Itzamná's Heritage

Mayan Red Light

Final Report

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1 Game Summary

1.1 Story

1.1.1 Background

The legend reports about the magical treasure of Itzamná – the well-known Mayan creator deity. The myth says that it is guarded by Itzamná's mighty eye. Its immeasurable value has tempted thousands of people to start a treasure hunt - none of them ended successfully... No one knows its exact location until one day, deep in the jungle, a mystical palace was discovered, a kind of royal temple, resembling a pyramid, an almost indescribable construction. It attracted many treasure hunters who strongly believed it to be the well-hidden location of Itzamná's treasure. They thought it would be a child's play to claim the treasure for themselves, but none of them ever returned...

We write the year 2010 when four independent teams started another attempt to find Itzamná's lost treasure. Each expedition team suffers of major losses and only the team leaders manage to survive the permanently present dangers of the deep jungle. Completely exhausted they arrive the very same day on a hidden jungle glade and are stunned from the catching scenery in front of them: The mystical eye of Itzamná is glaring threateningly from the top of the most beautiful Mayan pyramid they have ever seen.

1.1.2 Mission

From now on every second counts: Everyone wants to be the first to reach the pyramid and experiencing the glory of finding the lost treasure! The treasure hunters do not know any mercy and use every chance to fight down their opponents.
However, they also face a common enemy: The guarding eye is periodically watching attentively over the ground and sports the slightest movement. Of course, the wild river does not help in advancing quickly and additionally makes standing still a real challenge.
Whoever manages to find the best trade-off between speed, balance and cleverly making use of the given aids may outreach his competitors and reach the lost treasure.

1.2 Gameplay Summary

As one of up to four treasure hunters, each player has the goal to reach the pyramid - and hence the treasure - first. Equipped with previously chosen, powerful utilities they not only have to outplay their relentless competitors, but also avoid the guard's wrathful glare!

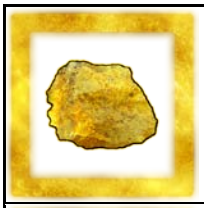
The players have to stand still by balancing (see section 1.4 on how to do that) whenever the guard is watching or hide behind a wall which are randomly placed in the playfield - otherwise, they will be punished and pushed back by a significant distance. The guard is randomly opening his eye and overviewing the game field.

Players are equipped with power-ups which can be applied to other players or oneself in order to gain an advantage over your competitors (see section 1.3).

1.3 Power-Ups

The following seven power-ups are available in the game and a player is allowed to have up to four power-ups in his inventory. In the initial backpacking screen each player is allowed to

arbitrarily choose three power-ups to bring on his adventure. Further power-ups are spawned during the game and are - attracted from the eye - floating from the back of the game field towards the guard. These power-ups can be picked up by any player. However, once a power-up is reaching the guard, it is applied to each player simultaneously (except for magnet and trigger guard).

	**Stone** If you throw a stone at another player he will be stunned for a couple of seconds. While a player is stunned he cannot move nor balance and is thus very vulnerable if the guard is watching.
	**Slow** Decreases the maximum speed of your target by 1 m/s but also makes it easier to balance.
	**Haste** Increases the maximum speed of your target. Allows to move forward at a higher speed (additional 1m/s). However, the faster a player moves, the more difficult it gets to balance.
	**Invisibility** Use this effect to get invisible and to hide from the guard for some time – but not from players. Be aware that you are not safe against punishment the very moment the effect wears off!
	**Confused** Inverses the movement directions of the affected player. Left becomes right, back becomes forward and vice versa. However, balancing is not affected by this power-up.
	**Magnet** The usage of this effect applies a force to the two affected players (thrower and victim) pushing them towards each other. The bigger the distance between the player, the bigger the effect
	**Trigger Guard** This power-up is thrown towards the guard and immediately awakes him upon impact. There is no explicit pre-watch time, but the sprite flying in the guard's direction provides more than enough time to prepare.

1.4 Controls

1.4.1 General Controls

Action	Game Pad	Keyboard
Pause Game	Back	Esc / P
Restart Game immediately	-	R
Quit Game immediately	-	Q
Toggle Fullscreen (only on PC)	-	F
Disable Guard Punishment (only on PC)	-	F1

1.4.2 Backpacking

Action	Game Pad	Keyboard
Select Player	Color Buttons	{1, 2, 3, 4}*
Validate Selection	Start	Enter
Switch Power-Ups	Left Thumbstick	Left/Right Arrow Keys
Add Power-Up to Backpack	A	Space
Remove last power-up	B	Backspace
Validate Backpack Selection	Start	Enter
Quit Menu	Back	Escape

[*] Note: 1 = Green, 2 = Red, 3 = Blue, 4 = Yellow

1.4.3 Game Controls

Action	Game Pad	Keyboard
Move	Left Thumbstick	Arrow keys
Sprint Mode	Right Shoulder	S
Balance Mode	Left and Right Trigger simultaneously	Space Bar
Balance	Left Thumbstick	Arrow keys
Switch current Power-Up (previous/next)	Right Thumbstick	K / L
Apply Power-Up	Color Buttons (color corresponds to target player)	{1, 2, 3, 4}*

[*] Note: 1 = Green, 2 = Red, 3 = Blue, 4 = Yellow

There is also an instruction screen explaining the commands visually:

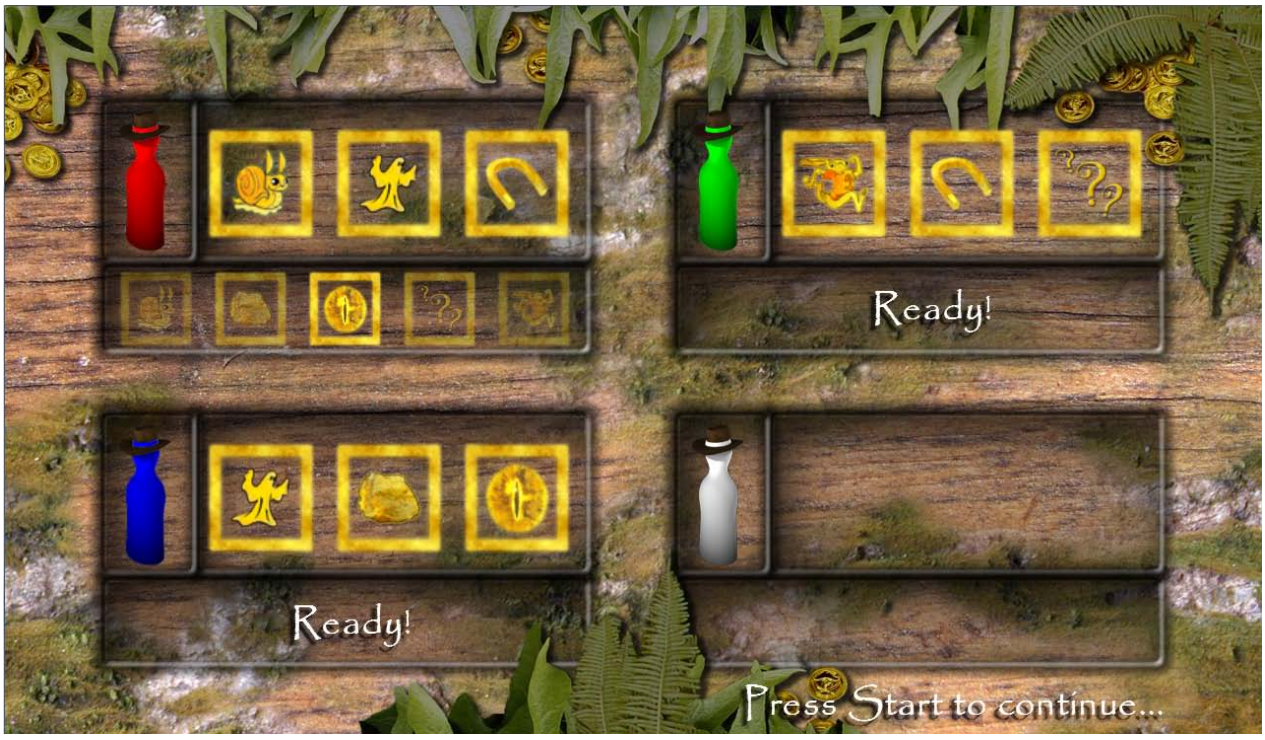
2 Changes since Alpha Release

We implemented the following changes since Alpha Release:

- Backpacking Screen
- Evil Shader & Shadow Map
- Improved Water
- Waterfalls
- Invisible Shader
- Turning Guard Eye
- Game Winning Screen
- Power-Up visualization on application
- Additional Power-Ups (magnet, trigger guard)
- Power-Up Spawning / Guard using Power-ups

2.1 Backpacking Screen

One major change we implemented after Alpha Release was the backpacking screen. In that screen, each of the (up to) four players can choose his colors and subsequently three items to initially bring on his adventure.

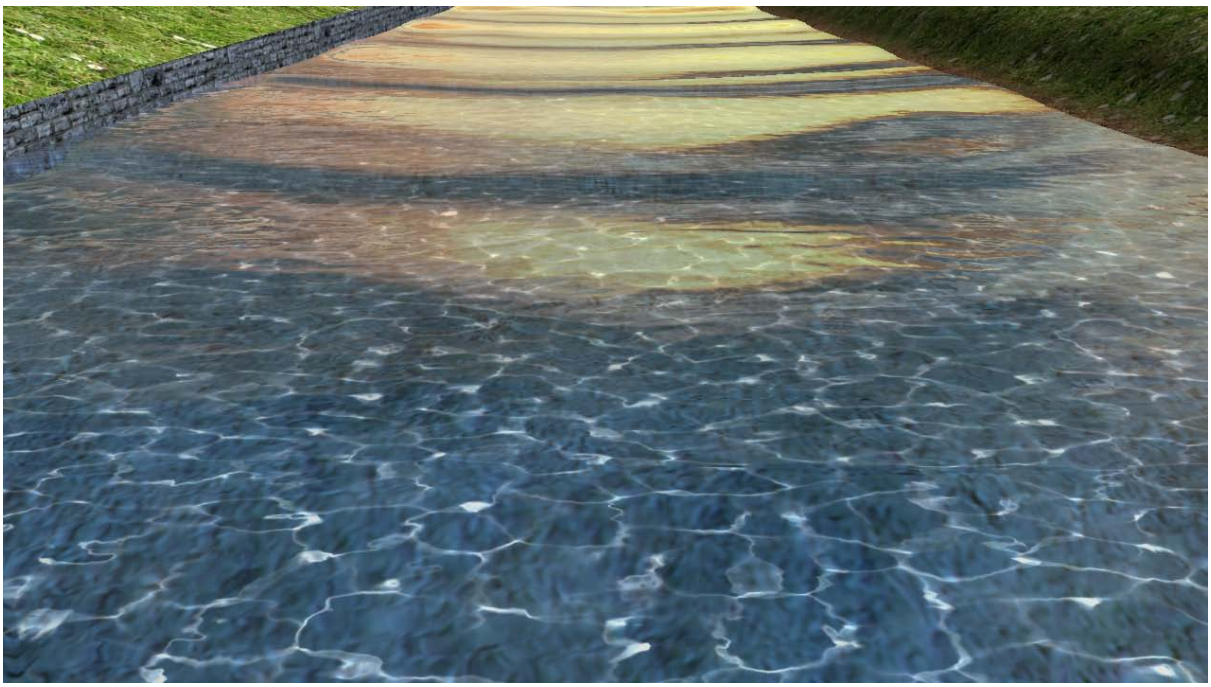


2.2 Evil Shader & Shadow Map

When the guard was watching, we added an evil-looking texture to the scene representing the light shining through the guard's eye and included a shadow map to visualize where the players are save to stand when the guard is paying attention.

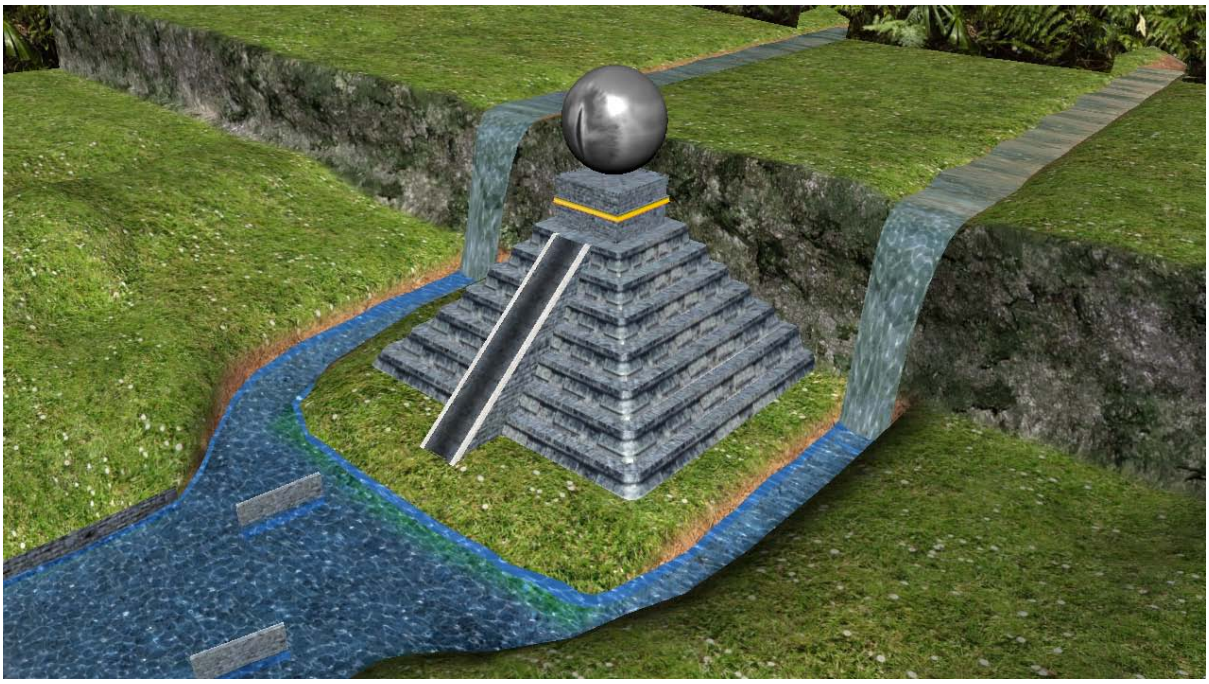
2.3 Improved Water

The look of the water was significantly improved. Mainly by the introduction of a caustics map and a bug fix in the bump map.



2.4 Waterfalls

Waterfalls were added to the scene to increase the beauty of our jungle glade.



2.5 Invisible Shader

In order to indicate that a player is invisible, we added an invisible shader which basically mirrors the skybox to achieve a distinct visual effect.

2.6 Turning Guard

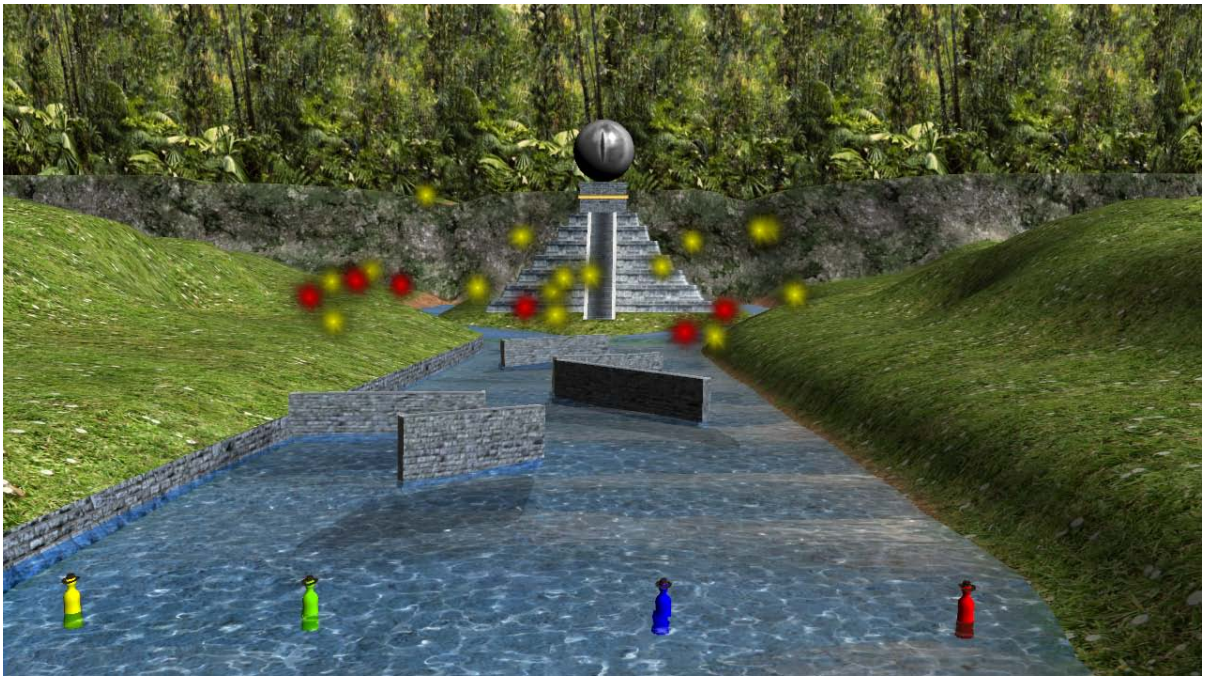
In order to add another dynamic element to our game, the eye is now turning when it is watching.

2.7 Game Winning Screen

To improve the winning experience, we added a game winning screen displaying the victorious player with the treasure.

2.8 Power-Up Visualization

When a player is shooting a power-up, a sparkle visualizes its path to the target player (or guard) and the effect is applied on impact. The color indicates the player triggering the power-up. The following screenshot is not a realistic game event, but visualizes an artificial event where tons of power-ups are used simultaneously.



2.9 Power-Up Spawning / Guard using Power-ups

A few seconds into the game, power-ups start spawning in the back and are attracted towards the eye. These can be picked up. Alternatively, if one reaches the guard the effect is applied to all players, i.e. a glimmering sparkle is shot towards all players. The spawning is demonstrated in the screenshot of the Evil Shader & Shadow Map.

3 Experience during Class

After hundreds of hours of challenging yet interesting work, we are very excited to present our results to the impressive crowd. As probably many other groups, we had our ups and downs.
In the beginning, it was rather frustrating to see the other groups proceed much quicker than we did, as we decided to invest a lot of time in planning and hence would not face any major problems towards the end. In addition the time spent implementing our own physics engine was much lager than expected. However, we did not get discouraged and decided to stick to our initial ideas and were able to catch up with all the time lost initially. Especially during this time, we had many positive moments as the game steadily improved from day to day. Eventually we were able to catch up with our initial schedule.

In the end, we achieved all our desirable targets and could even implement many of our high targets which was really satisfying. The only major design revision done was the decision to skip the shallow water simulation as we spent more than enough time on the physics engine. However, using a plane with displacement map, bump map, caustic and refraction map plus a reflection skybox lookup resulted in a really good looking water in the end.
Furthermore, after we had the core gameplay implemented, we decided not to go for our high targets in that area, but wanted to improve the visual appearance. Consequently, we focused on some advanced shading effects, i.e. evil shader, shadow mapping and added some improved models to the game. The reason for that revision was that we felt that the game was already rather complete and additional power-ups and sophistication (such as control over guard, escaping with treasure, …) would just be too complex for the players, keeping in mind that we intended to produce a simple, funny game. In other words, an improved visualization was considered to improve the fun-factor more than additional game play components.

There was also quite some deviation concerning the task assignments. In the end, Thomas was responsible for the physics and modeling, Silvan for the game logic and Marcel for shading. This change was rather reasonable, since it is much more efficient if one person can focus on a narrower part of the project.
Although the different parts were assigned to specific team members, we were always able to understand and influence the development in all the areas since most of the time the three of us worked together in CAB H57.

Our opinion is split about the project structure. On one hand, we think it was a pain to write down all the changes etc. and then listen to all the groups presenting it. On the other hand, it probably helped to keep up with development process and enabled us to realize when we were far behind schedule. Maybe, the presentations in parallel to our reports could be omitted and the course could be filled with more useful talks about shading (please! Much earlier in the course!!!) etc.

4 Personal Impression

Our general impression of the course is really good. We had a lot of fun solving challenging problems. We were aware in advance that there was going to be a huge work load and also considered that in our study plan for that semester. Hence, we worked a lot – probably the highest hours/ECTS ratio of any course until now – and came up with a really cool game which provides a lot of fun, but is also visually good-looking and we can honestly say that we are proud of our result.

Of course, the schedule was really tight, but considering the scope of the course it was reasonable. One consideration is to split the course into two semesters. The first semester could be the introduction of the general concepts including minor examples (XNA or HLSL) and in the second term the game could be implemented.

There was one bad thing about the schedule though. Some lectures came far too late in the course. Especially the shading should be within the first few weeks. We eventually ran into problems with our architecture, since we were not aware of the usage of effect files.