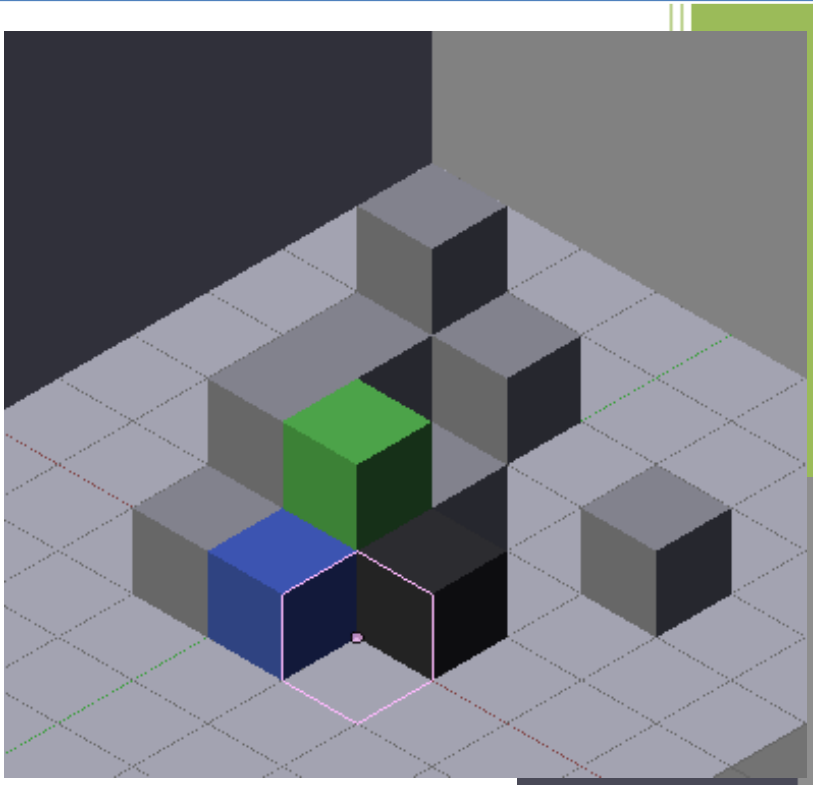
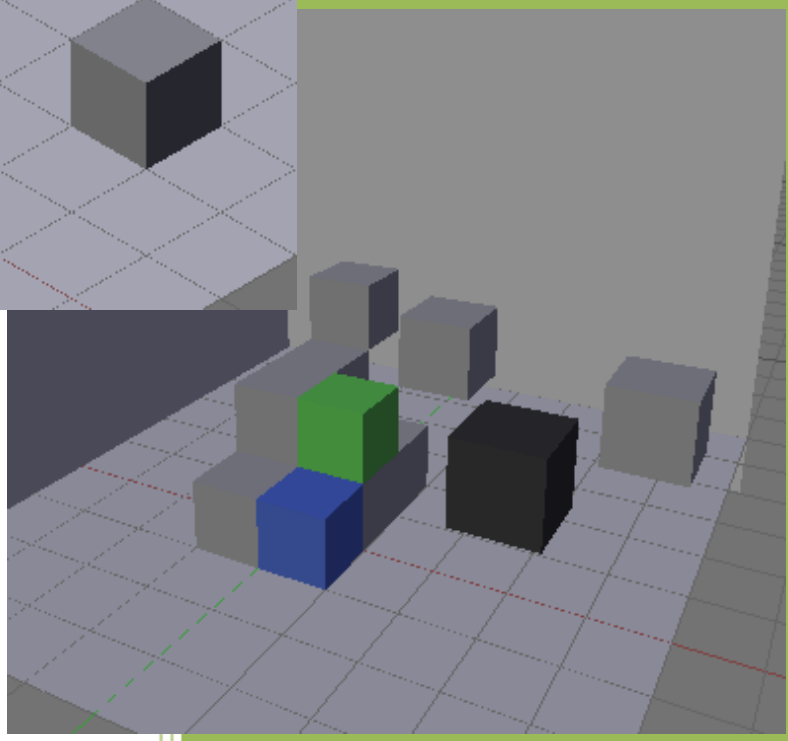
2010

YetAnotherWorkingName





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Game Programming Lab – ETH Zürich

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1. INTRODUCTION

For the Game Programming Laboratory at the ETH Zürich, with this document we want to present the first description of our game.
This document is the first step in a project development structure based on six phases: proposal, prototype, interim report, alpha release, playtesting and presentation.
The goal of the proposal is to get a consensus of the course of action and the time management throughout the course.
For this purpose, the proposal contains a detailed description of the game and a draft of the scheduling and work distribution.

2. GAME DESCRIPTION

2.1. SETTING AND STORY

This year's Game Programming Laboratory is set under the theme "Historic places & events". Since our game idea already shakes the very foundations of three-dimensional space, we have decided to embed it in a time travel storyline where the rules of space and the flow of time are slightly askew.
The character controlled by the player is an artist who owns a gallery. Due to the fact that he is at his very beginning, this gallery is initially just filled with empty canvases. But on an old Chinese market, he has bought some really special paints which allow him to travel through time and space by painting a picture of the desired era and location on such an empty canvas. His goal is to travel to various eras to collect lost mythic items (for example the Holy Grail) for his gallery.
Arrived in these eras, his special paints allow him to create objects out of thin air, or locally change the direction of gravity, which obviously comes in handy on his travels. Furthermore, he owns scissors that enable him to reassemble his surroundings like a collage.

2.2. GAME PRINCIPLE

The game starts with a menu showing a gallery with empty paintings that have to be painted. By selecting an empty canvas, the player can travel to an unvisited level through his painting technique. All levels are set in an era, which is reflected by that level's textures, but multiple levels may be set in the same era.
Each level is presented to the player as a three-dimensional world containing one or more puzzles. The goal is to find a way through the level and to collect the desired painting hidden somewhere.
The level consists of one or more rooms connected by doors. Each room is built from cubes arranged in a regular grid, which simplifies the actions the player can choose.
Initially, the game is played in a first-person perspective, where the player can use the controller to let the artist walk, jump or climb ladders.
Additionally, there are some spheres or other objects, which can be used for interaction with triggers e.g. buttons or dynamic simulations, such as falling balls or tangling bridges.
The artist can shoot a splash of paint at a surface to create an object at that position. This might be useful to change the direction of falling objects or the artist himself. Similarly, he can also splash anti-gravity paint on surfaces to create volumes where objects don't fall to the ground any more, but are accelerated away from the colored area or have no gravity at all instead. These painting operations are described in chapter 2.2.1.
The artist can use his scissors to reassemble the environment. This is described in more detail in chapter 2.2.2.
An undo utility could be feasible that allows reverting wrong painting or reassembling actions.
To finish a level, the artist has to find an empty canvas which will allow him to travel back to the present, that is, takes the player back to the menu. Upon returning from that era, he is able to revisit it by selecting that canvas, which now displays a snapshot

of the level. If he managed to collect the painting located in that level (which may be really hard to reach), it is displayed along with his own painting.

2.2.1. PAINTING

Painting is a process of either generating new solid objects or using the anti-gravity paint. The artist is initially equipped with two kinds of brushes that allow him to create two types of objects, namely cubes and ramps (i.e. diagonally halved cubes). The objects are created in alignment with the regular grid the room is based on. The player can create them by aiming at a surface using the right joystick, then pressing a certain controller button. In the case of ramps, an additional step is required to set the ramp's orientation before the operation is complete. The artist can work from any distance and doesn't need to get close to every surface he wants to paint.
Creating gravity fields uses the same aiming mechanism, but creates a brick-shaped force field perpendicular to the selected surface. Its height is fixed, but can be increased by painting the same surface multiple times. The field is visualized by small particles inside the affected volume which float in the field's direction.
Since many puzzles would become ridiculously easy if the player were allowed to generate an arbitrary number of objects and anti-gravity fields, the amount of paint carried by the artist is limited. Therefore, the player should use the paint wisely.
Creating objects doesn't use the same kind of paint as creating gravity fields. Creating gravity fields could also be limited by their count, and when a new field is created, the oldest one gets deleted.
There are areas which can't be painted because they have a special impregnation.

2.2.2. COLLAGES

As mentioned before, the player can switch to a collage mode by pressing a controller button. When activated, the camera pans to an isometric view.
In this view, the player does not have the possibility to let the character walk, jump or climb. Instead, he can alter the three-dimensional environment by modifying the projection.

The isometric view has the special property that all angles between the projected coordinate axes measure 120 degrees, and therefore a cube is projected to three congruent diamonds placed in a hexagon.
Rotating such a hexagon by 60° or 180° creates the optical illusion of a solid cube being replaced by its floor and back walls, or vice versa. Turning this illusion into physical reality allows the creation and removal of cubes.
This transformation does not really have a meaningful interpretation as transformations of three-dimensional objects.
What parts may be modified in what ways is determined by the game engine and presented to the player through colored outlines, through which he can cycle using the controller.
Due to the isometric projection, it can easily happen that cubes which are in fact far away from each other seem to be neighbors, and even form a hexagon together that looks like the back walls and floor of a cubic volume. It is imaginable that such a hexagon could be rotated in the same way to form a solid cube. On the title page of

this proposal, you can see an illustration for such a situation. This allows for various puzzles that require the player to think "outside the box".

Once the transformations are complete, the player can choose to return to the first-person view and continue to explore the environment.
Some areas may disturb the artist's creativity, so that he can't make any collages, i.e. the collage mode cannot be activated while the artist is located inside them.

2.2.3. SHADING

To give the game a unique look, we decided to use a special rendering technique. Since the game revolves around an artistic theme, we decided to work with a rendering method which makes the scene look like hand-drawn (e.g. pencil shader).
The rendering style could change between different eras to reflect the corresponding painting technique (e.g. impressionism).

2.2.4. EXTENSIONS

- Also allow translations in isometric view
- Let the player also paint surfaces to make them reflect the gravity field

3. DEVELOPMENT SCHEDULE

3.1. DEVELOPMENT PHASES

3.1.1. FUNCTIONAL MINIMUM

- First-person view in which the player can walk around and jump
- Force fields
- Rigid body engine (external library)
- Triggers (interaction with ladders and doors)

3.1.2. LOW TARGET

- Isometric view
- Creation of objects (blocks and ramps) and force fields
- Textures for one era
- Rendering mechanism (e.g. painted/comics look)
- Two different simple levels
- Menu for level selection

3.1.3. DESIRABLE TARGET

- Textures for at least a second era
- Transformation to/from isometric view by camera movement
- Transformations in isometric view
- Enlarging force fields
- Sound
- At least two non-introduction levels
- Effect/Shader of anti-gravity regions
- Undo/Redo of operations

3.1.4. HIGH TARGET

- Achievements
- Power-ups (colors ready to pick up)
- Simulation of more complex rigid bodies
- Transformation to/from isometric view as smooth as possible
- Random Maps

3.1.5. EXTRAS

- Also allow translations (of hexagons, diamonds?) in isometric view
- Let the player also paint surfaces to make them reflect the gravity field
- Multiplayer mode
- Shallow water ('cause we're never going to implement it anyway)

3.2. TIME SCHEDULE

	Phase[1]	JB[2]	MF[3]	TK[4]
9.-15.3.				
Final formal proposal		24	24	24
16.-22.3.				
Prototype		24	24	24
23.-29.3.				
World with ladders and doors	FM	12		
Physics	FM		18	
Character control	FM		6	
Map handling (load, maybe save)	FM	12		
Creating a player model for isometric view	FM			24
30.3.-5.4.				
Character control	FM		4	
First person view	FM		4	
Interactions with ladders, doors and force fields	FM		12	
Creating a player model for isometric view	FM			24
HUD	LT	8		
Creation of force fields plus simple visualization	LT	8		
Creation of objects (blocks and ramps)	LT	8		
Yet unknown problems			4	
6.-12.4.				
Isometric view	LT			8
Rendering mechanism (e.g. painted/comics look)	LT			16
Two different simple levels	LT	8		
Saving with stats (e.g. timer)	LT	8		
Yet unknown Problems		8		
Menu for level selection	LT		8	
Textures for one era	LT		16	
13.-19.4. (Interim report due 19.4)				
Detecting possible transformations in isometric view and applying them	DT	8		8
Highlighting (2D masks for selection) in isometric view	DT	8		8
Textures for at least a second era	DT		16	
Prepare interim report		8	8	8
20.-26.4.				
Detecting possible transformations in isometric view and applying them	DT	16		16
Transformation to/from isometric view by camera movement	DT	8		8
Effect when creating objects	DT		16	
Yet unknown problems			8	

[1] FM = Functional minimum, LT = Low target, DT = Desired target
[2] Jeronimo Bayer, working time in hours
[3] Matthias Flierl, working time in hours
[4] Thomas Kiser, working time in hours

27.4.-3.5.				
Visualization of Transformation	DT	8		
Trailer video Brainstorming		8	8	8
At least two non-introduction levels	DT	8	16	16
4.-10.5.				
Sound	DT	16		
Enlarging force fields	DT		4	
Undo/Redo of operations	DT		12	
Effect/Shader of anti-gravity regions	DT			16
Prepare alpha release		8	8	8
11.-17.5. (Alpha release due 11.5.)				
Trailer video		16	16	16
Playtesting		4	4	4
Polishing		4	4	4
18.-24.5. (Playtesting presentation 18.5)				
Trailer video		12	12	12
Presentation		8	8	8
Conclusion		4	4	4
25./26.5. (Debriefing and final presentation)				

4. ASSESSMENT

In this part, we review our game idea with regard to playability, fun and success.
Since the basic game principle is a riddle game, we feared that we face the same problem as most riddle games: they lack speed and flow, the riddles are fun, but the gameplay itself is often static and offers no or little freedom.
Therefore, we opted for a mixture; the force fields should bring some action into the game. Falling at high speed through a three-dimensional environment is fast and offers a challenge to the player.
The isometric riddles are a – to our knowledge – completely new concept and we assume that it can pique the player's curiosity. However, a new key game element is not always a warrant that the game will be interesting and fun to play. On contrary, exploring a new concept means that we risk that the game is seen as boring and cumbersome to play.
But for people who like mind-boggling riddles and visual/spatial thinking, the game might be fairly appealing.
We hope that the features will allow for challenging puzzles and an addictive gameplay. First drafts of some riddles and levels look very promising.
We are aware of the need to implement a high number of levels to satisfy the player, nevertheless we try to focus on game content. But like all other teams, we try to increase the number of levels at the end of the project if time’s available.

5. APPENDIX

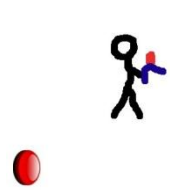

Abbildung 1: Force field 1

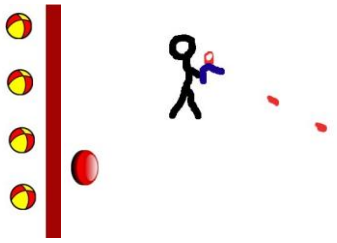

Abbildung 2: Force field 2

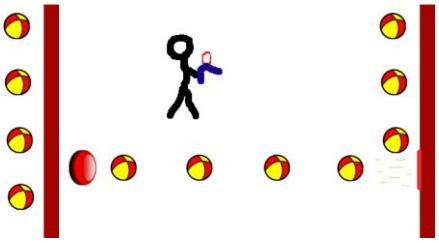

Abbildung 3: Force field 3

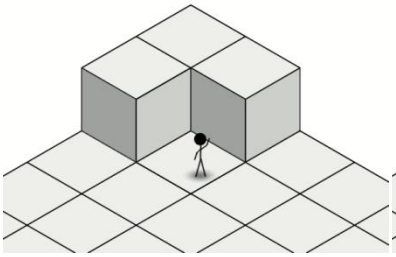

Abbildung 4: Rotation 1

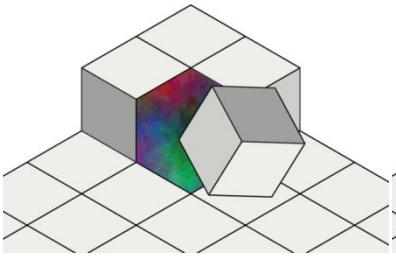

Abbildung 5: Rotation 2

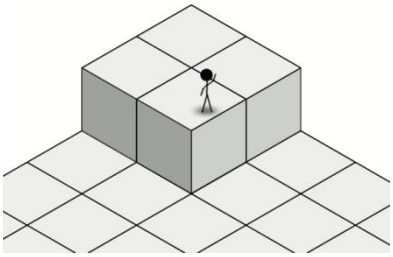

Abbildung 6: Rotation 3

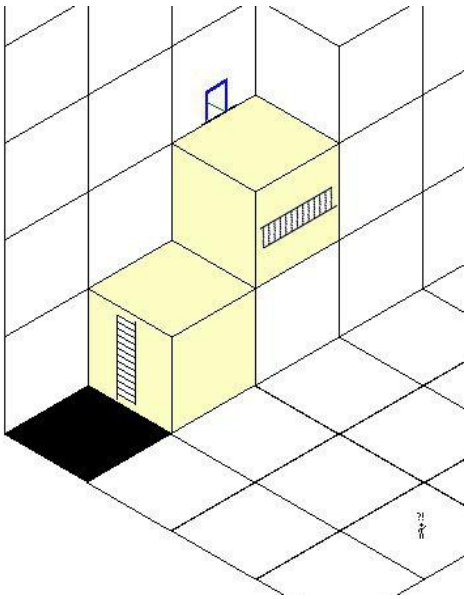

Abbildung 7: Reach the door

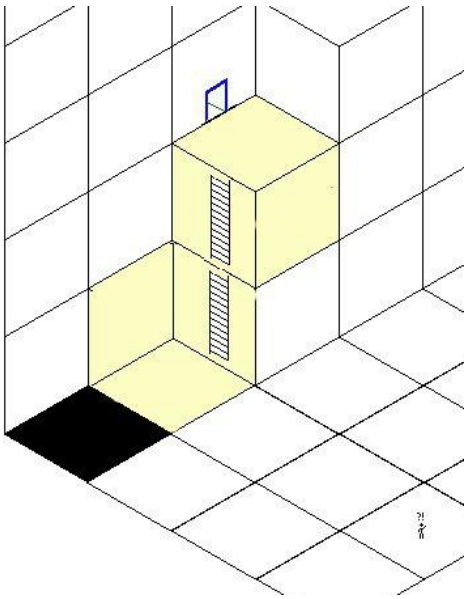

Abbildung 8: Door reached

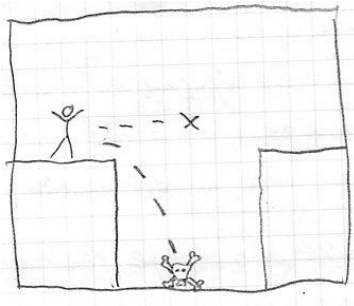

Abbildung 9: Abyss

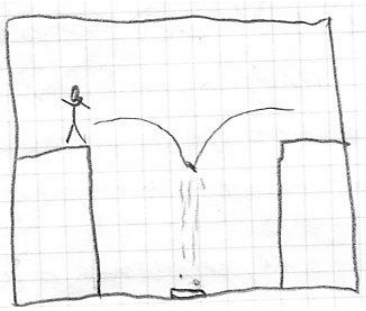

Abbildung 10: Abyss passed

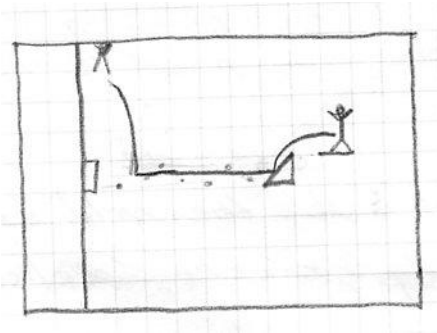

Abbildung 11: Ramp

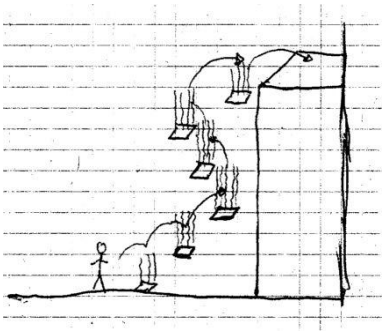

Abbildung 12: Force stairway

Abbildung 13: Artist

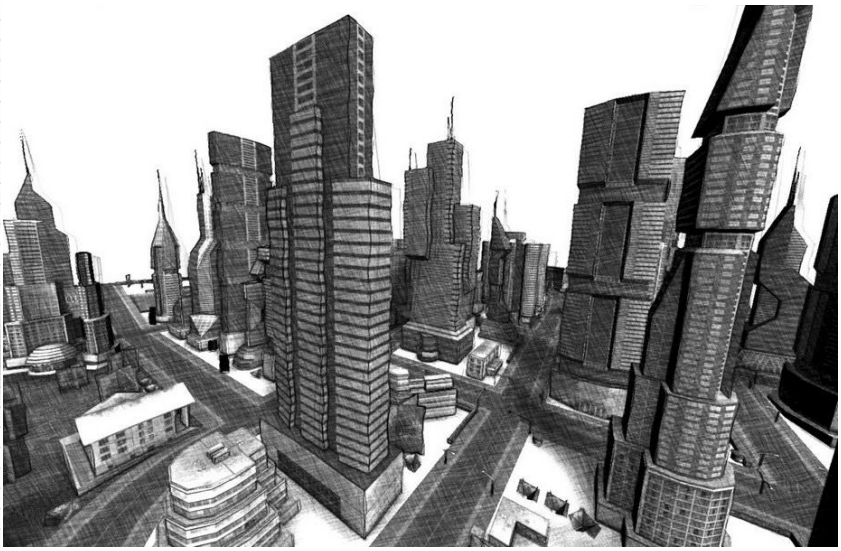

Abbildung 14: Pencil shader inspiration

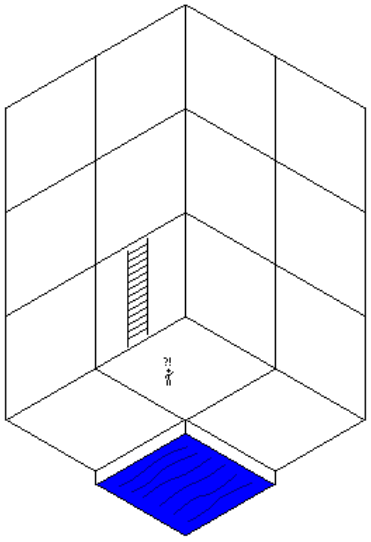

Abbildung 15: Isometric riddle

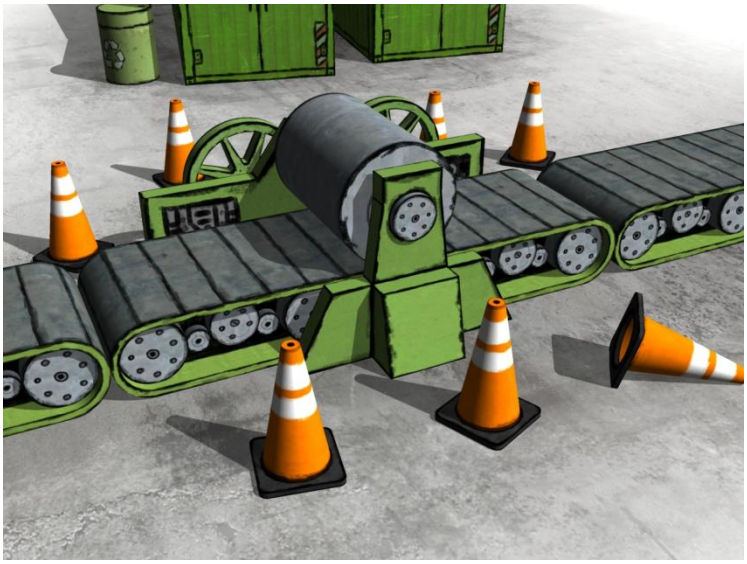

Abbildung 16: Texture inspiration