Team 5: Formal game proposal
Game Programming Lab

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March 13, 2011

1 Introduction

The formal game proposal makes up the first chapter of our project notebook. The game proposal describes our game idea, provides a detailed development schedule, and gives a qualitative assessment of our project. This proposal is intended to be professionally prepared, expressive, grammatically sound, illustrative of our efforts and process, and easy to understand.

2 Game description

2.1 Story and setting

A small group of gladiators is trapped by a big evil boss and fights for survival in a deadly arena. The game theme is centered around elements, so there will be fire, water, ice and earth both as obstacles and as attacks. We're not fixed on how the character and boss models will look like, figuring this out will be a part of the modeling tasks.

2.2 Basic game idea

Our basic game idea consists of a small scalable group of one to four surviving adventurers trapped in a large arena. The goal of the game is to defeat the evil arena boss who poses different challenges and threats to the players. While the boss is usually positioned at the center or at the border of the scene (in a prominent position), the scene is seen from top and character movement is restricted to the arena's floor.

The game is divided into different encounters where each encounter represents a unique challenge posed by the boss and a specific strategy that players must find in order to defeat him. After one such stage is completed, the next one begins and the fight continues. Besides the challenges posed by the current enocunter, the boss also features a standard attack shooting projectiles at the players which they have to evade. From time to time, the current encounter is interrupted and the boss uses a special attack that players have to cope with.

We plan to start by implementing the boss' standard attack and then extend it by adding encounters sequentually. Our desired target consists of one well designed level featuring three different encounters that players have to tackle. If time remains, we plan to add further levels with more encounters.

Every controllable player character has a health bar with a fixed amount of hitpoints. When the health bar of a player reaches zero, the player dies and is able to respawn after a short cooldown time. However, this can only be done a fixed amount of times for the whole team, so if this amount was to be 4, one player could die 4 times or all four players could die once each. If all lives are used up, the game is over and the players have to restart the encounter.

2.3 Player control

Every player acts individually and has a set of basic abilities available for use:

- Move around: The character moves into all four directions

- Melee attack: The character hits the boss from a small range

- Ranged attack: The character shoots a projectile at the boss from a longer range

- Jump: The character jumps in the air to move over obstacles

- Defense: The character ducks or shields itself in order to avoid damage

The different player actions are also illustrated in figure 1. We will implement these control options in layers as specified in the development targets.

2.4 Boss encounters

The following ideas are abilities the boss can use in levels on the players. One or several of these ideas could be combined to an encounter.

The rotation: In this encounter, the boss always attacks the player closest to him. Since player characters can only bear a limited number of boss hits before dying, the players have to figure out that they need to establish a rotation in order to defeat the boss: One player needs to stand closest and get attacked, while the other players are free to attack the boss and regenerate the hitpoints previously removed from their health bars when it was their turn to take the damage. After a while, the players have to rotate their roles before the one closest to the boss dies and another player has to take his place.

Frozen pool: The boss is located at the center of a pool filled with water and attempts to attack the players with ice beams. Ranged attacks against the boss are ineffective due to his ice shield, but every beam targeted at the players freezes a small water path from the players' position to the boss' location which enables one player to move closer to the boss and attempt a melee attack, which can crush the boss' ice shield and enables all players to target ranged attacks against the boss while the shield is recharching. In between ice beam attacks, the boss shoots projectiles at players that they have to avoid.

Burrower: The boss is able to burrow under the ground and suddenly reappear in the mean position of the players. However, the playing ground is a mine field and exploding mines damage players as well as the boss, so the players have to figure out that they need to spread out in order to make the boss appear in a desired location not too close to them and next to a mine. If a mine hits the boss, he is stunned for a brief moment and the players can damage him.
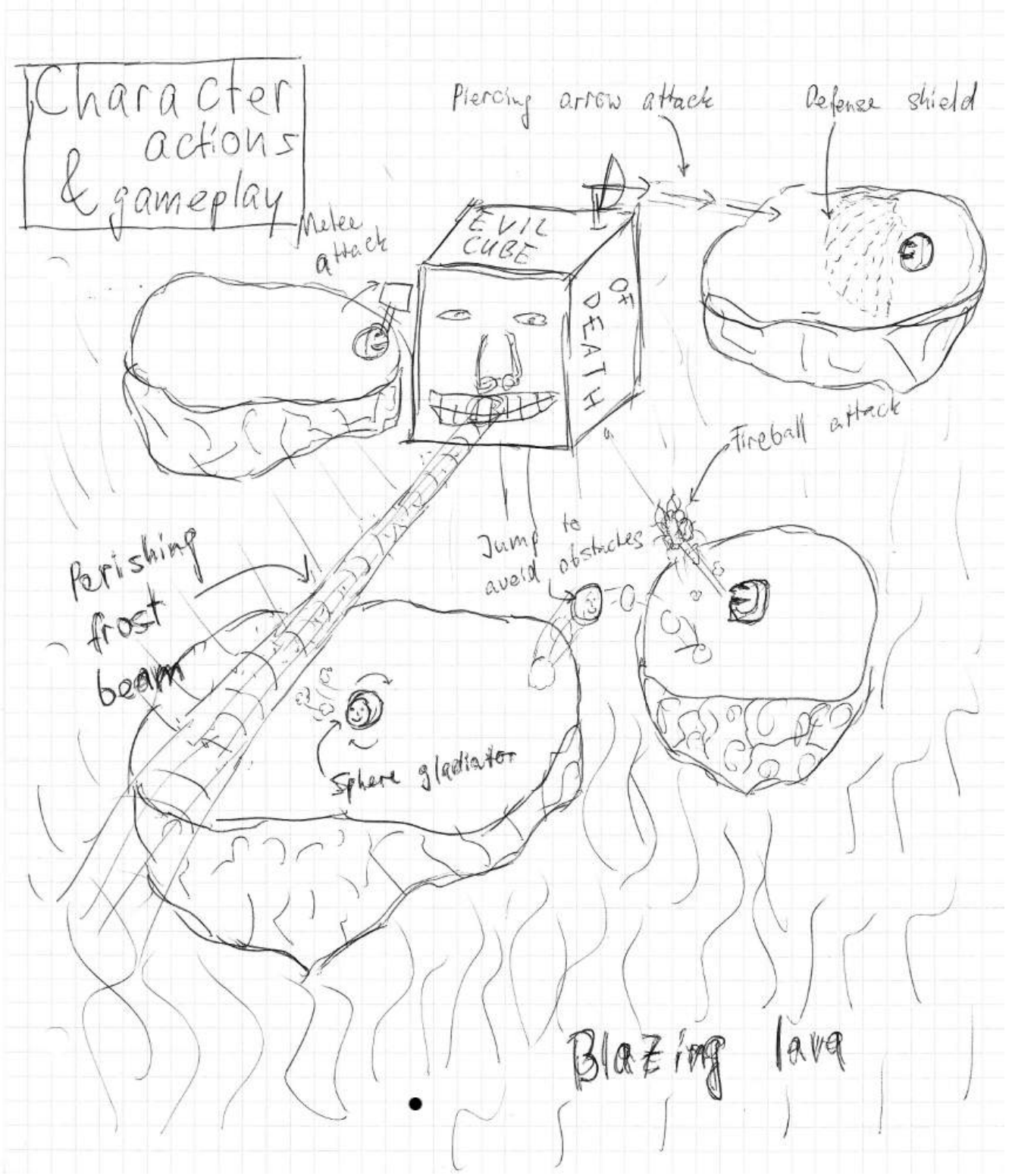
Figure 1: Player actions and gameplay concept art

The trap: In this encounter, there are several buttons spread over the map. If those buttons are activated at the same time (this can only be done at close distance), a trap is triggered. However, the impact point of the trap changes over time so players have to get the timing right in order to fire the trap directly on the boss. For example, a big rock could be floating over the map and fall down as soon as the buttons are activated. Further extensions to this encounter could include some way of unlocking the buttons first or activating them in the right order.

2.5   Special attacks

In addition to encounters, we regularly interrupt the current encounter and let the boss use a recurring special attack such as:

Earthquake: The boss stomps the ground and provokes an earthquake in a certain area that has to be avoided to prevent damage.

Reflective shields: The boss suddenly becomes immune to all player attacks and starts to shoot small projectiles at the players. The players have to figure out that the boss cannot be damaged directly but that they have to activate their shields shortly before the impact of a projectile to reflect it at the boss.

Energy beam: From time to time, the boss shoots out a straight energy beam reaching over the whole map and starts to rotate quickly around himself. The players have to hit their jump button in the right moment to overcome the beam and avoid massive damage.

Flame pillar: The area on which players can move is divided into platforms which start to break after the boss visually focuses on them. When a platform breaks, a flame pillar shoots up from the ground which deals high damage to a player standing on the platform. In order to defeat this level, the players have to multitask and avoid the flame pillars as well as deal damage to the boss at the same time. This is illustrated in figure 2.

3   "Big idea" Bullseye

Please see figure 3 for our "big idea" bullseye sheet.

4   Technical issues

Since several players interact with the world and with each other in the game, an arising issue is character modeling and animation. Even though none of the team members has previous experience in this field, we're committed to giving our best to explore ways on how to deliver a visually acceptable an non-disturbing range of animations.

Our big technical focus is the visually pleasing display of graphical effects to convey concepts such as ice beams, fire pillars or other "elemental" attacks. We intend to apply particle simulation and shading techniques in order to implement them.

Another issue is the camera placement and movement during the game. Since we don't plan to split up the screen for the individual players, the goal is to have all relevant objects (especially the boss and the playable characters) in sight at all time. If the players are spread out, this results in a birds-eye view, whereas to camera focuses more closely on the players if they are standing together.
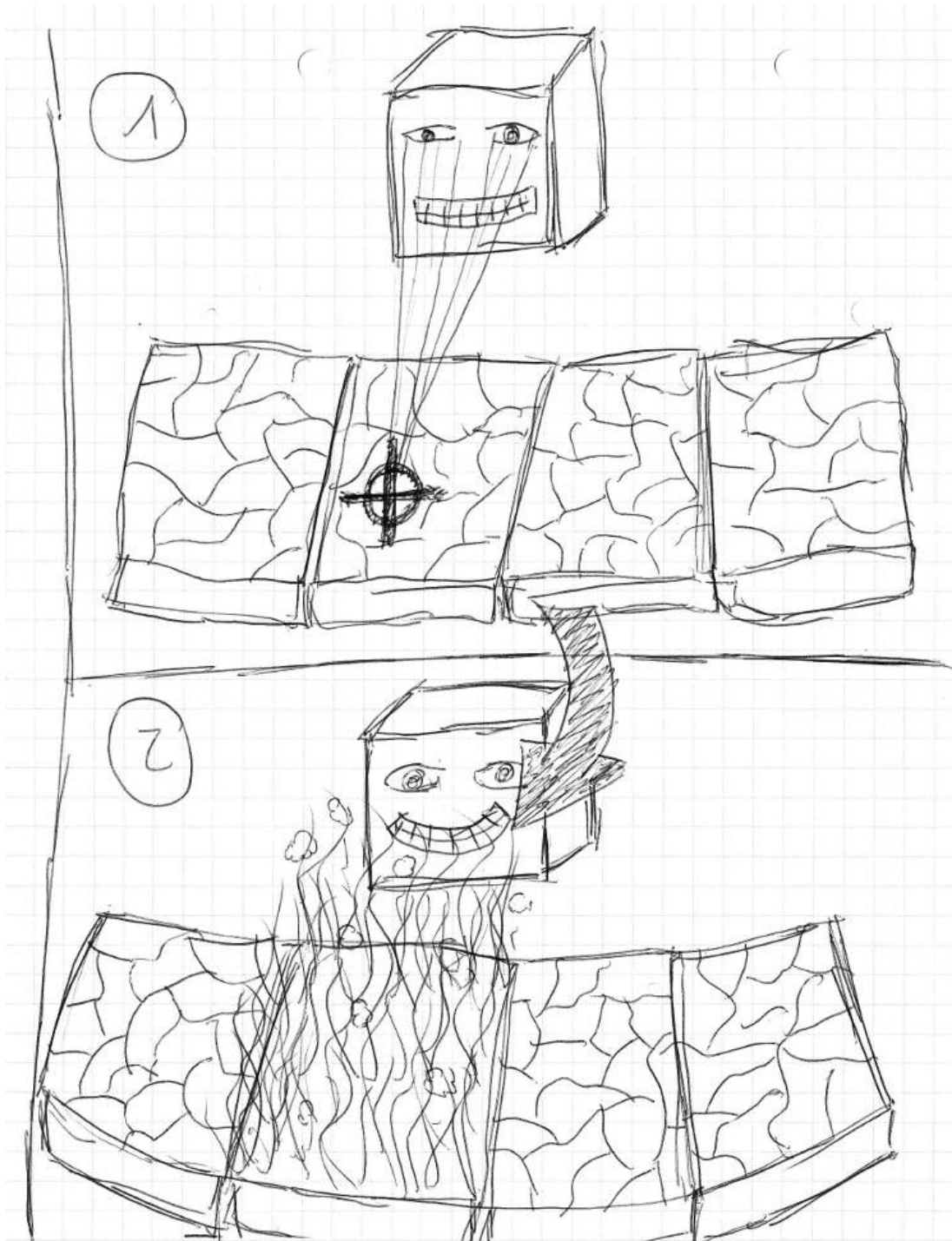
Figure 2: A concept art of how the flame pillar boss ability could work
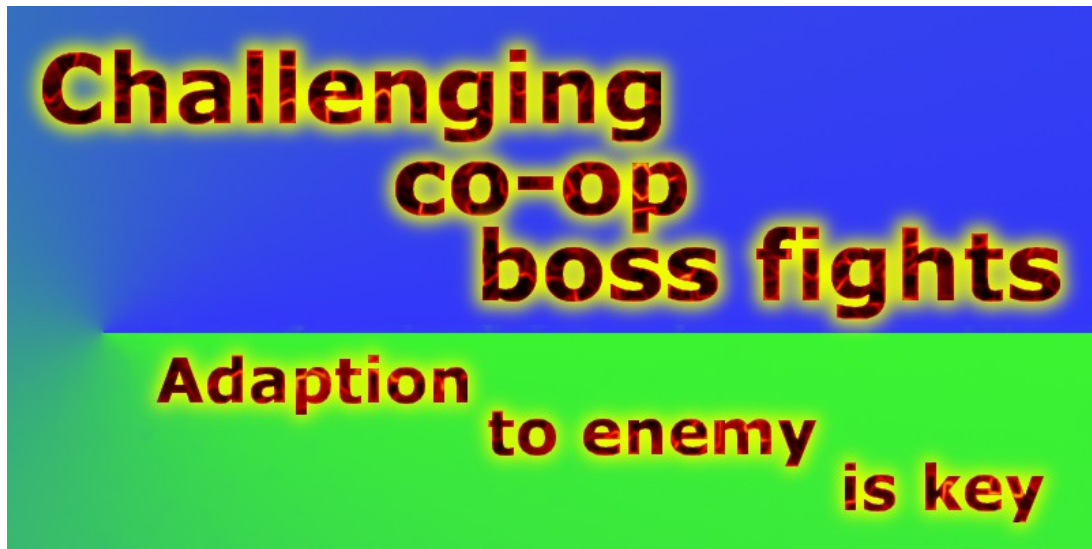
Figure 3: Our "big idea" bullseye sheet

However, we do plan to implement this feature in several layers and will thus start with a fixed camera perspective from top.

5 Development Schedule

5.1 Development targets

5.1.1 Functional minimum

- Simple arena with fixed camera perspective from top

- Crude character and boss models

- One controllable player character that can move and perform attacks

- No character animation yet

- Stationary boss with a health bar

- Boss throws balls at player

5.1.2 Low target

- Sound effects for attacks

- More sophisticated character and boss models

- Character jump action

- Character movement animation

- Multiple players

- Basic lighting, shading and shadows

- A single boss encounter

5.1.3 Desired target

- Game menu / GUI

- Character attack and damaged animation

- Dynamic camera movement

- A level consisting of three different boss encounters

- Graphic effects such as fireballs, ice beams, etc. depending on encounters

- Special boss attacks

5.1.4 High target

- Reiterating levels with increasing difficulty

- More different levels featuring different encounters

- Different selectable characters with different models and slightly differing abilities (stronger melee attack vs. faster movement, etc.)

- Improved lighting, shading and shadows

- Post-processing effects

5.1.5 Extra targets

- Networking support

- Map editor in game

- Role playing elements

5.2 Team background and task assignments

5.2.1 Florian Köhl

Semester: 7th Bachelor

Related courses taken: Visual Computing

Task assignments: Modeling, Animation, GUI, Sound

5.2.2 Marko Bencun

Semester: 1st Master

Related courses taken: Visual Computing, Physically-based Simulation, Surface Representations and Geometric Modeling, Computer Graphics, Advanced Topics in Computer Graphics and Computer Vision, Simulation using particles

Task assignments: Graphics Engine, Camera, Control, Shadows

5.2.3   Fabian Hahn

Semester: 2nd Master

Related courses taken: Visual Computing, Physically-based Simulation, Surface Representations and Geometric Modeling, Computer Graphics, Advanced Topics in Computer Graphics and Computer Vision, Advanced Methods on Computer Graphics

Related work: Internship at Disney Research Zurich

Task assignments: Graphics Engine, Physics, Effects, Boss AI

5.2.4   Remi Meier

Semester: 7th Bachelor

Related courses taken: Visual Computing

Task assignments: Artwork, Modeling, Animation, Boss AI

5.3   Estimated schedule

Please see table 1 for our estimated development schedule.

6   Assessment

Our game is a cooperative multiplayer action game targeted at players with medium skill who want to enjoy strategic and collaborative gameplay against a strong enemy with seemingly superior power. The players are encouraged to figure out the optimum strategy to defeat the boss in a level while evading projectiles and overcoming obstacles.
The top view ensures a good overview over the scene and intuitive control of the player characters.

	Week	3	4	5	6	7	8	9	10	11	12	13	14	15
	Date	7.3.	14.3.	21.3.	28.3.	4.4	11.4	18.4.	25.4.	2.5.	9.5.	16.5.	23.5.	30.5.
	Target		Functional minimum				Low target		Desired		High			
Marko														
	Project plan	x												
	Physical prototype		x											
	Core engine		x	x	x	x								
	Static Camera		x											
	Simple light			x										
	Xbox deployment			x	x									
	Basic lighting, shading, shadows						x	x						
	Encounters						x	x	x	x	x	x		
	Dynamic camera								x	x				
	Playtesting										x			
	Post-processing effects										x	x		
	Presentation and Video												x	x
Fabian														
	Project plan	x												
	Physical prototype		x											
	Player logic		x	x										
	Collision detection			x	x	x								
	Ranged attack				x	x								
	Core engine				x	x								
	Jump action						x							
	Multiple players						x	x						
	Encounters						x	x	x	x	x	x		
	Effects							x	x	x				
	Special attacks								x	x				
	Playtesting										x			
	Balancing / AI										x	x		
	Reiterating levels										x	x		
	Presentation and Video												x	x
Remi														
	Project plan	x												
	Physical prototype		x											
	Story and setting		x	x										
	Artwork		x	x										
	Character & boss models		x	x	x	x								
	Advanced modeling						x	x						
	Animation						x	x	x	x				
	GUI								x	x				
	Playtesting										x			
	Level design										x	x		
	Encounters										x	x		
	Presentation and Video												x	x
Florian														
	Project plan	x												
	Physical prototype		x											
	Simple arena model		x											
	Character & boss models		x	x	x	x								
	Overlays				x	x								
	Sound effects						x							
	Advanced modeling						x	x						
	Animation						x	x	x	x				
	GUI								x	x				
	Playtesting										x			
	Different characters										x	x		
	Presentation and Video												x	x

Table 1: Our estimated development schedule