

Physical Prototype

1. Prototype Idea

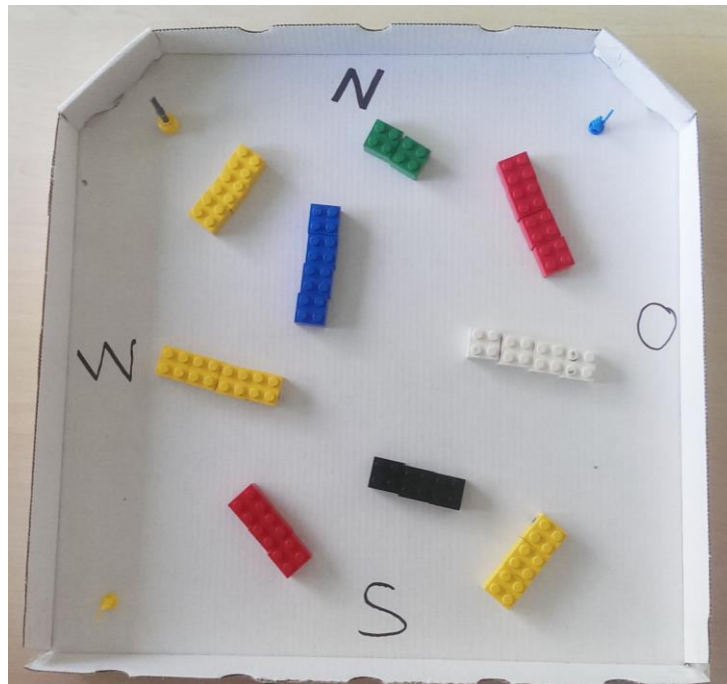
With a physical prototype of the game concept, we simulated the core elements and tested the game dynamics under the aspects of fun, strategic play style and game flow. A physical prototype has the advantage of a fast realization of concept changes and a quick investigation of their impact to the game.

Game Objects

The prototype is composed of an arena, players and a game master.

Arena

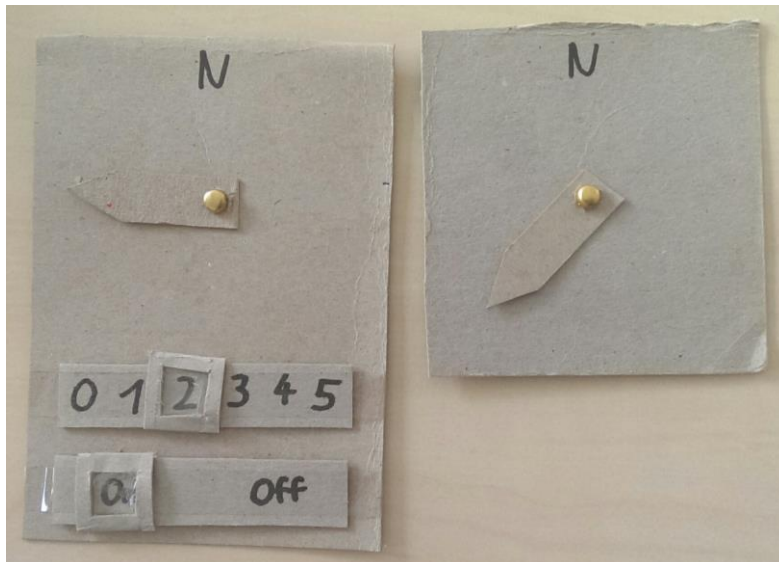
The arena is a planar quadratic shaped platform with walls at the boundaries and rectangular obstacles composed of several cubes. While the walls are fixed and indestructible, the obstacles can take damage, get destroyed and split up in two pieces. The players spawn in the corners of the arena.



A carton serves as the arena platform and the four directions of the compass (wind rose) are marked for reference. Small figures (e.g. Risiko soldiers) represent the players. LEGO elements are used for the obstacles.

Player Controller

The players can move in any direction, which means they have 360° of freedom. This direction is indicated by an arrow of the player controller card in an absolute manner. The moving distance ranges from 0 to 5 centimeters per round, specified by a slider. Besides moving, the players can also shoot in any direction, defined by a second arrow.



On the left card, the absolute movement angle and the movement distance are specified. Also whether the player wants to shoot or not. On the right card, the absolute shooting direction is stated.

Player Stats

The players have a health bar, starting with 5 points. If a player loses all hit points, he or she dies and will not respawn.

Every round, the players are able to shoot one projectile with an energy level regarding to their current weapon heat. Every time the players shoot, their respective weapon heat will increase about 1, if they do not shoot, it will decrease about 1. If the weapon heat reaches the highest heat level, in the prototype 6, the player has to wait one round before shooting again because the weapon is overheated.

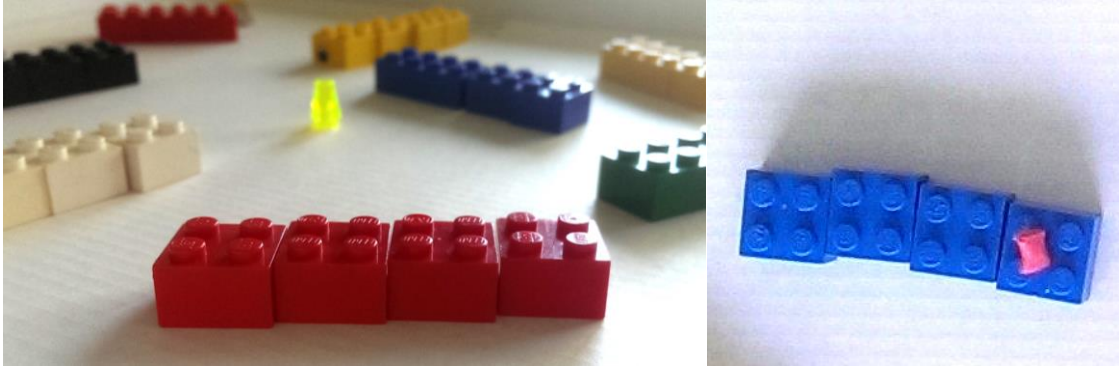
Projectiles

The projectiles, shot by the players, are classified in five energy levels, ranging from the highest, blue, to the lowest, red. If a player is hit, the player receives damage regarding to the energy level of the projectile, while blue deals 5 damage and red 1. See also table 1. If the projectile hits an obstacle, it gets reflected and one energy unit is absorbed, so e.g. a blue projectile turns into a green projectile. Also, the cube of the obstacle, which was hit, receives one damage unit.

If the projectile hits a wall, it also gets reflected and loses one energy level.

Obstacles

Obstacles are composed of several cubes, each of them can absorb one energy unit. If a cube receives two energy units, it gets destroyed and the obstacle is split and slightly moved to show the destruction impact.



The different colors of the elements do not have any impact of the properties of the obstacle.
 Damaged obstacle cubes are symbolized by putting the absorbed projectile on top.

Game Structure

Since simulating multiple real time elements is difficult in a physical environment, especially the projectiles, the game play is round based. Each round is composed of two phases, the planning phase and the execution phase.

Planning Phase

All players plan their next actions on their controllers at the same time, but hidden from each other. They define the absolute movement direction and the movement distance, state if they want to shoot and if yes, define also the shooting direction.

Execution Phase

Once every player has finished the planning phase, everyone reveals their controller cards and the game master executes the actions in a sequential order, but ensuring that the parallel character maintains.

First, every player is moved in the respective moving direction by the desired moving distance. Then, the projectiles, which are already in the game, are moved by 10 centimeters, while considering reflections, absorptions and obstacle destructions. After this, the game master places the new spawned projectiles 5 centimeters away from the shooting player in the respective shooting direction. The energy level of the projectile is set according to the current weapon heat of the player. At the end, the HP and weapon heat of the players are updated.

Blue	Green	Yellow	Orange	Red	overheated
5	4	3	2	1	0

Table 1: The table shows the energy levels of the projectiles. If the weapon of the player is overheated, the player cannot shoot and has to wait one round.

2. Experience

The game play of the prototype turned out to be very strategic, since it required the overview of all active projectiles and the 360° freedom of both, the movement and the shooting direction. Also, the destruction of obstacles played a key role especially in the later game, when they got sparser and sparser.

However, even though the strategic element of the game was investigated by the prototype quite well, the fast game play style got a bit lost due to the game structure composed in two phases. To enforce shorter games with more action involved, sudden death, lesser hit points or adjustments of the weapon heat concept to support more active projectiles can be introduced. However, the more projectiles were active the more difficult it was for the game master to keep track of everything.

3. Design Revisions

During the creation of the prototype, several core elements were revised and further worked out. One of the main key elements is the weapon heat concept, which we discussed and reworked.

Also, the destruction behavior of the obstacles was clarified. Absorption now affects only the hit cube of the obstacle rather than the whole object.

Additionally, the projectile spectrum – the five energy levels – were defined according to the law of physics, in which blue light has a higher energy level than red light.

Possible extensions

The prototype creation also revealed several new game elements, which may serve for extensions of the game, but was out of scope for the prototype itself. We introduced the concept of having a power up, which allows the player to shot a projectile of white light, which e.g. kills a hit player instantly or splits up in 5 projectiles, one of each color at obstacle hit.

Furthermore, several obstacle types were developed, such as glass, bricks, sandstone, and wood, all of them having different behavior in terms of absorption and refraction, which was excluded from the prototype concept due to complexity issues.