

Rot it!

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!

1. Game Description

Goal

The goal for which the players strive in this game is to destroy as much of the food piece as possible. The player who manages to destroy the biggest surface wins.

Game setup

Map

The battle takes place at a microscopic level, inside a piece of food. The surface is represented by a 2D map with top-down view, containing obstacles and resources. All the players can see the entire map, including their opponents.

The resources, as well as the players are spawned randomly on the map in the beginning of the game. As the resources are collected by players, they can respawn after a certain amount of time in other random locations on the map.

Player stats and abilities

Every player has two characteristics: strength and energy.

The first will be shown as a number that grows as the player gathers resources. The strength of the players determines how big is the area that they can destroy.

The energy is denoted by a bar that has a maximum capacity and can be charged when a player stands still and keeps a button pressed. The amount of energy charged determines the speed and thus, the distance for which a player can sprint. The energy bar can be charged faster by stronger players.

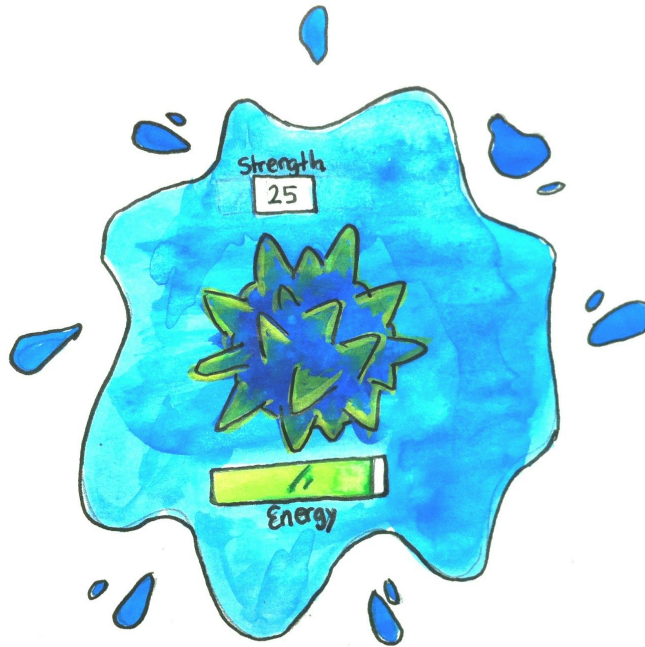


Figure 1.1 - Example of a player character

There are two main abilities that the players can make use of in order to win the match:

I. Exploding themselves

When a bacterium explodes, it destroys a circular area around itself. The radius of this area is determined by the strength of the player. The bigger the number/value of resources gathered, the bigger the strength of that player and the bigger the radius of the explosion area. The player will be able to preview the area by pressing a button. This is necessary because mentally correlating the strength value with the explosion area is hard and not practical. The explosion doesn't occur instantly at a press of a button, but takes a certain amount of time to charge.

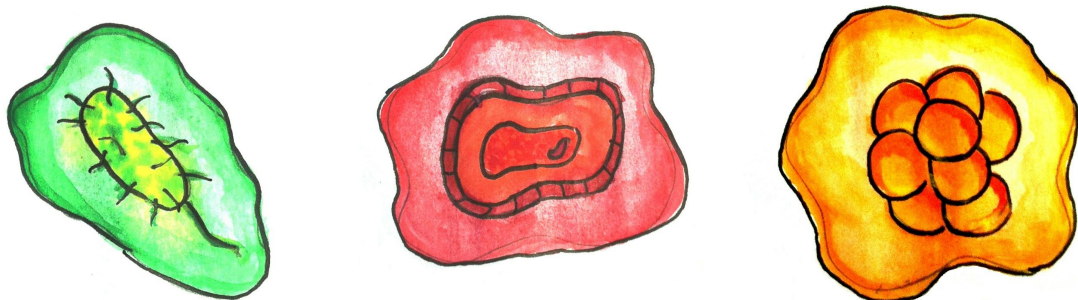


Figure 1.2 - Three different examples of bacteria explosions

II. Dashing at other players

This is the way in which players can attack each other. The amount of energy that one player has determines the speed at which the player can sprint and thus, the distance covered by their sprinting. The time of a sprint is constant for all players. Dashing at other players can only be done in a straight line. The sprint stops, either when the time is up (approximately 1-2 sec), or when a collision occurs. If one player hits another by dashing, then the other player dies and the attacking player gets a percentage of the other's resources.

Gameplay

The game starts with the players spawning at random positions on the map. At the beginning, every player has 0 strength and thus cannot explode. The players can move around, all with the same speed (except for sprinting).

Resource gathering

Resources also spawn randomly on the map, both in the beginning of the game and during the match. In order to gather resources, all the players have to do is run over them. Every resource add a certain strength value to the player that collects it. The value of the resources that have not been collected increases over time. Once a player collects a resource, it disappears, another resource spawning at a random point on the map after a certain time interval.

Explosions

When exploding, a bacterium destroys a certain area of the food surface. This will be visualized as a patch of the player's color on the surface of the map. The total percentage of the destroyed surface is shown for every player throughout the game. If an explosion area of a player overlaps with an area that has already been destroyed, then only the newly destroyed surface counts towards the percentage. At every moment in time,

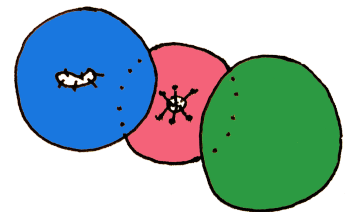


Figure 1.3 - Explosion areas

a player can check to see how big their exploding area is. In order to do this, they can press and hold a button. The area remains visible only as long as the button is pressed. If the player decides that they will cover an area that serves their purpose, they can decide to explode. In order to do this, they will have to stand still for a short amount of time while "charging" their explosion. Once a player explodes, they respawn with 0 strength at a random point on the map. This can occur either instantly, or after a certain amount of time, depending on how the game will be balanced.

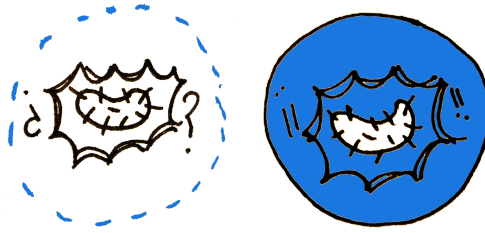


Figure 1.4 - Example of explosion check (left) and execution (right)

Attack and counter-attack

In order to sabotage other players, but also to grow their own strength value, bacteria can attack. The way to do this, is by dashing at other bacteria in a straight line. When a player wants to dash, they have to stand still while charging their energy bar (done by holding a button pressed). The stronger the player is, the faster the bar charges. As dashing takes a constant amount of time for all players, the energy bar determines the speed at which they sprint. The sprinting stops after the designated time, or if a collision happens. If the target was touched, the targeted player dies, respawning again with 0 strength, just like in the case of the explosion. The attacker gets a percentage of the strength value of the victim. If a player wants to defend himself, he can either put himself out of the attacking player's trajectory or he can counter-attack: run on the opposite direction. The stronger player will always win.

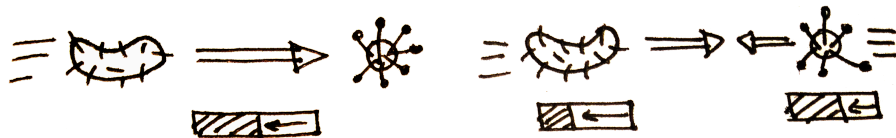


Figure 1.5 - Example of attack (left) versus counter-attack (right).
Note that bar consumption is proportional to displacement distance.

Game end

The match ends when no other player has the possibility to destroy a larger surface than the best player.

Targeted platform

This will be a PC game that can be played with controllers.

2. Technical Achievement

Our game is based mainly on explosions of the players (bacteria) and its collisions with the environment. These interactions will be simulated with a physics engine, so they seem realistic. We will have to find out how to implement this with the framework provided- Monogame- and to see which external libraries can be used for this purpose.

Regarding the maps, they will be at first designed by us, and so will the placement of players and resources. At a later stage, the resources will appear automatically and so will the players when they appear after dying. We will have to come up with a smart way to make the items reappear, so it keeps the game interesting.

Regarding the multiplayer, we will not implement the rest of players artificially. The number of players will be then, exactly the number of people playing at the same time.

Another innovative achievement will be when the players gather power-ups. These are powers that will make them more powerful against other players. We will implement the physics that lie behind them, and will be different in each case. An example would be to speed up a player on a certain area or to make the player invisible for a certain time. Also we will consider some fluid simulations for the explosions/interactions depending on the libraries available to simulate them.

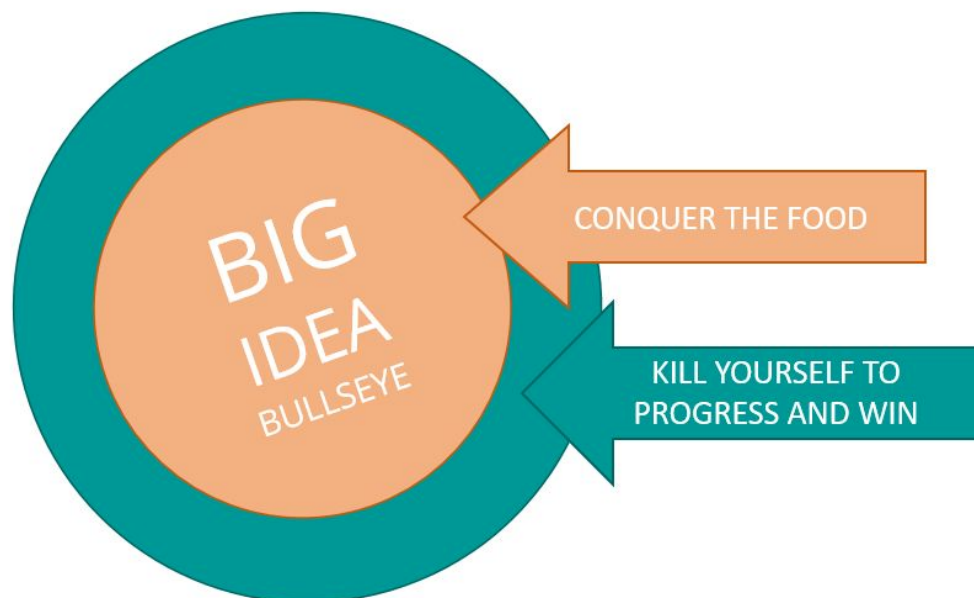
3. “Big idea” Bullseye

Big idea

Conquer the food.

Technical innovation

Kill yourself to progress and win.



4. Development Schedule

Layered task breakdown

Functional minimum

- 2D map with scattered resources and boundary walls (generated by us)
- 2 to 4 players running around and gathering resources
- Players and resources will be represented by simple objects (eg. triangles and circles, respectively).
- Players can explode to conquer the food.
- Explosion area will be circular and visible in the player's color after it occurs.
- Once you explode, you die (you cannot play anymore).

Low target

- A player explosion can also kill other players in the exploding area
- If a player gets killed, they randomly appear in other place, with zero strength again
- If a player explodes, they will respawn randomly appear and continue playing (if they didn't already win with last explosion)
- Experiment with respawn times.
- Add preview of explosion area.

Desirable target

- Players can kill other players and take a percentage of their resources by sprinting towards them
- Add energy bar and energy bar charging (used for dashing).
- Resources grow in value over time.
- Add obstacles to the map.
- Customize appearance according to bacteria and food theme.

High target

- Players can gather special resources with special powers (eg. invisibility, speed, etc.)
- Add more than one map (different maps in the game are different foods to conquer)

Extras

- First person view in a 3D map
- Generate obstacles on maps automatically
- Online players competing in the same map

Task allocation

Will be specified in the future.

5. Assessment

The game will be fast-paced and consist of short rounds. The game will have easy-to-learn controls that allow new players to get started very fast. Thanks to the different possible approaches (explode early, attack players to get resources, try to explode at highest possible strength, etc.), a lot of strategies are offered to the player to win the round. The aim is to produce a competitive and fun atmosphere.