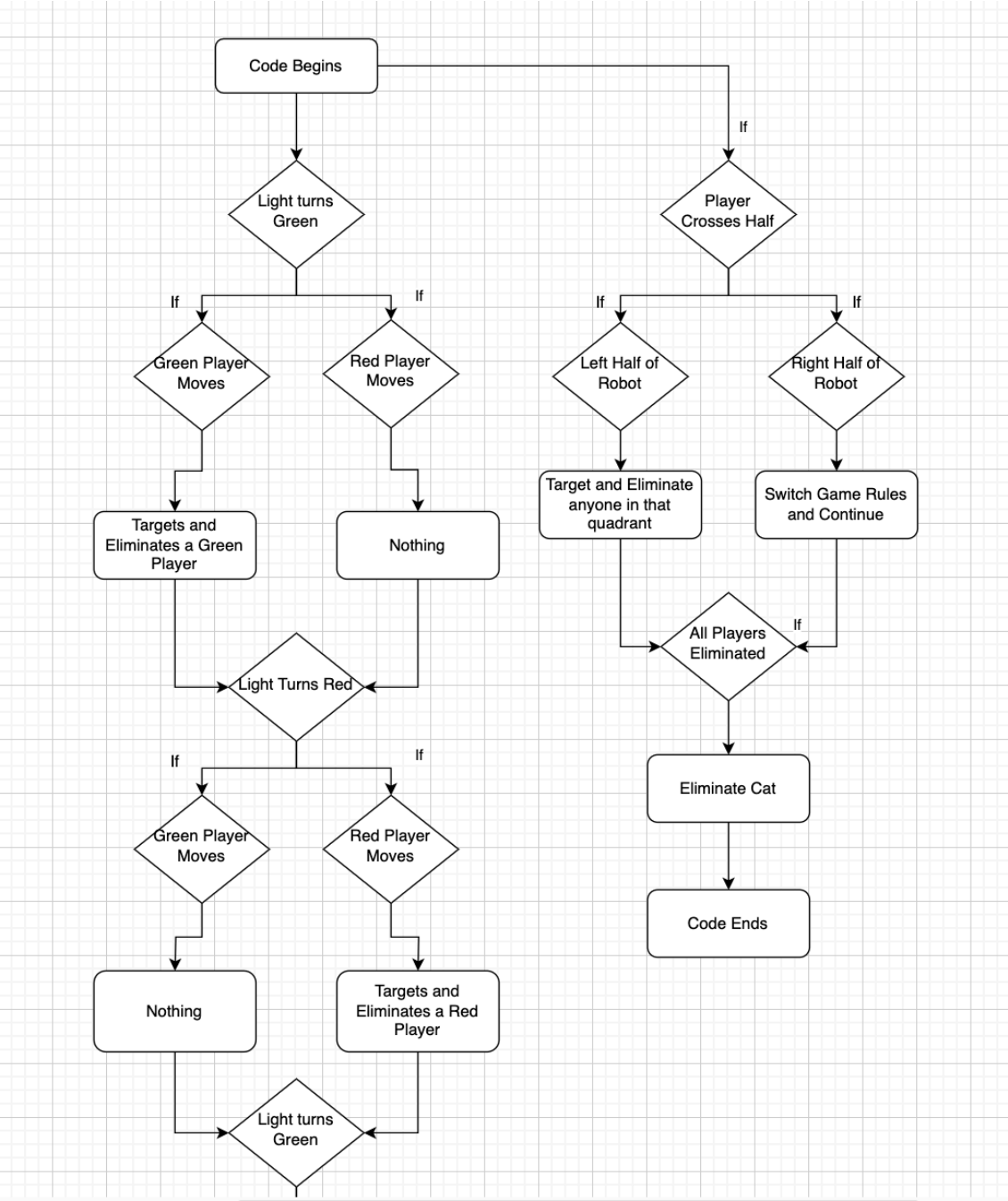
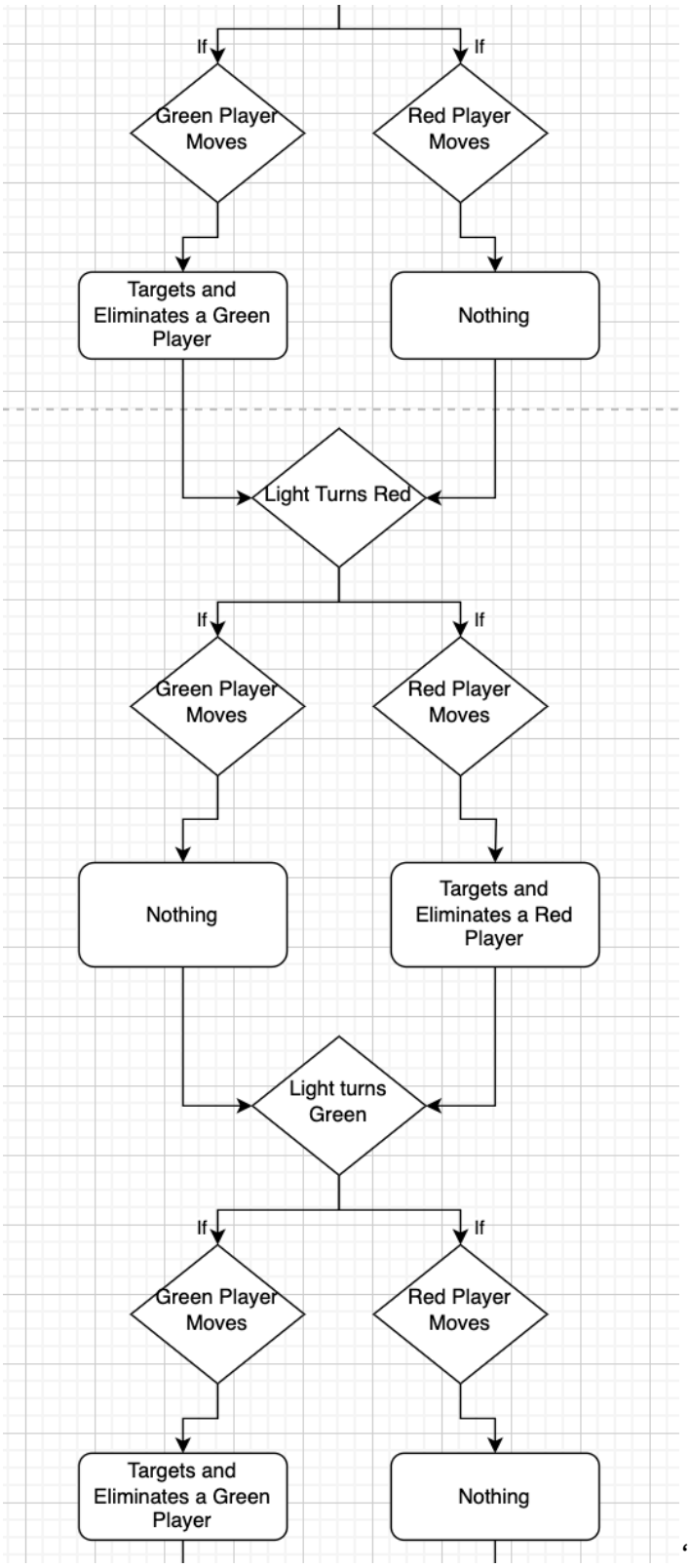


Figure 1 - Example Target

5. Storyboard / Flowchart




If
If
Green Player Moves
Red Player Moves
Targets and Eliminates a Green Player
Nothing
Light Turns Red
If
If
Green Player Moves
Red Player Moves
Nothing
Targets and Eliminates a Red Player
Light turns Green
If
If
Green Player Moves
Red Player Moves
Targets and Eliminates a Green Player
Nothing

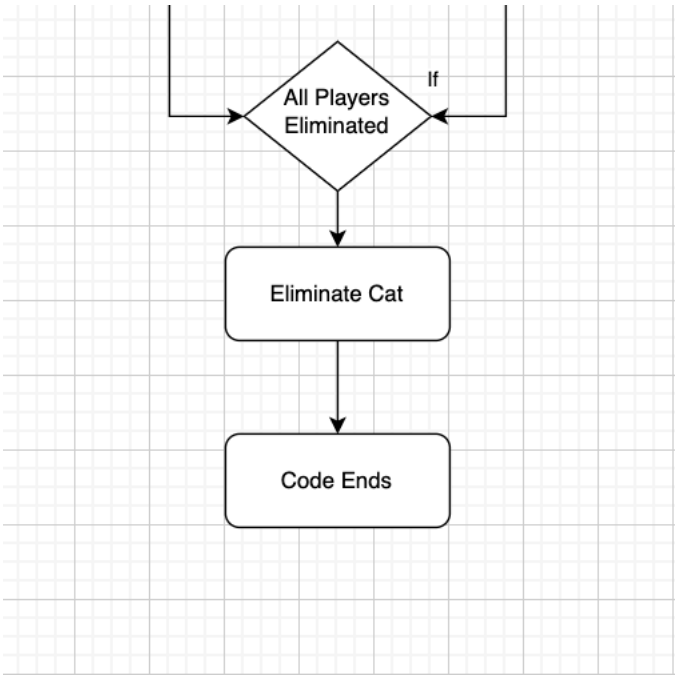
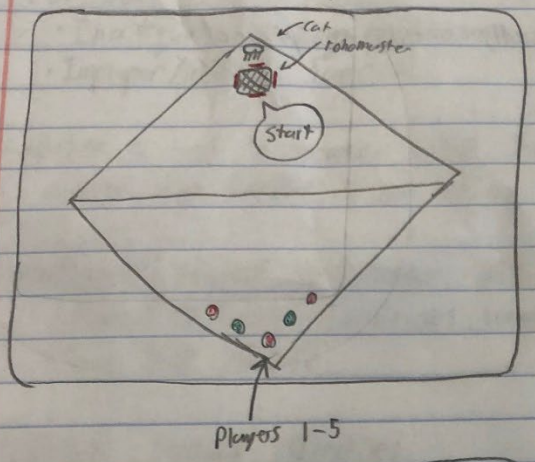
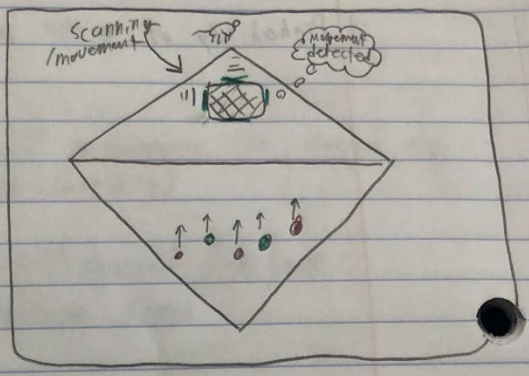


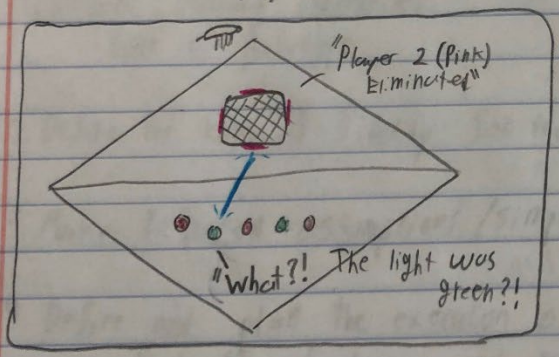
Figure 2 - Flowchart

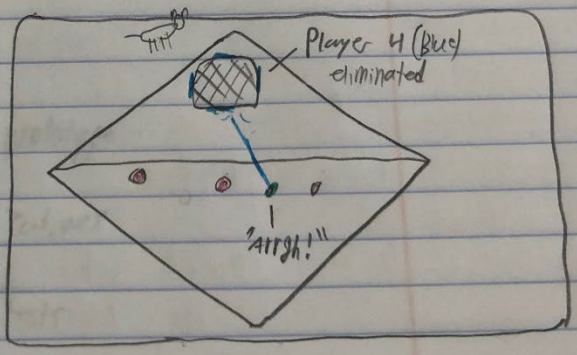
Deliverable F – Storyboard

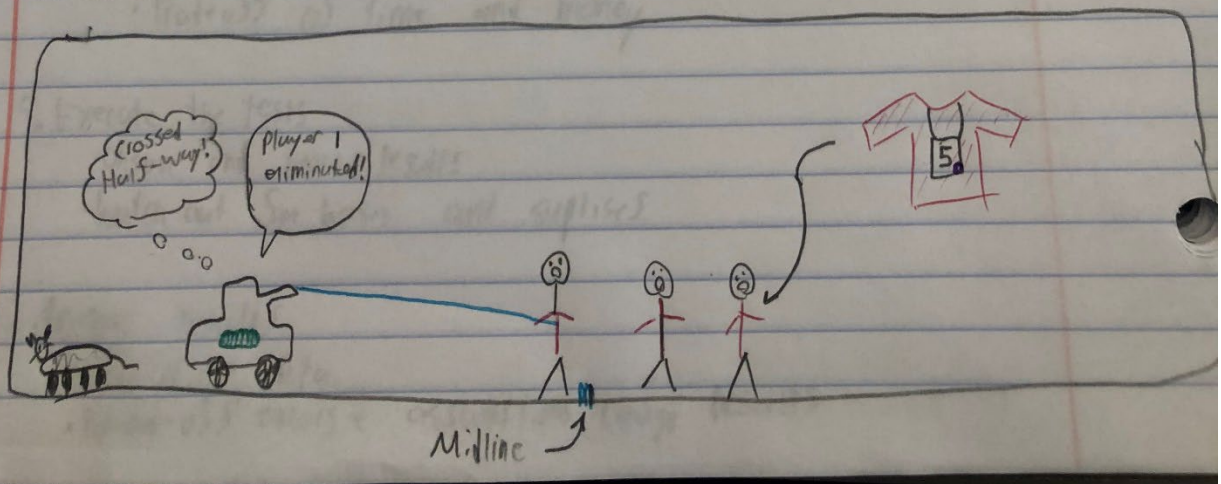
- This storyboard is the first prototype for our game.
- It demonstrates the process of the game / how it should work.
- Testing of ethical concerns will be done on this prototype











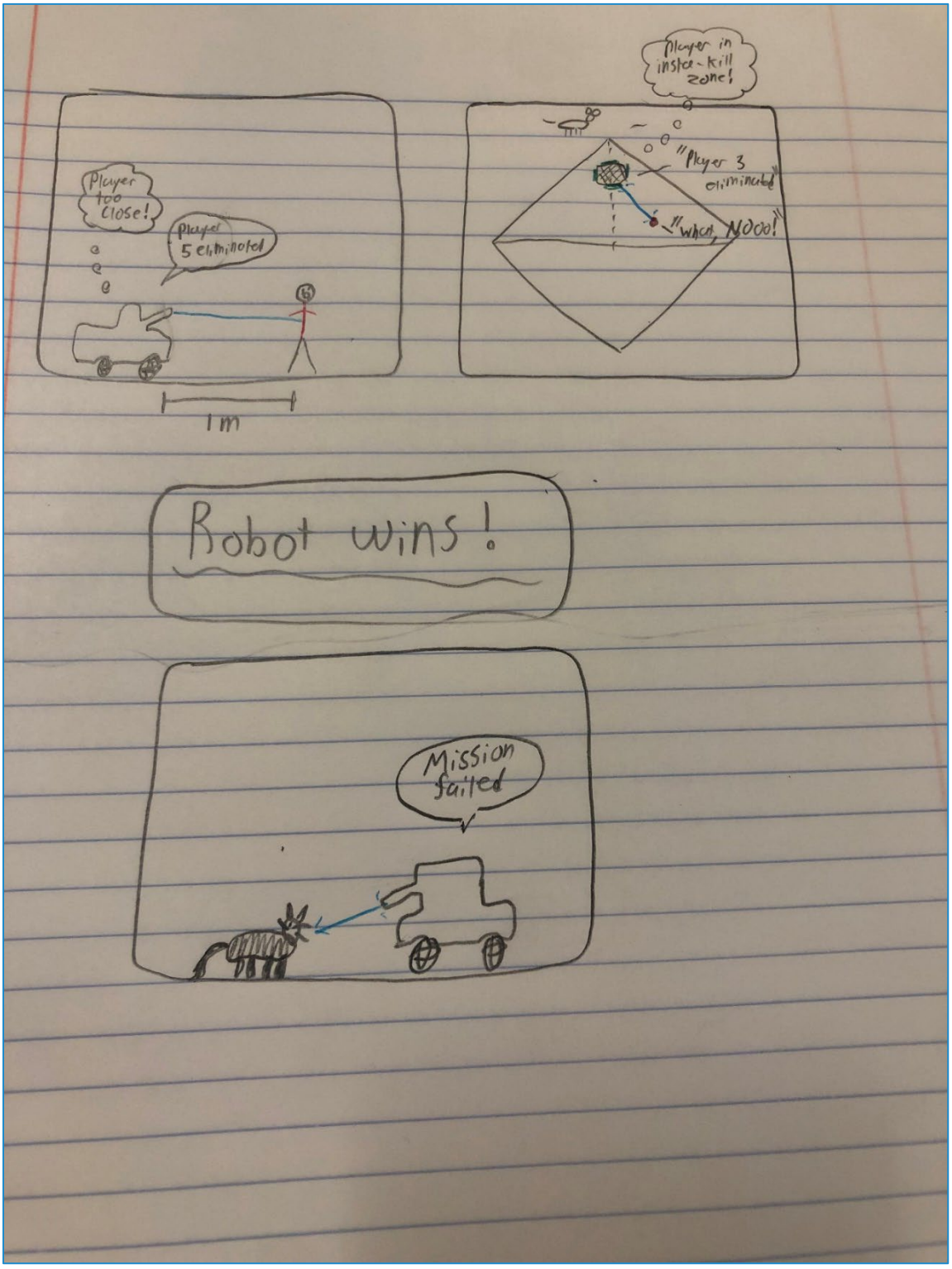


Figure 3 - Storyboard

6. Prototype I - Analysis and Explanation

In prototype one, the tests we conducted were regarding the ethical concerns demonstrated by the game. The story board demonstrates the strange ways that the robomaster eliminates the players. In squares 3 and 4, the green players are “wrongly” eliminated by walking during a green light. In square 5, a red player is eliminated for walking on green, on the other side of the halfway line. In square 6, a red player is eliminated for just being too close to the robomaster, and in square 7, the final player is eliminated, just based on where they are on the board. In the end, the stuffed cat is eliminated.

In the Flowchart, the process of the code run by the robot was displayed on a rudimentary level. This allows us to display the thought process of the Robomaster, and to display the possible outcomes of the game, depending on the input of the player, through movement. For example, by following the flowchart, the ultimate goa is to have no winners and is to instead confuse the participants as much as possible to eliminate all of them in as short a time as possible.

7. Prototype I - Testing and Results

- Which ethical concerns people find

Test	Person 1	Person 2	Person 3	Person 4
Ask people what ethical concerns they noticed in our game after reading the description, story board and flow chart. Highlighted green if yes, yellow if a little, red if no.	• Digital Dehumanization • Algorithmic biases • Loss of meaningful human control • Lack of human judgement and understanding • Lack of accountability • Inability to explain what happened or why • Lowering the threshold to war • A destabilizing arms race • Impact on our relationship to technology	• Digital Dehumanization • Algorithmic biases • Loss of meaningful human control • Lack of human judgement and understanding • Lack of accountability • Inability to explain what happened or why • Lowering the threshold to war • A destabilizing arms race • Impact on our relationship to technology	• Digital Dehumanization • Algorithmic biases • Loss of meaningful human control • Lack of human judgement and understanding • Lack of accountability • Inability to explain what happened or why • Lowering the threshold to war • A destabilizing arms race • Impact on our relationship to technology	• Digital Dehumanization • Algorithmic biases • Loss of meaningful human control • Lack of human judgement and understanding • Lack of accountability • Inability to explain what happened or why • Lowering the threshold to war • A destabilizing arms race • Impact on our relationship to technology

Ask people if a cats/animals “elimination” in the end of the experience would produce an emotional response. Why?	Yes, because they would not like to carry the guilt of having an animal harmed when they could’ve stopped it.	Yes, but they would not be genuinely upset from a fake cat getting shot with a laser pointer	Yes, because they don’t understand why it is happening	Yes, because they like cats.

Table 1 - Test

8. Prototype II - Test Plan

8.1. Fishbone Planning

Possible PCFME’s (Potential Cause Failure Modes and Effects) list for prototype II

- Infrared sensor
- Detection while moving
- Hard time reading symbols correctly
- Doesn't understand the borders of the game
- Can’t take movement and target colour into account simultaneously
- Can’t handle fast player movement
- The Robomaster cannot communicate elimination efficiently (volume & laser)

PCFME 1:
Cause / Effect – Robomaster can’t see symbols → Unable to target the players
Mode: 3
Effect: 4
Why can’t it see the symbols?

- The camera has a max detection distance of 3 meters

Why is this a problem?

- The longest length of the play area 8.6 meters, it won’t be able to eliminate players

Why can’t the robomaster see that far?

- The camera reaches a maximum of 4 times magnification, and 3 meters becomes its maximum range for the camera quality.

PCFME 2:
Cause/Effect - Players unaware of elimination → Players continue to play when they shouldn’t
Mode: 2
Effect: 3
Why can’t players tell they've been eliminated?

- Won’t be clear to them

- Can’t hear the robot
- Don’t see the colour que

Why wont it be clear?

- Laser pointer might be hard to see on yourself

- If its in a loud environment the speaker might be hard to hear.
- They are not looking at the robot when it flashes their colour

PCFME 3:
Cause / Effect – The Robomaster cannot detect player movement accurately → Cannot eliminate players properly or may not eliminate anyone at all
Mode: 4
Effect: 4
Why can’t it detect players properly?

- Because the infrared sensor has a range of 10m

Why is this an issue?

- Because the infrared sensor can be discombobulated by other sources of heat outside the immediate playing area

Why does this affect the gameplay?

- The Robomaster may try and eliminate those outside the playing area, which may cause the robot to get confused and remain locked on an outside source of heat, attempting to search for a target.

Why will the robot lock onto other heat sources?

- Because the infrared sensor is indiscriminate as to what is targeted, regardless of boundaries; must be paired with target sensing to ensure effective targeting

PCFME 4:
Cause / Effect: Player walks to fast for the robot → Players manage to beat a game that is supposed to be unbeatable.
Mode: 1
Effect: 3
Why do players walk to fast?

- Time between red light and green light is too long and the players have too much time.
- The player speed walks / runs right to the end in that time?

Why can people not walk fast?

- The robot will not be able to observe everyone in a short time and target them, and players may win the game.

Why won't the robot be able to observe people that fast?

- There are 5 people on a small board
- The camera quality is not the best (max range of 3 meters)

PCFME 5:
Cause / Effect: Robomaster environment is too loud for people to hear the elimination ques → Players will not know when they have been eliminated?
Mode: 3
Effect: 2
Why is it too loud?

- Design day is chaotic, and everyone is in one big, open room.

Why is it a problem for players not to hear the robot?

- Audio ques are one of the methods the robot will use to tell specifically which player has been eliminated?

PCFME 6:
Cause / Effect – Robomaster doesn't understand and respect game borders → cannot target and eliminate properly
Mode: 1
Effect: 2
Why can't it understand the game border?

- The game border may not be supported as a code installed constraint

Why is this a problem?

- The Robomaster may target objects or people outside the playing area or may move outside the playing area

Why does this affect gameplay

- By targeting an object outside the playing area, the players can run to the end of the area without any repercussions. This means that once the robot detects something that is not a player, the contestants will not be properly monitored, leading to an easy victory

8.2. Test Plan

See Excel spreadsheet

Testing.xlsx

9. Task Plan

Task	List of subtasks	Due dates	Roles

Deliverable E	• Abstract • Introduction • Budget • List of figures • List of tables • Task planning • Conclusion	• Oct 27	• Lucas • Owen • Sam • Owen • Jacob • Sam • Lucas
Client Meeting	• Make Presentation • Presentation • Take notes	• Oct 22nd	• Everyone • Everyone • Owen
Deliverable F	• Make Prototype • Documentation • Prototyping test plan • Make presentation • Update Trello Board • Draw up flowchart • Draw storyboard • Introduction • Analysis of prototype • Update task list • Conclusion • Abstract	• Nov 3rd	• Everyone • Owen • Sam • Everyone • Jacob • Lucas • Jacob • Owen • Sam
Deliverable G	• Make Prototype 2 • Documentation • Prototype test plan • Update task planner • Update Trello Board • Introduction • Prototyping (the “why”) • Conclusion • Abstract	• Nov 10th	• Everyone • Owen • Owen • Sam • Jacob • Sam • Lucas • Lucas

Deliverable H	• Update Trello Board • TBD	• Nov 23rd	TBD
Deliverable I	• Update Trello Board • TBD	• Nov 27th	TBD
Deliverable J	• Update Trello Board • TBD	TBD	TBD
Deliverable K	• Update Trello Board • TBD	• Dec 3rd	TBD

Table 2 - Task Plan

10. Conclusion

In conclusion, deliverable F outlines the process of the experience as it takes place, both in a coding sense with the flowchart, and a physical sense with the storyboard. Deliverable F also contains an updated Trello board and an updated task plan.