

Game Proposal for Rebomb

November 5, 2024

1 Game Description

We are planning to create a multiplayer turn-based game that contains time travel features, procedurally generated maps, and explosions via particle simulations. We draw inspiration from popular titles such as *Bomberman* for showing blast in maze, *Quantum League* or *Life is Strange* for their time travel features and *Candy Crush Saga* for the cascaded effects. *Rebomb* demonstrates the theme "Chain Reaction" in its mechanics by explosions of bombs. An active bomb affects nearby passive bombs, causing them to trigger and explode. Additionally, flammable objects such as oil buckets, haystacks, wooden fences and trees will be available on the map and players can use these items to their advantage. The game will be designed on several levels. In each round the player has resources that will be carried in the next rounds. The player gains progressively more resources for the chain reactions. Later rounds players can unlock powerful and more costly bombs with their survival bonus.

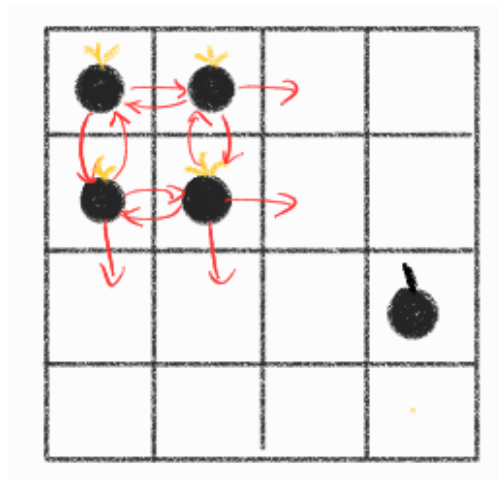


Figure 1: Chain Reaction.

1.1 Gameplay

Rebomb is a turn-based, maze-based multiplayer game that can be played with 2 or 4 players. The players can only move horizontally or vertically in a 2.5D map containing obstacles and collectibles. To win the game, players must eliminate all opponents and remain the last one standing. Players can get killed once they get caught up in a bomb's explosion, including their own. The bombs have to be strategically placed to destroy obstacles or kill other players. They explode in horizontal and vertical directions after some time causing a cascaded effect. Different types of bombs vary in their impact radius, with each type affecting the explosion distance to a greater or lesser extent.

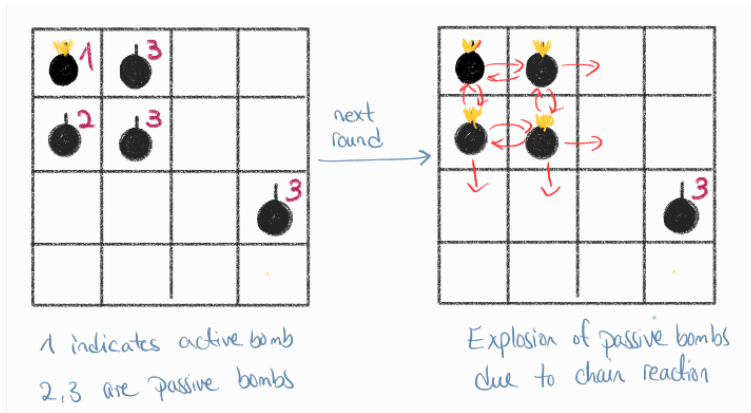


Figure 2: Passive and Active Bomb differentiation.

1.2 Game Mechanics

The player starts the game with fixed and limited resources. Resources can be measured by the number of coins a player holds. Placing the bombs costs coins. Various bombs have different costs. In each round, the player can move only n tiles in horizontal or vertical directions and place their bombs. Resources can be gathered by items on the map, by killing other players, or by designing an in-game interest system, so that the player gains more resources in the upcoming rounds, once they survive the round. The map consists of collectibles, such as hourglasses for time traveling, power-ups for stronger bombs, or extra coins. Once an hourglass is collected the player may choose to time travel back k rounds. In the context of this game, time travel means rewinding to a previous state of the map, where the position of the players, the resources, and all bombs, except for the last placed bombs by each player, will be reverted for all the players. This way the player with time-traveling ability has a chance to strategically change the course of the game in their own favour. Figure 3 demonstrates how time travel can be in a 1 versus 1 gameplay. Note that the same mechanic can also be applied when 4 players are in the game. In this example one bomb costs two coins and the players can move up to 3 tiles in each round.

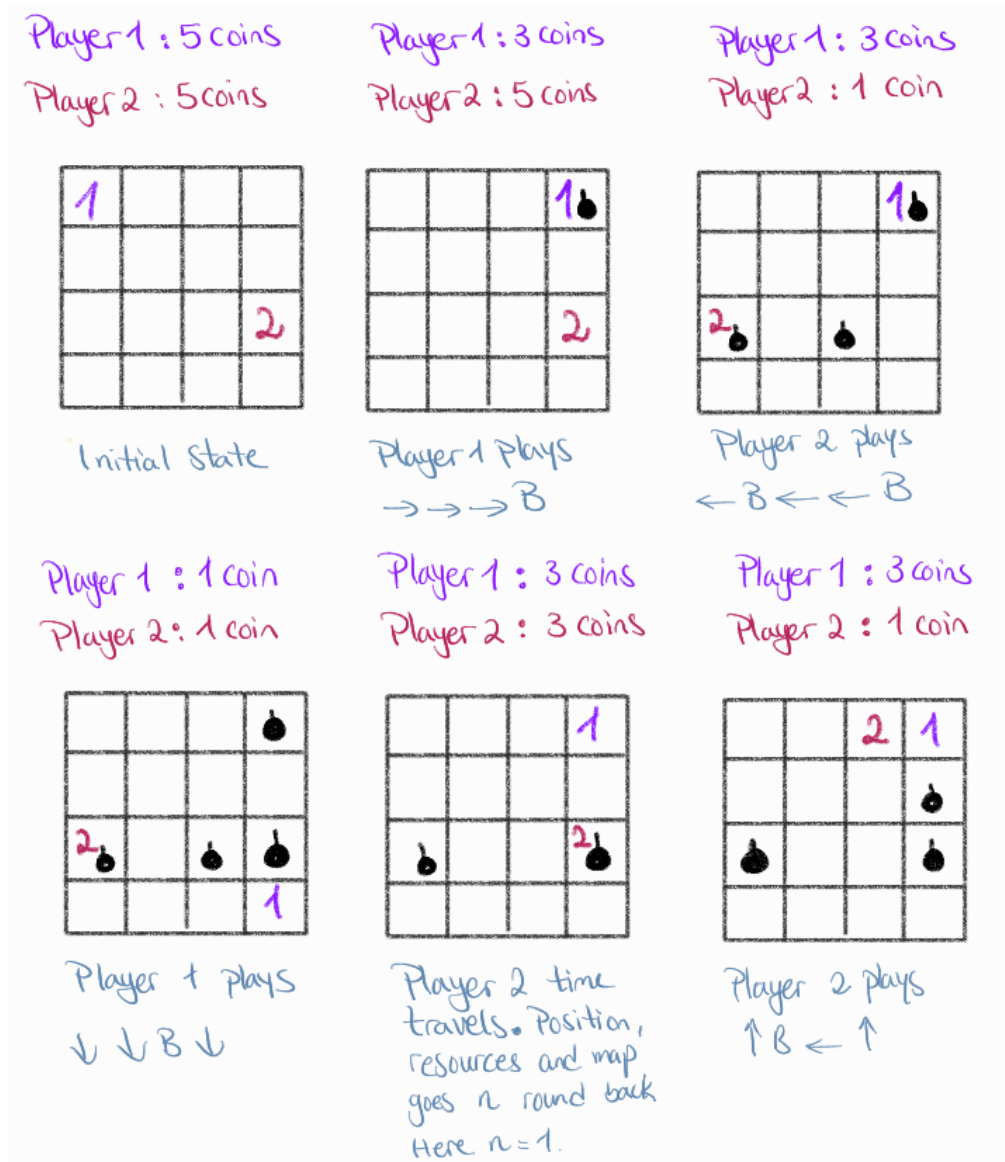


Figure 3: Time Travel Example.

2 Technical Achievement

2.1 Game Snapshots Recording

Our main technical achievement will be the implementation of a game state recording system to enable time travel mechanics. The system will save snapshots of key states including all necessary information to replay the game (movements, actions, objects, environment, etc). This will allow players to interact with previous game experiences, allowing them to explore alternative strategies and making time travel a functional and engaging game mechanic.

2.2 Multiplayer Functionality

Our game will support a multiplayer mode, allowing players to compete in the same scenario in real-time. This feature will require careful management of game states to ensure a minimal latency between devices so



Figure 4: Procedural generation in Minecraft.

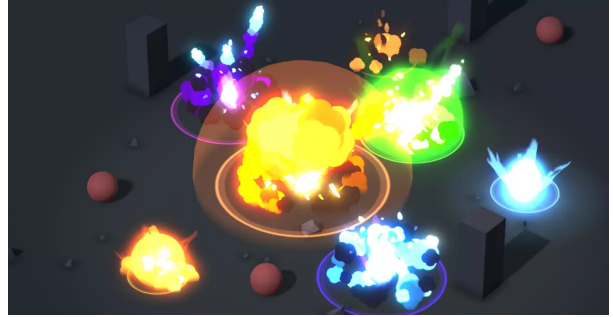


Figure 5: Different particle effects for explosions.

that game states are synchronized in every device. The multiplayer setup will also integrate seamlessly with the time travel mechanics to offer unique multiplayer interactions and experiences.

2.3 Procedural Generation

Using seed-based procedural generation, we will generate scenarios with unique configurations at each game-play. This method provides players with new unseen environments each session while ensuring playability with a set of predesigned rules that control randomness. This simple algorithm also allows for the scalability of the map generation. The seed value will allow players to replay specific map setups that they consider interesting and share them with other players, encouraging game replayability.

2.4 Explosions via Particle Simulation

We will pay special attention to visual dynamic effects from explosions. Each explosion will be generated using particle effects and based on parameters such as brightness, color, shape, or velocity, allowing for distinct patterns and range effects. The particle properties will be tied to different types of explosives and objects, allowing the player to associate the effects with the objects used and better visualize the game state.

2.5 Environment Change

To visually enhance the passage of time within a game session, we will incorporate environmental changes, such as shifting sunlight, moving shadows, or changes in lighting as cues for time progression. This element will act as a way finder, helping players to orient themselves in the temporal dimension while also improving immersion to reflect player decisions. These changes will be achieved through dynamic lighting adjustments based on the game's internal clock and scene configurations.

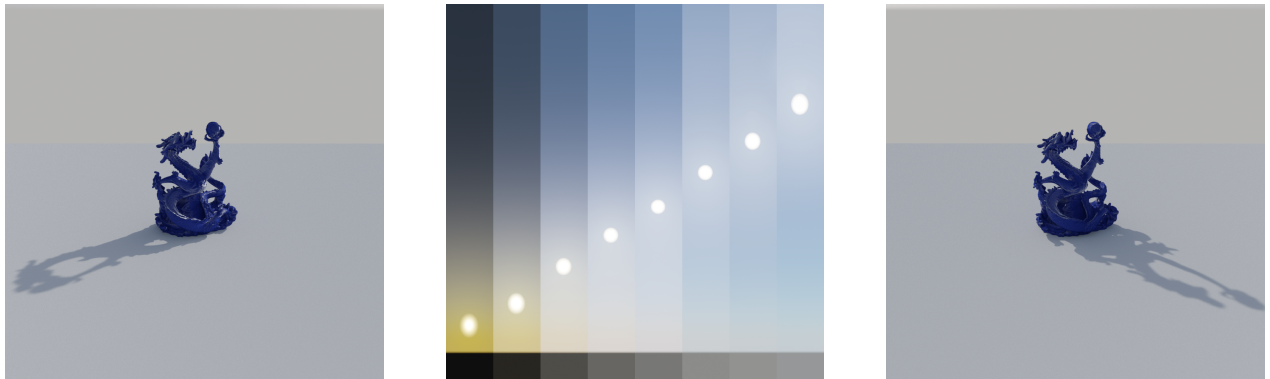
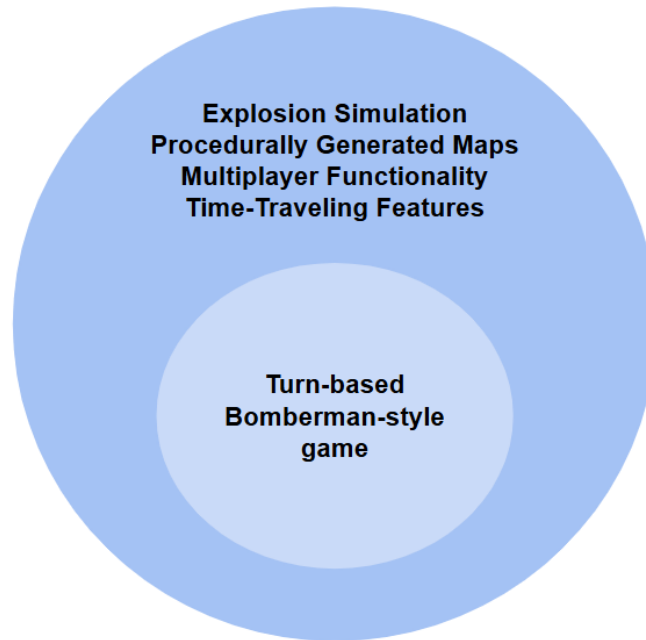


Figure 6: Change on shadows due to different solar azimuth.

3 "Big Idea" Bullseye



4 Development Schedule

4.1 Layered development Description

4.1.1 Functional minimum

Our minimum goal is to deliver a playable turn-based Bomberman-style game with simple default maps and limited interactive elements. The initial focus will be on core mechanics to ensure a functional foundation.

- Player movement and item placement logic.
- Basic environment objects.
- A fundamental weapon system that includes active and passive bombs.
- A basic resource system for initial resources and survival bonus.
- Essential assets.

4.1.2 Low target

At this stage, we aim to enhance gameplay mechanics and introduce additional features to create a richer experience.

- Time travel mechanics.
- Weapon system: sequentially unlocks more powerful bombs and special items.
- A basic GUI with menus and gameplay options.
- Assets specifically for special items.

4.1.3 Desirable target

Building on previous stages, we aim to create a more dynamic and engaging game environment.

- Procedural map generation to increase replayability.
- Local multiplayer for competitive play.
- Enrich interactive elements in environments.
- Assets and GUI for a better user experience.

4.1.4 High target

- Character personalization and animation.
- Multiplayer functionality across multiple machines.
- Additional game mode (e.g. round-based).
- Fine-tune numerical settings to balance gameplay and improve mechanics.

4.1.5 Extras

- Explore more interesting time travel feature possibilities and realtime gameplay.
- Online multiplayer gameplay.

4.2 Timeline

According to our layered development description and milestones in this semester, a initial time schedule is illustrated in Figure 7 and Figure 8.

5 Assessment

The game will combine strategic decision-making with explosive chain reactions, creating a dynamic and suspenseful experience. The time travel feature will add a unique twist, allowing players to strategically undo their moves, heightening both strategic depth and unpredictability.

The game is designed for players who enjoy competitive strategy games, especially fans of Bomberman, turn-based tactics, and games with elements of mind games or puzzle-solving. Players seeking multiplayer experiences with strategic depth and unique gameplay mechanics are expected to be particularly drawn to this game.

In this game:

- Players place bombs with an option to activate their fuses. Activated bombs explode after a delay of a few turns, while unlit bombs remain dormant and can be triggered by chain reactions from other explosions.
- The time travel feature allows players to revert all players and the environment to their state from some turns ago. However, the last bomb each player placed before turning back time will remain and explode according to its original timing.

This gameplay will introduce both offensive and defensive layers, encouraging strategic bomb placement and reactionary tactics.

1. **Engagement and Replayability:** Players should feel compelled to play multiple rounds and experiment with new strategies, especially utilizing the time travel mechanic.
2. **Balanced Mechanics:** A successful design should make the time travel and bomb chain reactions feel fair, with strategy prioritized over luck.

Date	Milestone	Week	Layer	Task	Expect Hours	Actual Hours
Nov 06-12	Prototype	1	Prototype	physical Prototype	4 * 5	
				simple assets	5	
				simple map & static object	5	
				player move & item place	5	
				simple GUI	5	
Nov 13-19		2	Minimum	active & negative bomb	6	
				resource system	6	
				interactive map & object	6	
				turn-based gameplay	6	
				version integration	4 * 4	
Nov 20-26		3	Low	specific assets	8	
				time travel mechanism 1/2	8	
				weapon & interactive obje	8	
				full GUI	8	
				version integration	4 * 2	
Nov 27-Dec 03	Interim demo	4		time travel mechanism 2/2	8	
				cascaded explosion refine	8	
				map generation 1/3	8	
			Desirable	local multiplayer 1/3	8	
				version integration	4 * 2	

Figure 7: Time schedule [1/2].

Dec 04-10		5	Desirable	map generation 2/3	8	
				local multiplayer 2/3	8	
				explosion effects 1/2	8	
				more weapon and objects	8	
				version integration	4 * 2	
Dec 11-17		6	Desirable	map generation 3/3	6	
				local multiplayer 3/3	6	
				explosion effects 2/2	6	
				numerical refine	6	
				version integration	4 * 4	
Dec 18-24		7		remaining tasks & test	4 * 10	
Dec 25-31		8	holiday(Dec 24-Jan 06)		0	
Jan 01-07	Alpha release	9			0	
Jan 08-14		10	High	remote multiplayer	2 * 8	
				assesment & bugfix	2 * 8	
				version integration	4 * 4	
Jan 15-21	Playtesting	11	High	remote multiplayer	2 * 8	
				improve mechanics	8	
				refine animation/character	8	
				version integration	4 * 4	
Jan 22-28		12		remaining tasks & test	4 * 10	
Jan 29-Feb 04	Final release	13	Extra	extra tasks & test	4 * 10	

Figure 8: Time schedule [2/2].

3. **Strategic Depth:** Players should have opportunities to improve with experience, discovering advanced tactics and evolving their strategies.
4. **Player Retention:** The game's success can be measured by a strong player base with high retention, indicating enjoyment and multiplayer appeal.