ANCIENT

Report

Universitetet i Agder

DAT 215

David Kunzmann, Daniela Šťastná, Tarek Rahou, Yin Liu, Patrik Madsen

December 5, 2015

Contents

1 Introduction

In the following we discuss and document the progress and finalisation of a programming assignment concerning creation of the game Ancient. We completed the game in the course of winter semester 2015/2016. For detailed description of the game design, please refer to the Design Document.

2 Abstract

This report documents and evaluates the development process of the game Ancient. It is complemented by the Game Design document which explicitly describes all game elements and their united interaction. The Ancient is an online JavaScript game which makes use of isometric design. The game consists of dialogues and turn-based battles with no main characters.

Brief game summary:
The game takes place in year 2718 anno domini, the White Spacecraft Laboratory is the biggest research center of the galaxy, built by the Galactic Government. It's a place where scientist from every planet come and contribute to the scientific society. A team of scientists had been working on a project, that if successful would revive an extinct and highly powerful life form. The outcome was terrible as the creatures rapidly created chaos throughout the ship which eventually crashed on an unknown wild planet. The scientists who survived this disaster are being persecuted by the Galactic Government which doesn't want any witnesses. In the single player game Ancient you are in charge of the surviving scientists.

2.1 Abstrakt

Denne rapporten dokumenterer og evaluerer, utviklings prosessen av spillet Ancient. Rapporten komplimenteres av spill design dokumentet som egenhendig beskriver alle spill elementer og interaksjoner. Ancient er et online enkeltspiller JavaScript spill som tar I bruk isometrisk design. Spillet består av dialoger og tur for tur kamper med ingen hovedkarakter.

Kort oppsummering av spillets historie:
Ancient finner sted I år 2718 anno domini. Det Hvite Romferge Laboratoriet er galaksens største forskningssenter. Utviklet og produsert av den Intergalaktiske Regjeringen. Romfergen er en plass der forskere fra hele universet kan bidra til det vitenskapelige samfunn. Et forsker team jobbet på et hemmelig prosjekt, der om de lyktes ville bringe tilbake en utryddet og ekstremt kraftig livsform. Prosjektet tok en horribel vending ettersom livsformen hurtig svarte aggressivt og spedde kaos om bord fergen som til slutt krasjlandet på en ukjent ubebodd planet. Forskerne som overlevde katastrofen blir nå forfulgt av den Intergalaktiske Regjeringen som ikke vil ha noen vitner om hendelsen. I enkeltspiller spillet Ancient er du ansvarlig

for overlevelsen av forskerne.

2.2 Kurzfassung

Dieser Bericht dokumentiert und evaluiert den Entwicklungsprozess des Spiels Ancient und wird von dem Game Design Dokument ergänzt. Dieser beschreibt explizit alle Spielelemente und ihr Zusammenspiel. Ancient ist ein im JavaScript entwickeltes online single-player Spiel, welches auf die Nutzung von isometrischem Design setzt.

Kurze Spielzusammenfassung:
Das Spiel spielt sich im Jahre 2718 anno domini ab, das White Spacecraft Laboratory ist das größte Forschungszentrum der Galaxie und wurde von der Galaktischen Regierung errichtet. Es ist ein Ort an dem sich Wissenschaftler aller Planeten treffen um dem Gut der wissenschaftlichen Sozietät beizutragen. Ein Team von Wissenschaftlern hatte an einem Projekt dessen Ziel es war eine äußerst mächtige Lebensform wiederzubeleben gearbeitet. Das Resultat war furchtbar - die Kreaturen verursachten auf dem Raumschiff einen Riesenchaos, der letztendlich zum Absturz auf einem unbekannten wilden Planeten führte. Diejenige Wissenschaftler die diese Katastrophe überlebten, werden von der Galaktischen Regierung verfolgt, die um die Eliminierung aller Zeugen bemüht ist. Im single-player Spiel Ancient übernehmen Sie die Rolle der Wissenschaftler.

2.3 Résumé

Le rapport suivant documente et évalue la procédure de développement du jeu Ancient. En complément, se trouve le document de Game Design qui explicite de manière détaillée tous les éléments compris dans le jeu ainsi que leurs interactions. Ancient est un jeu au design isométrique, mono-joueur, en ligne, développer en JavaScript. Le jeu est composé de dialogues ainsi que de batailles au tour par tour.

Synopsis:
Le jeu se déroule en l'an 2718 Anno Domini, le White Spacecraft Laboratory, créé par le Gouvernement Galactique, est le plus grand centre de recherche de la galaxie. C'est un lieu d'échange ou des scientifiques de toutes planètes apportent leurs contributions, au monde des sciences. Une équipe de chercheurs travaillant sur un

projet qui, en cas de succès, redonnerait la vie à une forme de vie éteinte possédant de gigantesques pouvoirs. Malheureusement, le résultat de cette expérience fut la création d'une créature semant le chaos dans le vaisseau qui finit par s'écraser sur une planète sauvage. Les scientifiques, ayant survécus à ce désastre, sont à présent persécutés par le Gouvernement Galactique qui ne veut laisser aucun témoin de cet échec. Dans ce jeu mono-joueur vous êtes à la tête de l'équipe de scientifiques.

2.4 摘要

报告描述和评估了游戏Ancient的整个创作过程。其中，作为补充文档的游戏设计文档明确描述了所有游戏元素及联合互动。Ancient是一个线上单人JavaScript游戏，使用等距设计。游戏包含了对话、没有主要角色的回合制战斗。

游戏简述:
游戏发生在公元2718年，White飞船实验室是有Galactic政府建立的银河系最大的研发中心。来自各个星球的科学家都会来这进行科学研究。其中一组科学家正在进行一个致力于成功复活已经灭绝的具有超强力量的生物的项目。项目结果十分可怕，研发出的生物迅速在整个飞船上引发了混乱，并最终在一个不知名的野生星球上坠毁。在这场灾难中存活的科学家被Galactic政府迫害，因为他们并不想留下证人。在这场单人游戏Ancient中，你就是负责这些存活的科学家。

2.5 Abstrakt

Táto sráva podrobne dokumentuje a evaluuje vývoj hry Ancient. Je doplnená Game Design dokumentom, ktorý detailne rozoberá jednotlivé elementy a ich výslednú súhru. Hra Ancient je online hry vyvinutá v JavaScripte využívajúca izometrický dizajn. Je založená na striedavých ťahoch hráča a počítača, pozostáva z dialógov a bitiek, pričom nemá hlavných hrdinov.

Stručné zhrnutie herného deja:
Hra sa odohráva v roku 2718 anno domini, White Spacecraft Laboratory je najväčšie výzkumné laboratórium galaxie vystavané Galaktickou Vládou. Je to miesto kde sa výzkumníci z celej galaxie schádzajú, aby prispeli k vývoju vedeckej spoločnosti. Tím vedcov pracoval na projekte, ktorý mal za cieľ oživiť vyhynutú extrémne mocnú formu života. Výsledok bol strašný - monštrá spôsobili na vesmírnej lodi obrovský chaos, ktorý viedol k jej stroskotaniu na neznámej divokej

planéte. Vedci ktorým sa podarilo prežiť sú prenasledovaní Galaktickou Vládou, ktorá sa snaží elimovať všetkých svedkov. V single-player hre Ancient hráč preberá rolu vedcov usilujúcich sa o holé prežitie.

3 Development process

3.1 Versioning and file sharing

To ensure appropriate and reliable versioning during the development process, we used GitHub for the source code. For sharing of other documents and graphic assets we predominantly used to OneDrive, sometimes also Google Docs in order to be able to co-write files simultaneously.

4 Scrum

During our game development we used a slightly altered version of Scrum. The main change was, that since there was no product owner we deployed a mixed version of team consulting democracy and game requirements provided by the university for formulating and prioritising requirements. Another change was we didn't hold daily scrum meetings in the early phases of the project development as it wasn't possible due to capacities of our human resources. However, we did use daily scrums in the final stages of product development. During the early and mid-phase of the project development we had weekly scrum meetings. The main priorities of the next project iteration were always set, as well as the product backlog was updated. David Kunzmann was selected as responsible Scrum master. Each team member was assigned tasks, which accomplishment was briefly reviewed in course of the following scrum meeting. In order to secure software quality we organized one sprint review meeting monthly. We refrained from using a burn down chart.

5 Graphic design

Our team had a strong graphic designer base, since two of our members follow majors in design/ closely to design related studies. This allowed for wider scale of game characters. Despite this since the aim of the project was to develop a platform independent online game, resolution and size of graphic assets deployed was significantly limited which led to design of aiming for pixel art.

6 Source code

Ancient is a game developed using JavaScript. For this project we decided to create our own engine.

- **The engine**
  The engine created for Ancient is basic but offers the possibility to load assets (Asset Manager), to switch through different scenes and levels and also load and play sounds. The creation of level is also facilitated, as a level can be created in a text file. In this case the level is represented as a two dimensional array of number. Each number represent a texture of a tile in a sprite sheet.

- **Object oriented**
  In Ancient the character classes are based on one main class Environment. This hierarchy gives use the possibility to use default behaviour. The same hierarchy is used for the level and the scene classes. As JavaScript is not strongly typed, we could have omit the inheritance, but in our case, it is used to simplify the code and inherit attributes.

- **Command pattern**
  For the character to execute actions, we implemented the command design pattern. Our implementation does not include the possibility to undo actions, but it is easily scalable and adding action is fast and easy.

7 Sound

The main sound theme of the game was created by David Kunzmann who has professional background in this field, what enabled him composing to the this. For level specific game ambience we decided to use third-party sound assets, as recording of nature sounds on our own would have had diverted us to a great scale from our main focus.

8 Correctness and Testing

All members of the team were involved in the game testing, both in the earlier phases of development and in the final phases. We put great focus on intuitive

game control and it was important that in every stage it was clear also to non-development faction which which causalities follow all actions without any explicit explanation. Every bug discovered was reported and listed in the bugs backlog until successfully fixed. Due to browser diversities we tested predominantly on Mozilla Firefox, which is due to its developer friendly approach our preferred browser.

9 Further Ideas & improvements

- **Animations**
  Creating animations for each actions is one of the most important feature we could add to our game. Making the environment move would give a life to Ancient.

- **Map**
  Having map bigger than the screen and having a controllable camera is one of the improvement we would love to look into.

- **Inventory**
  Creating an inventory for the characters and the possibility of equipment management would be a big plus in our game. This feature would require also a system of loot.

10 Post Mortem

10.1 Project description and specification

Work group members and their fields of responsibility:

- **David Kunzmann** - responsible project leader, main software and sound assets developer

- **Daniela Šťastná** - main project planning and risk management, quality securing & documentation department

- **Patrik Madsen** - chief graphic designer, main surface assets developer

- **Tarek Rahou** - main script writer, responsible for story consistency

- **Yin Lui** - main character assets developer

Project start date: 1.9.2015

Project alpha version completion: 12.11.2015

Project beta version completion: 19.11.2015

Project completion date: 5.12.2015

10.2 Project schedule

- **Beginning project phase - from 1.9.2015 until 21.9.2015** - analysis, Product specification, requirements, model planning, defining milestones
- **Project early mid-term phase - from 22.9.2015 until 31.10.2015** - assets development, engine core, story setting, main graphic assets
- **Project late mid-term phase - from 1.11.2015 to 19.11.2015** - project prototyping, music and other assets, more specific graphic assets, alpha version
- **Final development phase - from 20.11.2015 to 5.12.2015** - testing, refining, debugging, writing post mortem and finalisation of documentation

10.2.1 Performance according to schedule

In some stages of the development we had to sacrifice certain features for securing the completion of the product within allotted time. If some of the features was omitted in any stage, it was always listed down in product backlog.

10.2.2 Key Accomplishments

- Development of own game engine
- Scaled hexagonal tiles - accounting for pleasant isometric design
- Game portability - online game
- Clever game screen space administration - decent trade-off between screen size and game load speed

- Original game assets - own design assets
- Own main sound theme
- Deep background story - sophisticated background story

10.2.3 Key Problem Areas

- **User Input Management** (lacking scalability)
  The user inputs are managed through event Listeners added to the canvas. Those events are added and remove with every scenes. The problem we encounter with the user input is the scalability. This is specially true for the inputs during the battles. This is due to the fact that during battles we are looking for a sequence of input and not only inputs. The order of the mouse clicks being relevant it may take a lot of work to insert a functionality in the middle of this sequence.

  For example a basic input would be : Selecting a character ->clicking on an action (MOVE or FIRE) ->clicking on a tile or on another character. In this scenario adding an action is not a problem but adding for example the possibility to select two characters at the beginning could take lot of time.

- **User Asset Management for files** - lacking scalability
  The asset managing is a huge part of the engine of the game, and one flaw we see in it, is located in the loading of files using XMLHttpRequest. For these requests it is not possible to work with a promises pool as we did for the loading of images for example. In order to keep the promise pattern working we opted for just a single promise for file. One way of making work with multiple files would have been to create an array of XMLHttpRequest instead of an array of promises.

- **Character**
  The classes representing the characters and environment are based on simple Object Oriented hierarchy. Another way of implementing it would have been by using the entity component design. Which give us more flexibility and also less code. Sadly we didn't know about this design pattern before it was too late in the development of the game.

- **Optimisation** - due to higher prioritising of other tasks we weren't able to finish this to our satisfaction

- **File Naming Conventions** - realisation this might cause problems came too late

10.2.4 Challenges

- **Team Communication** - different level of English, different cultural background and references
- **Game Engine** - very little previous experience
- **Post Mortem** - no previous experience with this type of report
- **Lack of previous game development experience**

10.2.5 Risk Management

- **Planning** - attempt to mitigate risks of non-fulfilment of requirements and product goals due to time delays, multiple meetings for readjustments of time management
- **Regular Scrum** - to ensure stable and reliable communication flow
- **Prioritising** - higher prioritising of more essential and more complex task in early phases of development

10.2.6 Overall Project Assessment

Criteria	Score
Testing for goals	1 2 3 4 5 6 **7** 8 9 10
Performance according to schedule	1 2 3 4 5 6 **7** 8 9 10
Performance according to quality	1 2 3 4 5 6 **7** 8 9 10
Project planning	1 2 3 4 5 6 7 **8** 9 10
Project management	1 2 3 4 5 6 **7** 8 9 10
Development	1 2 3 4 5 6 **7** 8 9 10
Communication	1 2 3 4 **5** 6 7 8 9 10
Team cooperation	1 2 3 4 5 6 **7** 8 9 10
Project deliverable	1 2 3 4 5 6 **7** 8 9 10

10.2.7 Key Lessons Learned

- **Software development & co.**
  - **Inheritance in JavaScript**
  - **Proper way of programming character classes**
  - **Dealing with asynchronous requests (Promise pattern)**
  - **Precise formatting of canvas texts**
  - **Advanced Latex formatting**
- **Other**
  - **Team management** - clear formulation of the issues
  - **Team communication techniques**

New experience implemented

Our newly gained skilled listed in the previous section are visible in use of inheritance in the source code, better management of the assets used and nicer layout of Latex documentation.

10.3 Evaluation

On conclusion we state fulfilment of our major project goals and completion of solidly working and well documented game prototype. In spite of communication issues in some project stages we managed deliver owing to reasonable project planning and reliable time plan. Major lecture for future projects is to put even more emphasis and efforts into workable communication and team building. There are still a handful of areas we would have liked improving before final delivery, however we still find our final product satisfactory.

11 Conclusion

All in all the Ancient game is decently working game with some fun factor a good possibilities for further development. This game can be found on:
http://ancientthegame.byethost31.com/index.html.
Furthermore we provide good game design documentation and project work report. The game itself is thoroughly tested and performs as expected. Current version is a fully functional and playable prototype, which leaves good opportunities for further development and embellishment. We conclude fulfilment of project goals and great augmentation of our professional skills and experience.

12 References

- Drawing formatted text on the canvas :
  http://www.canvastext.com
- Implementation of an HashMap Christophe:
  http://stackoverflow.com/questions/368280/javascript-hashmap-equivalent
- Implementation of hexagonal tiles :
  http://www.redblobgames.com/grids/hexagons/
- Base code for the asset manager from Seth Ladd:
  http://www.html5rocks.com/en/tutorials/games/assetmanager/
- Post Mortem Guidelines & template:
  https://lastbytes.wordpress.com/2013/01/15/a-postmortem-template/
- Background sound assets sources:
  http://www.sounddogs.com
  http://www.tabletopaudio.com
- Powerpoint template:
  http://www.51pptmoban.com/
  http://www.wallpaper4k.com/de/wallpaper/raum/wpw9s373.html