

Toon Dimension

Alpha Release

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1. What's new?

1.1 Graphics

The most important changes in graphics are the effects and the shadows. For the effects we use simple point sprites. This gives us nice looking results for fast moving particles as fire, explosions or snow flakes. But also effects far away like clouds profit from this technique.

For the shadows we use the shadow depth map approach, rendering the scene once for the light and once for the player comparing the depths to the light. We also played around with variance shadow mapping and different gauss blurs to improve the results. However, there are still open issues with a too low render target resolution and a broad clipping plane range caused by the size of the levels.

1.2 Controllers

Several control entities have been implemented and added to the game.

A mechanical enemy represented as a turret has been inserted as well as spawn points which spawn enemies. These enemies use a simple wander algorithm for a natural behaviour when not tracing a player.

Entities used to create puzzles and control the game flow as for example switches, elevators and doors have also been added and included into the maps.

Essential was also an event system that has been set in place. controllers are able to publish and receive events and act accordingly. To get a better control over those events, additional controllers were inserted that do things like, counting events and publish a new one after a certain number or controllers used to delay events by some amount of time.

1.3 Models

We've created some new models for enemies and props (sheep, penguin, flamingo) and there's been a great improvement in level design, fixing geometry, adding stuff to make them look more interesting and alive. Though there still needs to be done some work here and there. But the major part should be done.

1.4 Map Editor

As it turned out, the ray-casting algorithm of BEPU-Physics is very poorly implemented. The routines used in the map editor to select objects worked quite well while there were only a couple of objects in the scene, but turned out to be inaccurate when the map geometry became more complex. Because of this we had to work around and just made a list in the GUI with all available controllers that can be selected from there. It's not such a nice solution and would need some work if we were to use it for a longer period of time.

1.5 Sounds

Some sounds were integrated into the game. But still need some work. Especially in tuning the volume of the individual ones. We'll invest some more time there after this alpha release.

1.6 Characters

A varying number of animated characters can now be handled efficiently. Animation does not have to be recalculated every frame. Instead whole walk cycles are matched to an input trajectory. Skinning moved from CPU to GPU, while Motion Blending works well as a CPU-based

implementation. Finally, the character animation also runs on the XBox.

The locomotion generation got better, but there is still room for further improvement. Backward and “strafe” motions have no special implementations, since the head is rotated according to the viewing direction and therefore the body does not need a special orientation. Up to now the character was always in hurry. With this release a state is added to simply stand still and wait.

2. Problems

2.1 Shadow Map

We tried out the simple shadow map approach to make the visual aspect a little more ambitious. Since we have big levels with a wide sight, the render target in to which we render the shadow map is too small and we get aliasing. A further problem is also that the difference between the nearest and the furthest point to the light is too big for the render target format and we get there artefacts too. The artefacts partially disappear using a strong enough blur, but we have to try out different render target formats and sizes to improve the shadow quality.

2.3 Modelling

2.3.1 Maps

The work here was clearly underestimated. But we still managed to create four different maps. The most Maya turned out to be all right, but far from perfect to be used for this kind of task. But it probably wouldn't have been worth the effort to evaluate other tools as all the ones that were known to us suffered from more or less the same deficiencies. In a more serious game development where more content would have to be created, we'd probably have to extend our map editor to be able to create/edit geometry and texturing.

2.3.2 Characters

Setting up a good (automatic) content pipeline for the characters was still a time-consuming task for this release. The complicated integration of MotionBuilder for better skeletal animation data is discarded for now, but is still a promising option.

For better software design, the character animation is implemented as a self-contained framework, with no dependencies to the rest of the game. In fact this introduces some unnecessary complexity, which specifically results in some extra work to take care of the various game states and communicating events.

The fact that the .net framework of the XBox provides only a small subset of functionality also lead to additional work. For example serialization (used to significantly reduce the initialization times of a character animation model) using the BinaryFormatter was not possible, instead a solution with the very basic XmlSerializer had to be found.

3. Revisions

3.1 Game Design

The game design still holds as hoped for in earlier stages of the projects. The refactoring pays now off since the hierarchical model of the entities prevents us from writing the same code multiple times. Nevertheless, implementing a new controller at the bottom of the inheritance chain turned out to be delicate too, since the semantics of lots of other classes have to be taken into account.

3.2 Schedule

The problems stated in section 2 delayed the whole process so that we had to drop some of our fancier ideas and restrict ourself and making some simplifications. Therefore we dropped the idea of multiple weapons and complex enemies while focusing more on the puzzle part.

4. Schedule

The term (x/y) stands for x hours expected, in y hours realized. Green entries are additional work which has been completed, red terms are partially or not at all complete.

Date	Course Items	Peter	Christian	Nicola
24.02.		- FGP (3/3) - Sketches(2/2) - Mock up Scene (5/7)	- FGP (-/8)	- Design (-/4) - Skeleton (-/4) - Physics (-/16) - FGP (-/8)
03.03.	Formal Game Proposal	- Simple Map(10/8) - Meshload (5/4) - Ghost cam (-/3)		- Character Controller (20/15) - Power-Up Prototype (-/10)
10.03.	Mutual Project Critiques	- Project Critiques (1/1) - Simple Map editor (20/20)	- Project Critiques (1/1)	- Project Critiques (1/1) - Dimensions (15/15) - Box Controller (4/10)
17.03.09	Game Prototype, Functional Minimum	- Map-Modelling (5/3) - Map editor (15/13) - Refactoring (-/2) - Separating editor solution (-/5)	- Character modelling (12/4) - Prototype video (-/24)	- Bomb Controller (20/15) - Refactoring (-/15)
24.03.09		- Textures (5/1) - Mapeditor (15/15) - DM-Map (10/10)	- Animated character (12/6)	- Menu (20/12) - Character Controller (-/8) - Shader (-/3)
31.03.		- Textures (5/-) - DM-Map (15/-) - Introduction Map (20/20) - Map-Save/Load (3/3) - Mesh-Controller (4/4)	- Animation clip production (20/5)	- Multi Player (20/10) - Character Controller (-/10) - Pre-Alpha Tests (-/2) - Shader (-/3)
07.04.	Interim Report, Low Target	- Sound Effects (10/10) - Props-Modelling(10/3) - Map adjustments (5/5) - Interim Report (3/3)	- Realistic locomotion generation (20/25)	- Power-Ups (10/5) - Weapon (5/-) - Interim Report (5/1) - Interface (-/3) - Model Binding (-/5) - Menu (-/5)
14.04.		- Enemies (20/10) - Map-Editor (-/3) - Mapping (-/10)	- Several character models (16/10)	- Switch (4/6) - Elevator (8/8) - Door (8/2)

		- Event-System (-/5)		- Testplaying (-/2) - Camera (-/2)
21.04.		- Mapping (10/15) - Decorate (10/5) - Varia (-/5)	- Character actions (20/24)	- Puzzle controllers (20/5) - Shadows (-/16) - Enemy (-/5)
29.04.		- Mapping (15/20) - Music (5/2) - Debugging (-/5) - Graphics (-/4)	- Improved character rendering (10/2)	- Effects (20/10) - Basic AI (-/10)
05.05.	Alpha Release, Desirable Target	- AR-Report (5/1) - Balancing (10/0) - Controllers (-/10) - Mapping (-/15)	- Basic AI (10/15) - Intelligent bomb (6/-) - AR Report (1/2)	- Mech. Enemy (10/10) - AR-Report (5/3) - Adjustments (5/8)