Possible PCFME's list

- 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.