Have you ever seen perfectly shaped food not ever going bad ?
Have you ever wished that you could do something about it ?
Now is your chance! Pick your bacteria type and decay that food!
But be careful, other bacteria will try to sabotage you.
Battle for the right to decay the food in your own way!

Team 4
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1. Description of prototype

Board

The board is divided in a grid composed by hexagons. This enables to evaluate the area of explosion of each player easily. It would be impossible to keep track on the scores of each player in a gridless board. As the explosions are supposed to be circular, hexagonal grid seems the be the better approximation. In this paper prototype, we have not added walls in order to keep it simpler.

Player's movement

Players move all at the same time. For ensuring that everyone moves at the same speed, we use a metronome. At each beat every player can displace its piece one step forward in any direction he wants. This approach makes the game more realistic and enables all users to move in real-time.

Player's decisions

Within a beat time step, each player can either move its piece or stay in the same position and either attack or explode. Instead of moving the piece, the player says out loud "**explode!**" or "**dash!**".

Dashing

When a player says "dash!", other players have one more beat time to move in the direction they want, and the player dashing must stay in the same position. After two beats, this player can move straight in the direction he wanted to move. If other players that were around could move far enough, the player dashing can kill them and take 25 % of their resources.

Exploding

When a player says "explode!", other players have one more beat to move. They can take resources in this extra beat or also decide to dash or explode, but they will have to wait until the first player that exploded resolves its explosion. Once the extra beat time has passed, the game stops, and the computer places the correspond colored area in the board.

The correspondences between number of resources gathered and explosion radius are in the table. This table also contains the basic rules of the game and is placed near the board so that each player can see it at any time.

# RESOURCES	EXPLOSION RADIUS
2	1
5	2
8	3
11	4
13	5

GAME RULES:
- Each time step → One possible action { move / Dash / Explode
- If you die, time to respawn is { Dashed: 2 s / Exploded: proporcional to # resources.
- The first to cover all with its color → WINS!

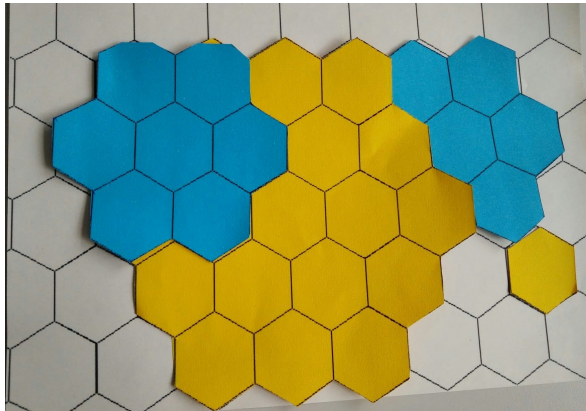*Fig.1.1 Table with resource's equivalences*

Explosion example:

Fig.1.2. Is a sample explosion. The image shows how the explosions would overlap while playing. The explosions have different radius and the ones on top are the ones which exploded before, so they conquered in advance the concrete area.

Fig.1.2 - Sample explosion

Gathering resources

The resources are small pieces of paper distributed randomly on the board. The pieces have to lie inside a grid cell of the board, so the player will be able to gather it automatically when being on the same cell where the resource is placed. While moving through the board, the player will collect the resources by simply sticking the resources with the tool shown in Fig.1.2. The resources are accumulated on the pin, so after each explosion everyone knows how many resources has gathered and which would be the correspond explosion area.
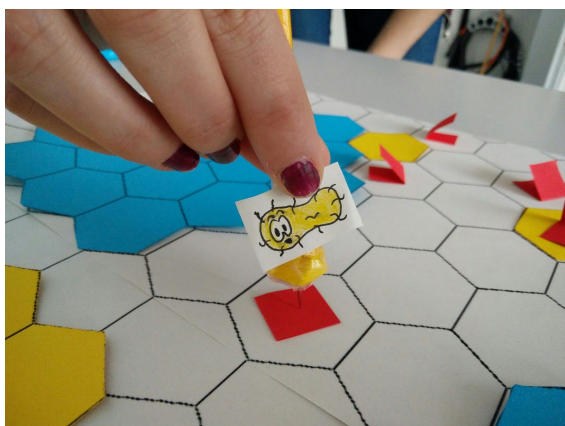
Fig.1.3 - Player's pins

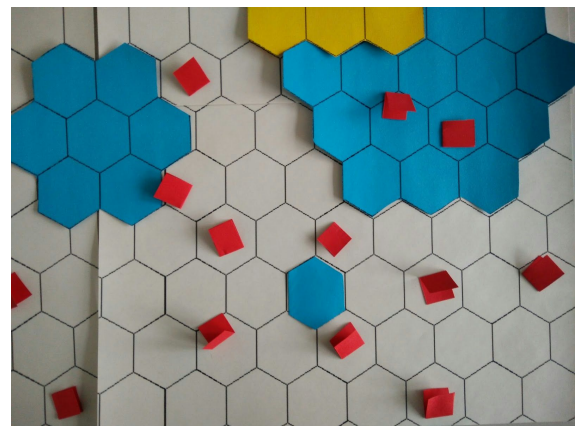*Fig.1.4 - Player collecting resources*

Fig.1.5 - Resources placed on board

Dying

A player can die in different circumstances, each of them with different results:

- **Exploding**: when a bacteria explodes, it also dies. If the last explosion makes the player cover enough area such that no one else can cover that much, this player wins. If there is still area that other players can cover to win, the player exploding will have to wait a respawn time proportional to the explosion area.

- **Dashed**: If a player is attacked successfully, it will die for two beat times and the computer will randomly place it in the board after that time.

- **Explosion area**: When a player is inside the explosion area of another player, it will die when the explosion occurs. This player will wait two beats until the computer randomly places it in the board again.

2. Observations while prototyping

While we were doing the paper prototype and playing with it, we observed several important issues we needed to solve:

- Playing with cards simulating each time step is too **slow** for our game. We need to simulate fast decisions (as the real game would be) and that can only happen when everyone plays at the same time. In our approach, everyone moves their piece at the same time and the speed is regulated with a time step. We use a **metronome at 60bpm** and movements or decisions are taken within the time step.

- The more you cover the board with your color, the closer you are to win. This is why it's essential that each player is able to easily visualize how much percentage of the board surface has won with its explosions. That means that the **color explosions** must be well represented!

- Some players are not willing to dash other players and will just collect and explode without interacting with others. Keeping the **resources limited** forces these kind of players to dash at other players when there is no more resources in the board. This will be their only chance to get the necessary resources to explode and conquer the remaining area of the board that will lead to their victory!

3. Final decisions and images

- When a player explodes, we look up their resource number in the table and decide what is the explosion radius that corresponds to it. Then, we colour the cells around the player with the player's colour, according to the radius.

- Resources are limited. They are respawn only when someone dies, and the quantity of respawn resources is exactly the one that the player had before dying, not more. In some occasions, the resources will finish and players will be forced to kill other players. Indeed, they need more resources to explode and conquer the necessary remaining area that makes them the winner.

- When exploding, if there are resources within your area of explosion, these resources will stay at the same place.

- Dashing has to be made in a straight line, in one movement of the hand. This means that the player who is attacking is not allowed to "follow" the target or make the dashing in multiple steps. This imposes a natural limit on the distance of the dash.
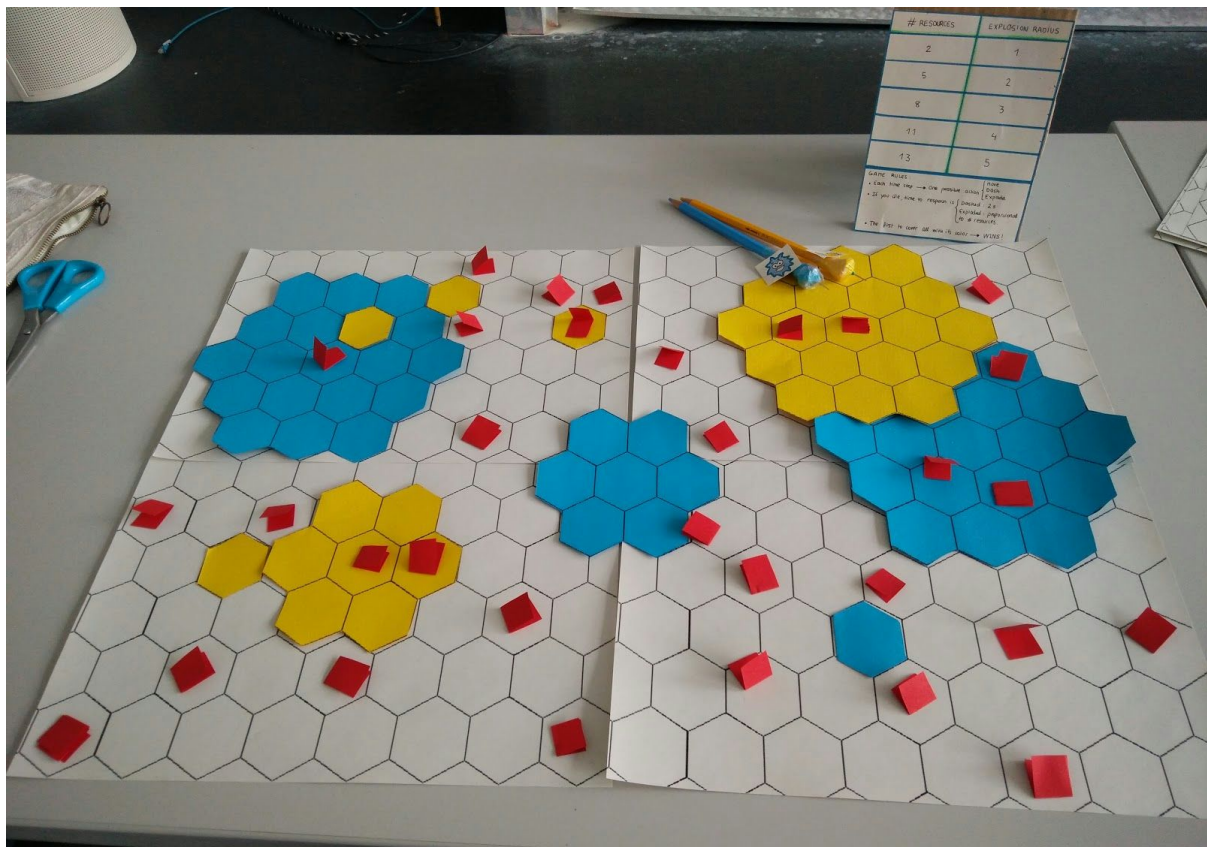

Fig.1.6 - Final board with some sample explosions and resources

4. Player experience

While playing our game we realised that the fast-paced experience that it offers, together with the need for fast real-time reactions is what makes the game fun and challenging.

The game rules stimulate the players to come up with different strategies, but to also do it in a timely manner. Players need to make fast decisions, but even with a clear strategy in mind, the moves are not always successful. We weren't able to find a certain winning strategy, every game being shaped by the opponents. The replayability of the game is fairly high.
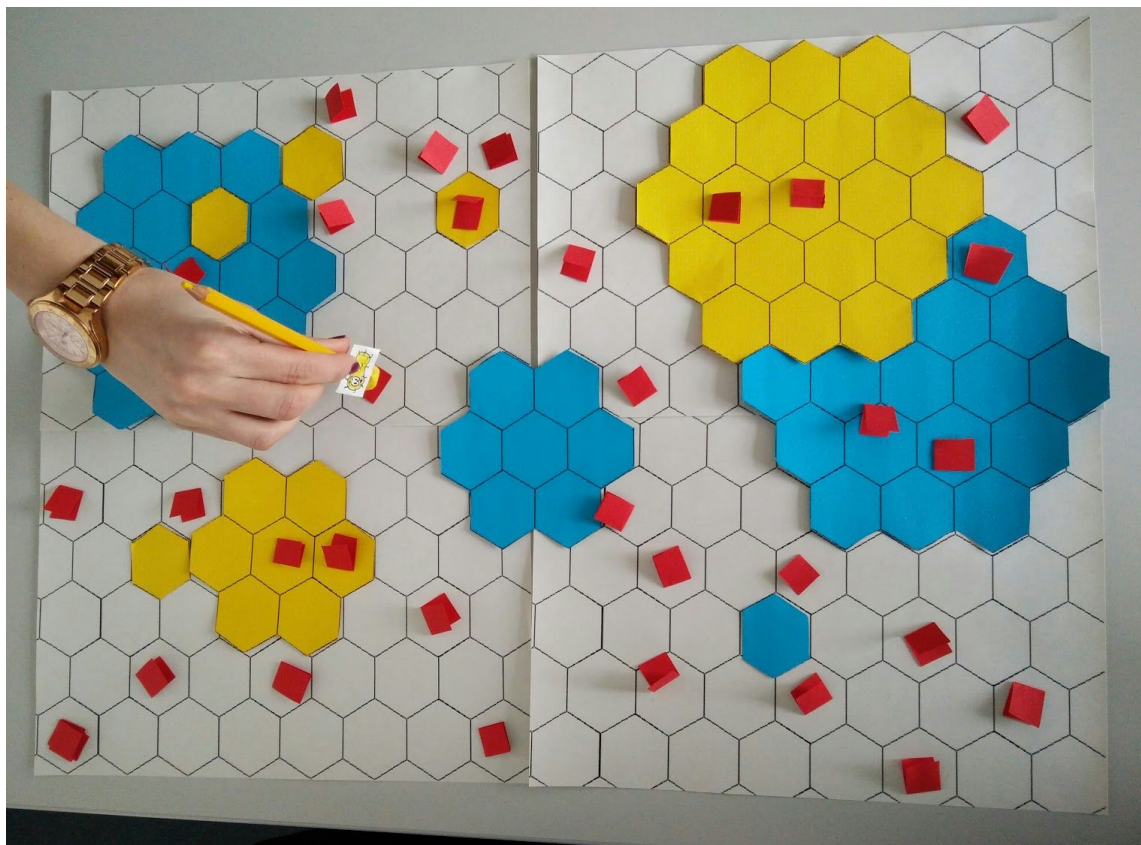

Fig.1.7 - Example of a player playing and collecting the resources