



Game Proposal

Jonas Stulz, Peter Güttinger, Patrik Toth & Isa Roesch

Contents

1	Game Description.....	3
1.1	Game Idea Overview and Story.....	3
1.2	Gameplay.....	3
1.2.1	Goal.....	3
1.2.2	Players.....	3
1.2.3	View.....	3
1.2.4	Controls.....	4
1.3	Game Mechanics.....	4
1.3.1	Base Toppings and Pizza Crust.....	4
1.3.2	Heat/Time.....	5
1.3.3	Air Circulation.....	5
1.3.4	Pushing/Jumping.....	5
1.3.5	Character Attributes.....	5
1.3.6	Playable Toppings.....	5
2	Technical Achievement.....	6
2.1	Toon Physics.....	6
2.2	AI.....	6
3	“Big Idea” Bullseye	7
4	Development Schedule.....	8
4.1	Layered Development Description.....	8
5	Assessment	10

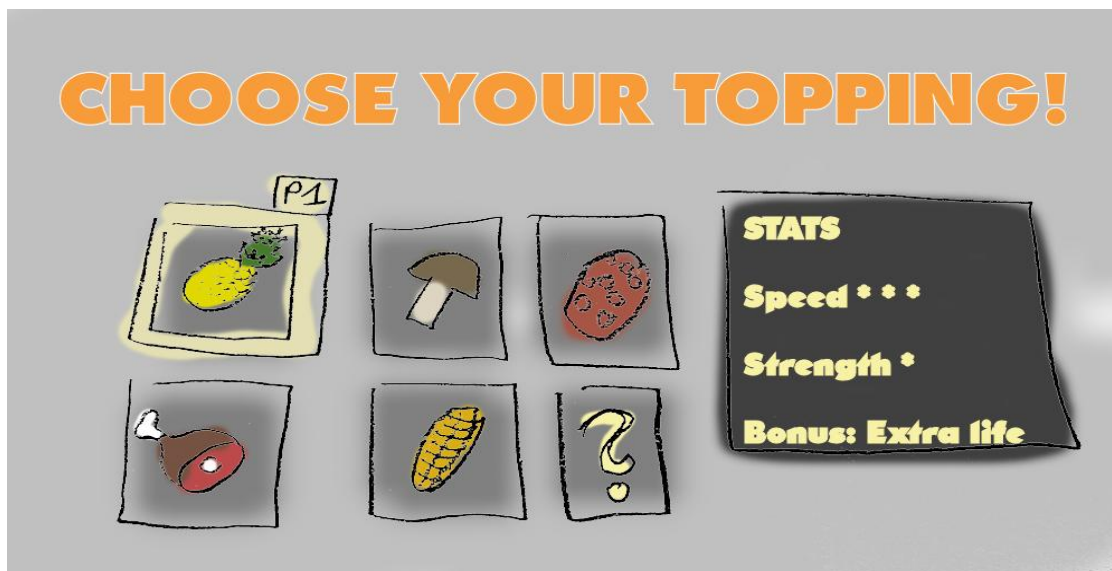
1 Game Description

1.1 Game Idea Overview and Story

The story behind the game is that two or more people with a different pizza taste try to bake a pizza together and couldn't decide on the toppings. This is why they just put their favourite topping on the pizza, regardless of the consequences. When they finally put their pizza in the oven, the game starts.

The game itself is a platform push game where the players take the role of their chosen pizza toppings. As they don't like the other toppings, each player tries to push his opponents over the pizza edge, until only the winner remains.

This game idea relates to this year's theme *Food* with the virtual world it takes place in – a pizza – and the playable characters, the pizza toppings, which are also food.



1.2 Gameplay

1.2.1 Goal

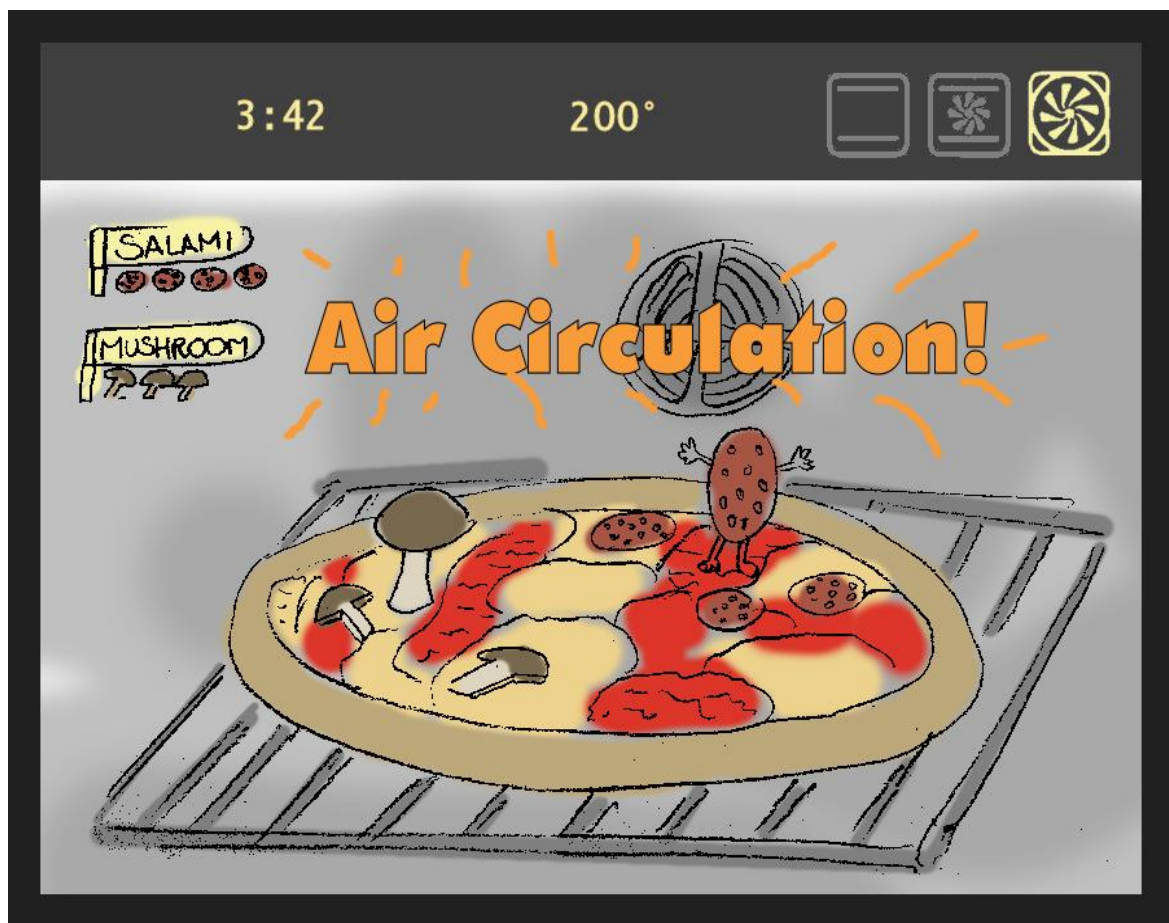
Each player has a certain amount of lives, which reflect in the number of playable topping pieces he has left. The goal is to push the other players from the platform (the pizza in the oven). If a player gets pushed down, he loses one life. If all his lives are gone, he loses this game. The player who is left in the end wins.

1.2.2 Players

The game can be played by 2-4 people and is only playable offline.

1.2.3 View

The view a player has on the game can be described by looking at a pizza baking in an oven. The game is going to be in 3D and the pizza will be relatively big compared to the oven. Each player has the same view on the pizza, which means that only one camera will be used. To give the players feedback about the game state, an oven-like GUI will be used as an overlay.



1.2.4 Controls

The game is going to be a console game, played with controllers. Below is a short listing about the controls we are going to use.

- **Run:** A player can move his character in the 2D space on the pizza, using the joystick.
- **Jump:** To move in the third dimension, a player can jump by pressing a designated button on the controller, which is not yet defined.
- **Attack:** Two other buttons are bound to the two attack types a topping has.
- **GUI controls:** Players also have to be able to control the GUI i.e. to pause or quit a game, to select a character and to confirm that the game can start.

1.3 Game Mechanics

1.3.1 Base Toppings and Pizza Crust

There are two base toppings in the game, namely **cheese** and **tomato sauce**. These toppings are not playable characters but randomly distributed on the pizza and influence the player's movement if he walks over it. These base toppings will also give the player a "buff" for a certain duration as they will stick to the topping for a certain time: a "cheese" or "tomato sauce" buff.

- **Cheese:** Cheese is sticky and will slow the players movement and makes it impossible to jump. In addition, the player is immune against the push effect of the air circulation.

- **Tomato sauce:** Tomato sauce is slippery and will reduce the players damping -> it is more difficult to stop inside these blotches and the player is more likely to be pushed. But, it is also good for taking a running start and push another player with a big velocity.
- **Edge:** The pizza crust has no cheese or tomato sauce on it and surrounds the pizza. It is attractive for a player because his physical movement won't be impacted, but on the other hand, it's near the deadly abyss.

1.3.2 Heat/Time

The pizza needs to be baked for a certain time (1-3 min), the time of a round. While the time runs out, the oven gets hotter and the base topping cheese will be baked and loose its damping properties. This means that it gets more and more difficult with time to stay on the pizza.

1.3.3 Air Circulation

From time to time - probably randomly and more frequently when time passes - will the air circulation in the oven turn on. It can come from all 4 sides, these are also randomly decided and push all players that are not in an active cheese splotch in a certain direction. This wind gust also may get stronger with time, so that you can walk against it in the beginning of the round but need to place yourself accordingly in the end to avoid getting pushed down.

1.3.4 Pushing/Jumping

The players have two possibilities to push other toppings down. The first one is running and jumping against other players, which will result in an elastic collision between the two players. Having more velocity and weight will help pushing other players with the "jump"-attack.

The second one is actively attacking other players. These attacks are different from topping to topping and are not defined yet.

1.3.5 Character Attributes

Each topping has its own stats and two different ways to attack. (Default attack and special attack)

A topping's stats include:

- Weight
- Size
- Form
- Acceleration/max velocity
- Initial number of lives

1.3.6 Playable Toppings

Our target is to implement at least four different toppings. Each of them has two unique abilities, which are described here.

- **Mushroom**

Light, medium lives, asymmetric form, running.

- **Headbutt:** A strong attack that pushes the opponent a long distance into one direction
- **Spin:** The mushroom spins and pushes all opponents in a short range a short distance away.

- **Olive**

Medium light, medium lives, small form, rolling, can't jump very high

- **Seed-Spit:** The olive spits its seed out into one direction and pushes an opponent a small distance on hit.
- **Spin-Jump:** The olive starts to spin, jumps in a certain direction and pushes an opponent away where it lands.
- **Tomato**
A slice, large, heavy, few lives, rolling around on one side.
 - **Flat Jump:** The tomato slice jumps and flips on one side, pushing all opponents it hits a medium distance away.
 - **Acceleration:** The tomato gains speed when rolling into one direction, getting pretty fast (and hitting other toppings with more velocity is always better)
- **Salami**
Large, medium weight, thin, few lives, can move by gliding
 - **Glide:** Jump and glides down. Is immune against tomato sauce while gliding.
 - **Spin:** The salami starts spinning while in the air and pushes other toppings into all directions.

2 Technical Achievement

2.1 Toon Physics

We are going to write the game's physics ourselves. The physics rules of Pizza War will not always reflect the real world physics, that's why we call our physics "toon physics". One technical challenge of our game will be this 3D physics engine. To make the game fun, the toon style engine should feel rewarding and predictable. Each player needs to feel like he plays against his opponents and not against the game.

We have many different characters with different ways to move (walk, roll, glide). The engine needs to support easy tweaking and balancing of different movements and actions.

Features of the engine:

- Rigid Bodies
- Collision Detection
- Inelastic/Elastic Collisions
- Wind
- Angle Dependent Drag

2.2 AI

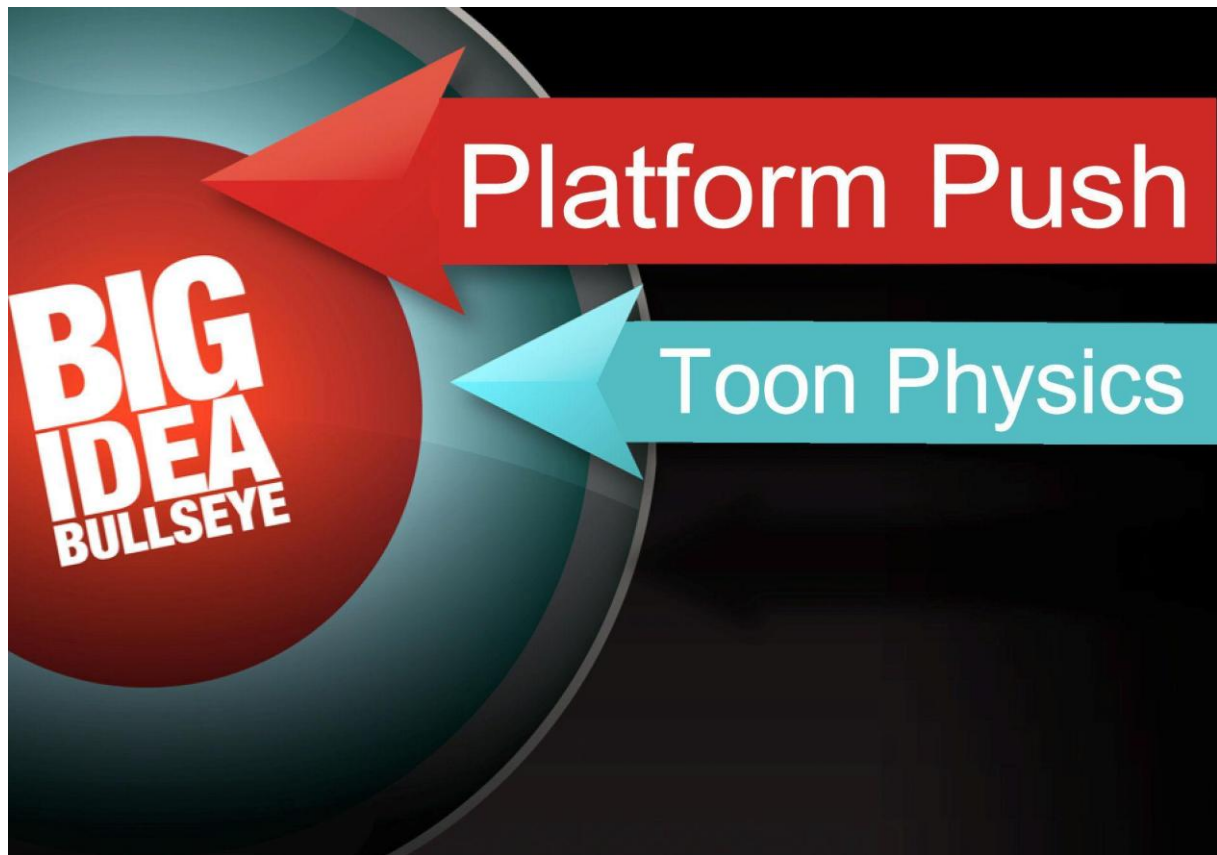
Another technical challenge is an AI for the toppings, so that other players can be replaced with the computer. The algorithm we are going to implement is a function optimization: AI controlled characters have certain things they want to do and decide on the best. How good the AI is going to be depends on the level of our layered schedule we're going to reach:

Low Target: AI controlled characters try to stay in the middle of the pizza and attack other players whenever they are in range.

Desirable Target: Function optimization for the different actions (attack, move (pathfinding)).

High Target: A specialized AI for each topping.

3 “Big Idea” Bullseye



4 Development Schedule

4.1 Layered Development Description

- **Functional minimum**
 - A pizza (plane) with objects (spheres) that can bump into each other and die if they move too far away from the center
 - Very simple physics
 - Minimal GUI
 - The game allows to determine and show a winner.
- **Low target**
 - 2 toppings
 - Jumping
 - A simple default attack (kick)
 - "Good enough" physics, that make the game fun to play
 - Minimal graphics to show that it is a pizza
 - Splash-, player select and winner screen
 - Simple AI
- **Desirable target:**
 - 4 toppings
 - One individual attack per topping
 - Air circulation
 - Dynamic camera
 - Sound effects
 - Good physics
 - Nice models and textures, animations (rigging)
 - Base toppings (cheese and tomato sauce)
 - Better AI
 - Music
- **High target:**
 - 4-6 toppings
 - Two unique attacks per topping
 - Particle systems (using an engine; for air circulation and tomato sauce splash)
 - Really smooth movement and good controls
 - Shaders/Textures/Lighting to give the game a unique, "toon-ish" look
 - Game mechanics to make the game harder over time
 - Nice AI, that's actually a bit of a challenge to play against
- **Extras:**
 - Different Levels
 - More toppings
 - Action camera

Task	Time(h)	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	W13	W14
Developer's Notebook															
Game Proposal (Draft)	4		All												
Game Proposal (Final)	6			All											
Prototype	4				All										
Interim Report	8									All					
Alpha Release	8											All			
Playtesting	5												All		
Conclusion	4													All	
Deliverables															
Paper Prototype	4				All										
Alpha Release	8											All			
Trailer	6													All	
Miscellaneous															
Monogame & Gitlab setup	4				All										
Team Meeting	26	All	All	All	All	All	All	All	All	All	All	All	All	All	
Bug Fixing	?									All					
Playtesting	?											All			
Playtesting Presentation	2												All		
Public Presentation	5													All	
Functional Minimum															
Minimal placeholder assets	4					Patr									
Minimal physics & collision	8					Jon									
Simple Screens and GUI	8					Isa									
Minimal game logic and controls	10					Peter/Isa									
Low Target															
Simple models (toppings, pizza)	4						Patr								
Improve physics (jumping, kicking, smoother controls)	10						Jonas								
Attacks	6						Pet								
Very simple AI	6						Pet/Jon								
Player select screen, winner screen	15						Isa								
Desirable Target															
Texturing/Animating/Rigging	10							Patr							
Sound effects	8							All							
Simple GUI assets	5							Patr/Isa							
Improved AI	6							Peter/Jonas							
Air circulation	5							Jon							
Base toppings	20							Peter/Jonas							
Dynamic camera	5							Pet							
Improved attacks	20							All							
Level generation	10							Peter							
Music	2							All							
High Target															
Smooth controls and physics	15									Jon					
Challenging AI	15									Pet/Jon/Isa					
Shaders/Lighting	8									Patr					
Remaining Toppings and attack logic	10									Pet/Jon/Isa					
Advanced game mechanics	20									Pet/Jon/Isa					

Note: The time (h) is per participant of the task and not overall.

5 Assessment

The virtual world of our game simulates a pizza and everyone likes pizzas. The fun aspect of the game is that you can play against your friends that play other pizza toppings. Maybe you really play some rounds of the game to decide what will be on the pizza you are baking together. The target group of our game are 12+ year olds that have a console & a couch and like to spend a gaming evening together.

It is important to us that each topping has its advantages and disadvantages, so that the players would like to play different characters and don't stick to one – this would also result in a "war", but not the game itself, but the war of "who gets to play the most powerful topping".

Our goal is that the players who play this game are motivated to play more than one round, because the game is fun and has also an aspect of randomness, which means that only if a player loses now, it doesn't mean he's going to lose the next five rounds.