

Our Game Design: Hot Zone Havoc



Mines Action Canada

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Team 21: Five Alive

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Our Task

- Client: **Mines Action Canada**
 - International leader with aim to eliminate the impacts of indiscriminate weapons
 - Campaign to Stop Killer Robots

Task: Create an immersive experience that subjects players to the ethical concerns of LAWS through interactions with the RoboMaster S1

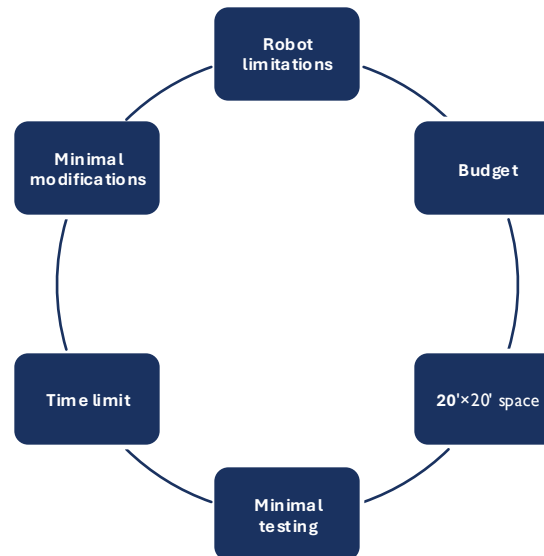
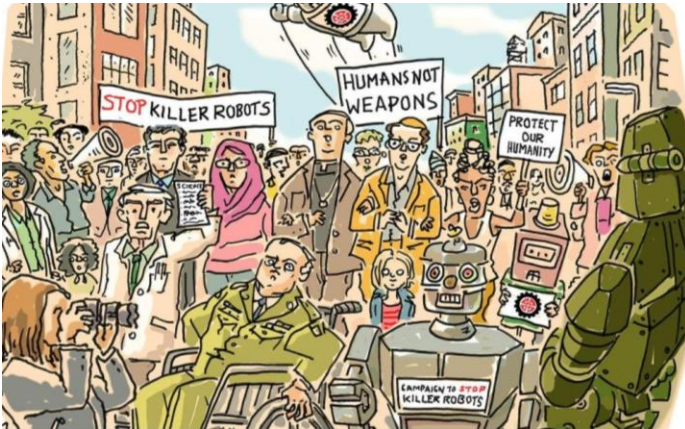
- Illustrate min. 3 of 9 ethical concerns
- Engaging

Understanding Our Client's Needs

Client Needs	Interpreted Client Needs	Priority (1-5)
Participants should feel as though they have lost	Outcome should not be victorious	4
5-10 minutes	Pace should not be too fast or too drawn out	4
Clean, commented code	Organized and manageable code	2
Modifications done/undone in 1 min.	Minimal modifications	3
Supplies need to fit in a carry-on suitcase	Portable experience	4
Robot should run without external control	Completely autonomous control after set-up	3

Defining the Project

Problem statement: A need exists for Mines Action Canada to demonstrate the ethical concerns regarding LAWS through a short, simple, portable, and immersive experience with a RoboMaster S1, where participants in groups of 3-5 can grasp the severity of losing human control over weapons systems.



	Robomaster S1	Unitree Go2 Air
Size	32*24*27cm	70*31*40cm
Cost	\$499	\$1600
Battery life	35 mins	1-2 hrs
Weight	3.3 kg	15 kg
Max climb drop height	0 cm	15 cm

Brainstorming



- Target based on proximity
- Targeted based on movement

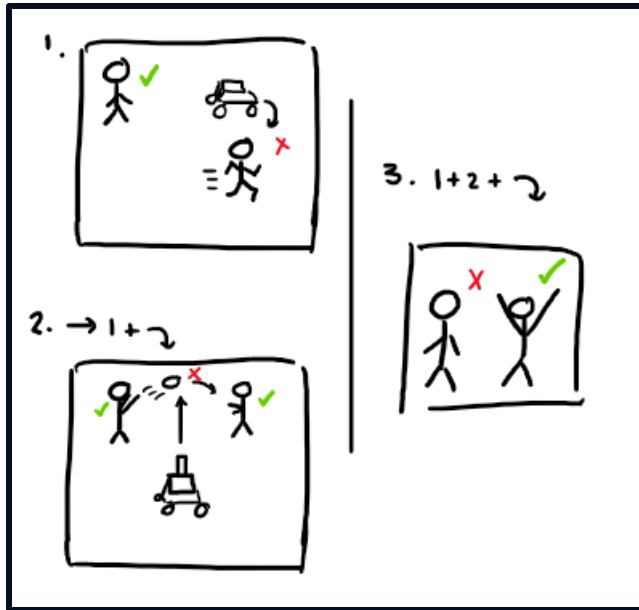


- Disabled using gestures
- Visual and audio response



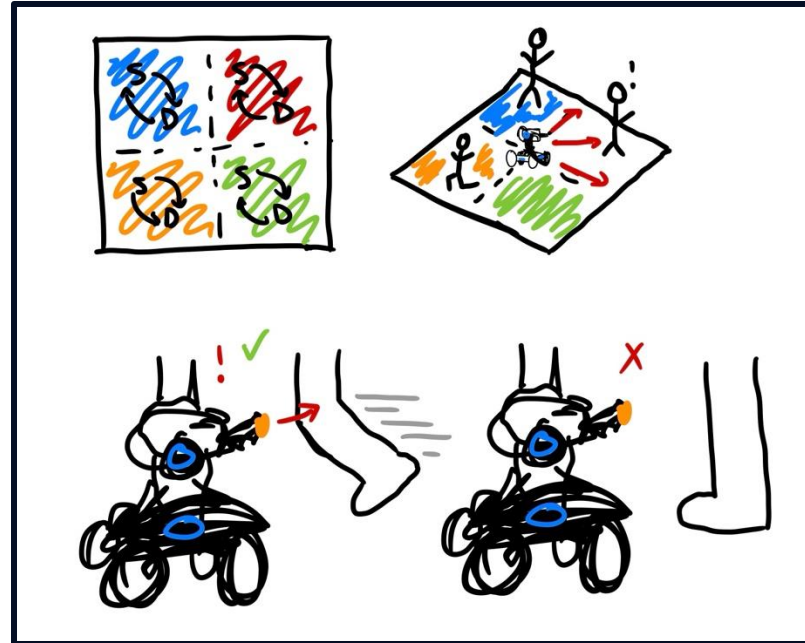
- Zone-based layout and movement
- Unpredictable detection
- Plane of landmine

Conceptualization



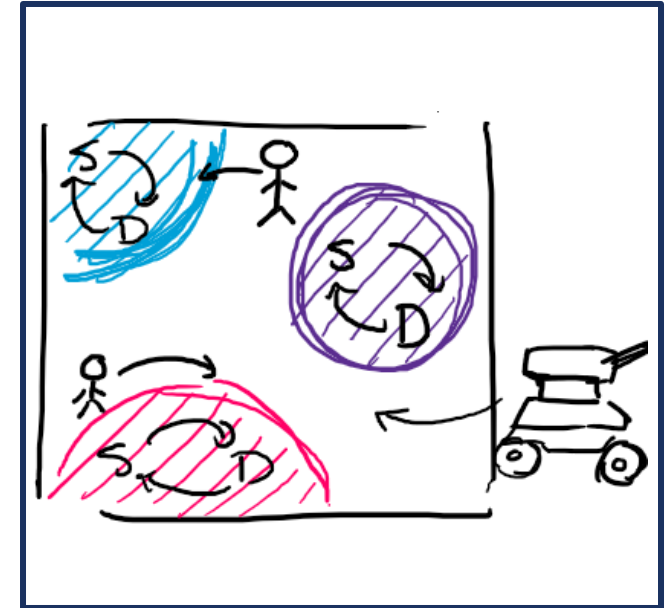
Concept 1: Hot Potato & Multi Style Mix

Progressively combines elements from Night at the Museum, Hot Potato, and gesture recognition



Concept 2: Four Corners & Night at the Museum

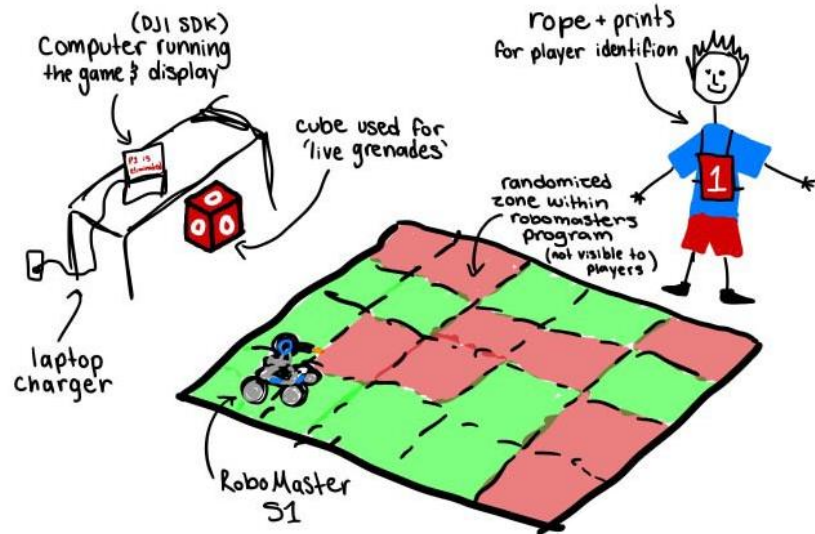
Bases elimination on coloured zone as well as movement within or around that zone



Concept 3: Randomized Safe Zones

Confuses players by randomly assigning safe/danger zones that are inconsistent each round

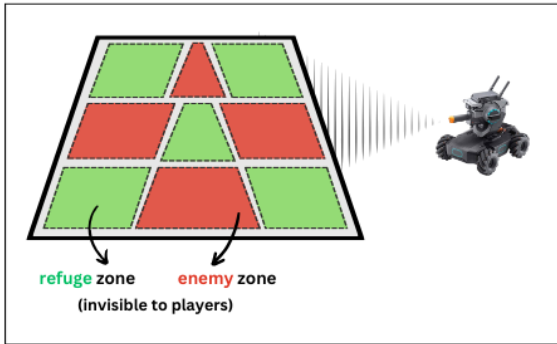
Final Concept: Hot Zone Havoc



- A simplified combination of the proposed concepts based on client feedback
- Incorporates majority of ethical concerns we intended to hit
- Meets design criteria and stays within the constraints

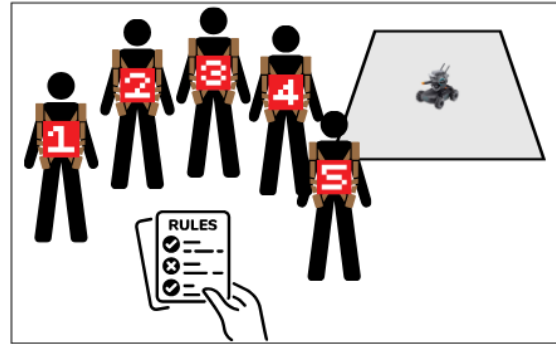
Hot Zone Havoc Storyboard

1: SETUP



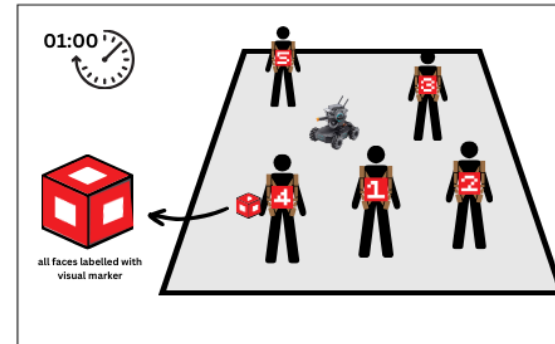
The Robomaster scans the space and determines refuge zones and enemy zones. The divided zones are invisible to players.

2: SETUP



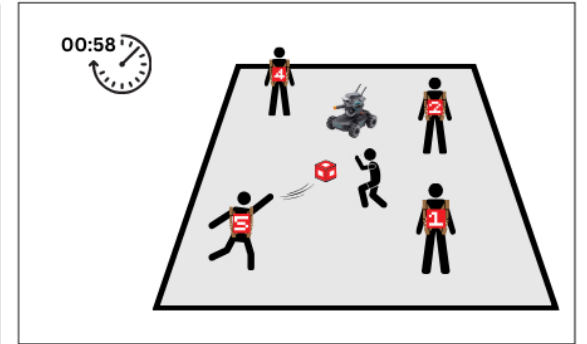
Players are given instructions and a player ID of a visual marker to wear.

3: LIVE GRENADE



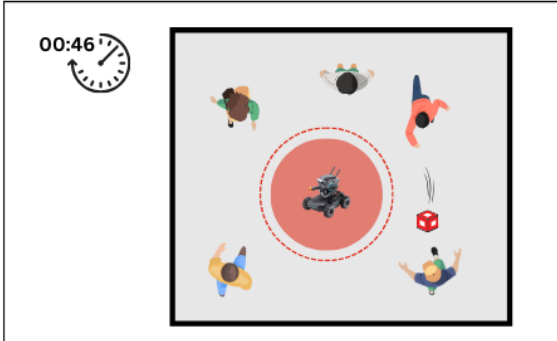
Players are given a grenade (cube) with all faces labelled with a visual marker.

4: LIVE GRENADE



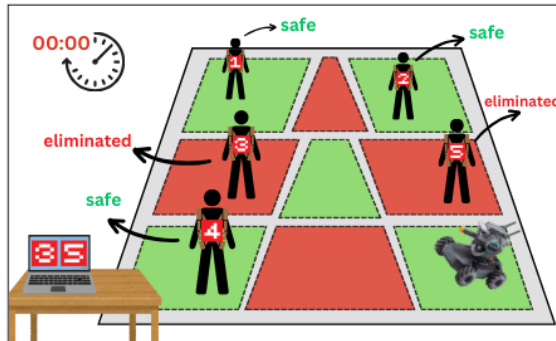
Once the timer begins, players must throw the grenade around.

5: PROXIMITY



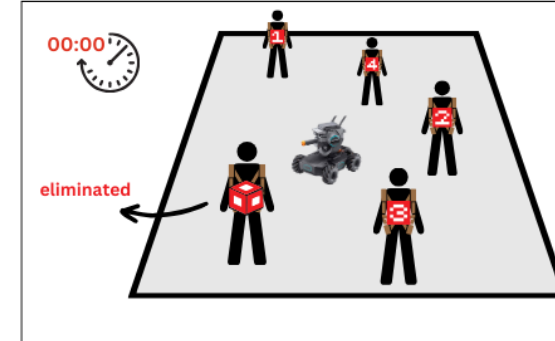
During the round, the Robomaster will randomly move to patrol the play zone. Players must avoid close proximity to the Robomaster.

6: ELIMINATION BASED ON ZONES



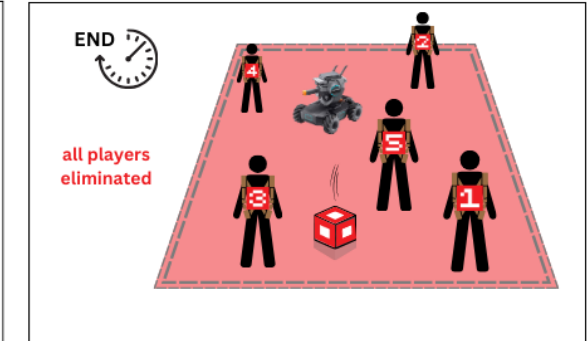
Once the timer ends, the Robomaster will identify and eliminate players in an enemy zone.

7: ELIMINATION BASED ON GRENADE



Once the timer ends, the Robomaster will identify and eliminate the player holding the grenade.

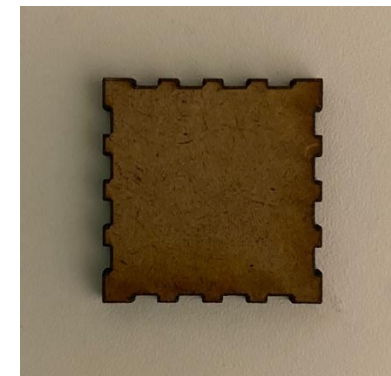
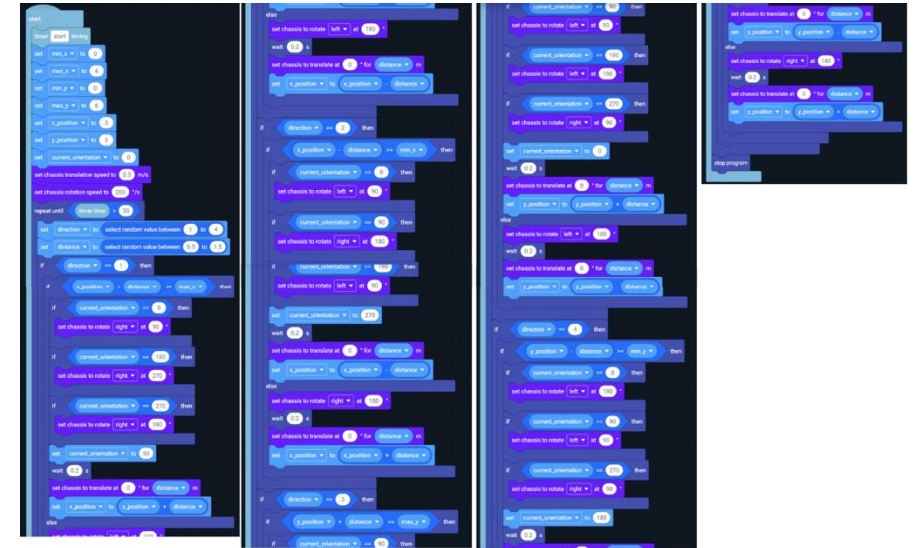
8: DROPPING THE GRENADE



If the grenade is dropped during the round, all players are eliminated and the round ends.

Prototype II

- Code consisting of 3 main segments:
 1. Random movement within boundary & timer
 2. 20'×20' boundary
 3. Player ID identification and interaction
- Cube with visual markers
- Player ID tags



Prototype II Testing

Moves in a random direction
within boundary for 30s



Identifies and eliminates players



Notable Issues During the Design Process

- No access to RoboMaster S1 during initial design stages & very limited access during prototyping & testing
- Logistics of the code which judges whether a player is in a safe zone
- Logistics of the “hot potato” design

Lessons Learned & Next Steps

- Lessons learned:
 - Prioritize adjusting design complexity to project timeline
 - Improve scheduling by constantly keeping tabs and adjusting based on team availability
- Next steps:
 - Refine game programming as much as possible by continuing testing
 - Improve on user experience (display aesthetics, ease of learning from instructions, etc.)