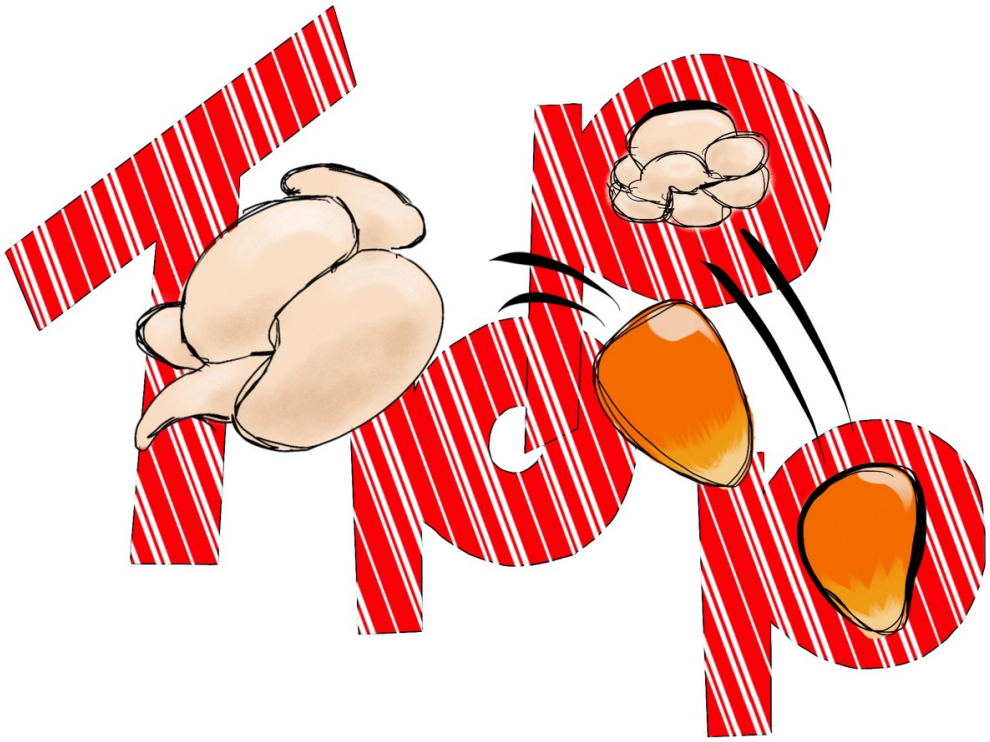
Toppop

Game Proposal Draft



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1 Game Description

1.1 Story Line

The corn kernel is a social creature. In its natural environment, individuals can be observed dozing on densely populated cobs throughout the day. However, corn kernels held in captivity have evolved into another species entirely: popcorn. Though most specimens remain oblivious to being removed from their cobs and their high risk of being eaten, popcorns that have become aware of these conditions become highly volatile and ready to explode at any time, they will stop at nothing to escape their fate.

1.2 Gameplay

1.2.1 Setting

The game is a puzzle game and will be split into levels which are 2.5D (3D Models on a 2D plane) environments consisting of:

- **Characters:** Players will control corn kernels with two basic actions: *rolling* and *popping*. Characters have two states: *base* and *popped*. At the beginning of levels characters start in the base state which is the unpopped corn kernel. This state is more compact and is affected less by wind but does not bounce. After Popping, the character transforms into the popped state which bounces but is also strongly affected by wind.
- **Platform:** Characters navigate through the levels by interacting with platforms. Interactions include rolling on, bouncing off, breaking and pushing. The effect of each interaction is determined by the type of the platform.
- **Goals:** The location that the character has to reach to complete the level.
- **Switches:** When triggered, switches move platforms, thus allowing or denying access to parts of the level. Different types of switches can also toggle air vents.
- **Power-ups:** They change the properties of the character and thus affect their interactions with platforms.
- **Air vents:** Determine air currents that help or hinder the character. They can be activated or deactivated by switches.

The completion of a level requires the player to manoeuvre the character from its starting position to the goal by making use of the layout and objects provided within.

1.2.2 Core Mechanics

Only two actions are available to the player: *rolling* and *popping*.

Rolling is a horizontal non uniform linear motion which allows the player to position the character in terms of location, direction and speed. It is the supporting mechanic: all three aspects determine the character's trajectory and thus serve as setup for the popping action. Rolling will also provide a spin on the character to improve the visuals of popping.

Popping provides the player with vertical motion. This action can only be performed once per character. This limitation is what creates the puzzle aspect of the levels. Popping also changes the state of the character, making it more elastic, and will allow it to bounce off platforms and objects. As the central focus of the game, its animation will ideally be fun and amazing to watch.

1.2.3 Progression

Levels

While the character will fundamentally retain its physical properties throughout levels, levels will progressively introduce more interactions. The first few levels should serve as tutorial levels, which introduce players to the basic types of interactions individually. Later levels will combine the previously established interactions to create puzzles.

Difficulty

Levels will increase in difficulty in three ways:

- **Puzzle:** The direction and location from which players should pop becomes less obvious.
- **Reflex:** The range of allowed speed, direction and location for successfully reaching a goal decreases.
- **Complexity:** Later levels will introduce more objects (switches and power-ups) and multiplayer aspects.

1.2.4 Extended Mechanics

While switches, power-ups and air vents are already an extension of the base game, further extensions can/could include:

- **Level properties:** E.g. Levels with no gravity.
- **Shell Expulsion:** Additional mechanic where the corn kernel expels its shell in any direction to perturb its trajectory.
- **Portable Power-ups:** Power-ups that are picked up upon touching them that can be activated at any time.
- **Base powers:** In some levels the player could be enabled to use some powers (like inverting gravity or changing air density) in a small region or during a small timespan.

- **Multiplayer:** Levels designed for more than one player will focus on synchronising pops to reach the goal. Separate target regions may be available for each player.

1.3 Thematic Relevance

The game's entire focus is on the acrobatics of the corn kernel in its popping when heat is applied. Though in the game no heat is necessary to make the corn pop and an additional rolling movement is introduced, the player should receive the most satisfaction from planning out and then popping their corn in the right moment. By only allowing the corn to pop once, the mechanics stay true to real corn and keep the action from becoming stale.

1.4 Sketches

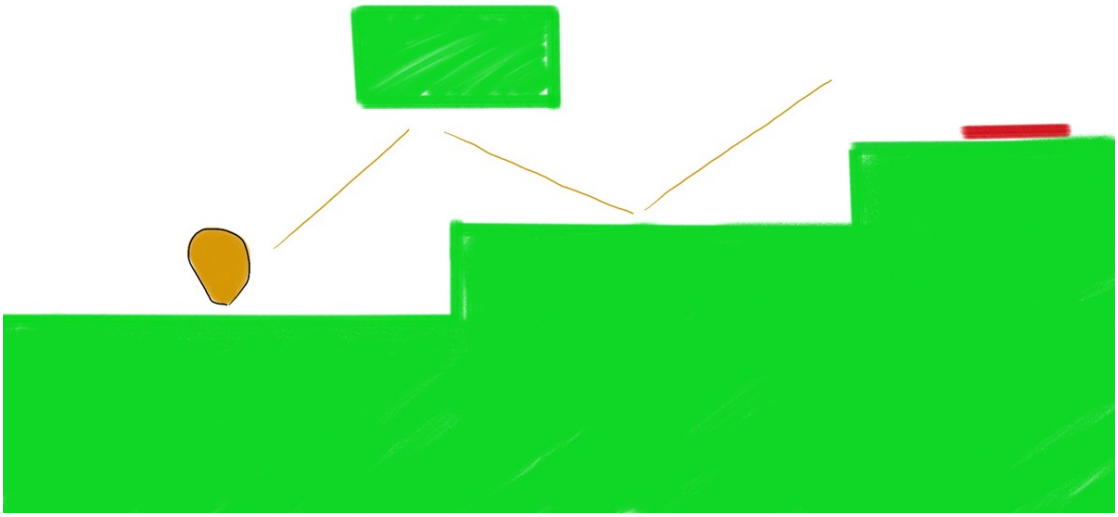

Figure 1: Easy level that requires bouncing against a platform.

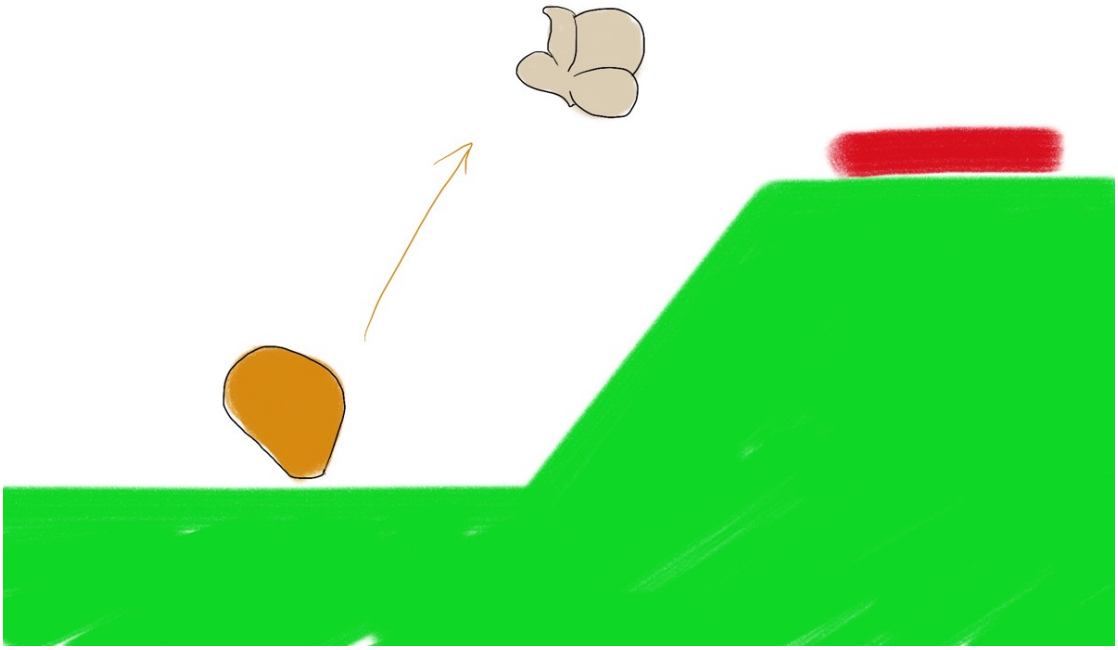

Figure 2: Tutorial level that introduces popping.

2 Technical Achievement

The most central part in our game is the interaction of the popcorn with its environment and/or other popcorns. Thus our main goal will be to develop a physical model, which produces a plausible and believable behaviour of (popping) popcorn while still allowing to extend the levels creatively with items, power-ups, terrain and/or regions, which prescribe behaviors not seen like this in nature.

Optimally, the physical model should include torque, inertia, momentum, advection, gravity (or acting forces in general). But most important are ways the environment can have an influence on the player's popcorn, e.g. through bouncing it back or behaving like a slide.

This flexibility while designing levels can keep the player(s) motivated for a long time: all levels will be different and may require a non obvious combination of movement, timing and interaction with the environment. Even levels with multiple valid solutions are easily imaginable and the player could be judged based on the difficulty or elegance of

his chosen solution. This way also long term motivation could be achieved for players who like to reach a 100% rating/score on all levels.

For the desired target, we would also like to include a multiplayer mode. This gives an additional challenge for each player and enforces some communication between the players which can increase the fun while gaming.

3 "Big Idea" Bullseye

Figure 3: "Big Idea" Bullseye.

4 Development Schedule

4.1 Layered Development Description

1. **Functional Minimum:**
   - Singleplayer
   - Popcorn moving and jumping

- Simple graphics (2D)

2. **Low target:**
   - Basic levels: Reaching some target area
   - Basic physics: Plausible/believable rolling, bouncing and popping physics
   - Complex levels using only platforms
   - Basic background music or sound effects
3. **Desirable target:**
   - Improved physically plausible/believable rolling, bouncing and popping physics (torque, inertia, momentum, etc.)
   - Power-ups for faster rolling, higher jumping
   - More complex levels with additional elements (switches, moving platforms, portals, traps, ...) including necessary changes to the physical model.
   - Cooperative multiplayer mode
   - Different levels for different number of players (X player levels need X players to complete)
   - Some levels with multiple solutions and the player is awarded points based on the difficulty of the way and/or time taken for the level
   - Nice 2.5D graphics (3D objects on 2D plane) and animations
4. **High target:**
   - Different environments (sticky, bouncy, zero gravity regions, air streams (advection))
   - Power-ups/switches affecting environment
   - Rigid bodies and collisions (objects other than players)
   - Shell expulsion (change of direction, momentum, mass)
   - Alternative game mode: rescue all popcorns in a level by reaching a connected target (e.g. switch) to free and continue with the next popcorn.
   - Well fitting background music / sound effects
5. **Extras:**
   - Singleplayer possibility for multiplayer levels (control all pop-corns by rewinding time or other fitting UI control mechanisms)
   - Procedurally generating levels using given elements
   - Level editor
   - Dynamically changing environments

4.2 Task Allocation

Task Nr.	Description	Who	Hours	Actual
	Global Tasks			
1	Final Game Proposal	All	∞	
2	Physical Prototype	All	∞	
3	First Playable Demo	All	∞	
4	Interim Report	All	∞	
5	Alpha Release	All	∞	
6	Playtest	All	∞	
7	Release	All	∞	
	Functional Minimum			
8	TODO	All	∞	
$\vdots$				
	Low Target			
9	TODO	All	∞	
$\vdots$				
	Desirable Target			
10	TODO	All	∞	
$\vdots$				
	High Target			
11	TODO	All	∞	
$\vdots$				
	Extras			
12	TODO	All	∞	
$\vdots$				

Table 1: Task Allocation. D = Dominik, F = Francine, M = Marie, S = Serge

4.3 Timeline

Task	22.3	29.3	5.4	12.4	19.4	26.4	3.5	10.5	17.5	24.5	31.5
1	All										
2	All										
3			All								
4						All					
5								All			
6										All	
7											All
8											
9											
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Table 2: Timeline. D = Dominik, F = Francine, M = Marie, S = Serge

5 Assessment

The idea and rules of our game are very simple. The player should immediately recognize what is at stake in this game, and what the goal is. The difficulty of the game is only increased by a visually appealing level design, additional objects and different locations; for the most part, the main character is not changed in its two basic forms. The most important aspect is the popping up of the corn kernel. The player should like to do this again and again and therefore both entertainment of the animation as well as sound effects are very important. The game is suitable for both single as well as multiplayer(2-4 players). In multiplayer the timing and teamwork will be of great importance. In both game modes, the players will think about physical problems and must consider the exact target path to win. This creates a buildup to the exciting action. The platform design should be simple but also contain decorative elements that set the atmosphere as well as obscure the solution to the level. A detailed 2.5D platform (pseudo 3D) in which the foreground, background and the plane of motion is different is very suitable for this project.