

SCHOOL OF COMPUTING

UNIVERSITY OF TEESSIDE

MIDDLESBROUGH

TS1 3BA

Beats of Rage

BA Hons Computer Games Design

Lewis Simon Preen

18/02/2018

Supervisor: Ian Sturrock

Second Reader: Jamie Smith

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ABSTRACT

This report was written to document the development and creation of my final year project. I wanted to challenge myself to create a type of game I have never made before, using blueprints and techniques that I haven't fully learnt, but also utilising the skills I have developed over the past 5 years between college and University. I knew because this was a new challenge for me I would have to keep myself highly motivated for the few months that I would be producing this product. This was because I have a tendency of being a perfectionist, if something isn't to my liking, I can get overly critical of my own work and stressed, which has resulted in deleting an entire section of production and starting again.

The game idea I went with was creating the basic mechanics of a retro 2D side-scrolling beat-em up and transforming them into a 3D game. My reasons behind this was because I am a fan of this type of game growing up in the 80's and constantly hammering money into arcade machines. It was also something that I have never attempted before and as mentioned above was a fresh and exciting challenge for me.

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Jamie Smith

Supplied me with advanced game design techniques, especially within the UE4.

Matthew McGrory

Another tutor who taught me fundamentals of games design but was also support on this project if I was ever stuck with blueprint scripting.

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1 INTRODUCTION

Beats of Rage is a final year project that aims to take classic arcade 2D side-scrolling beat-em ups such as; Golden Axe, Streets of Rage (where this project takes its name from) and Teenage Mutant Ninja Turtles take their mechanics and showcase them in a 3D format that can be utilised to create games and levels.

This project mainly focuses on the working mechanics in a 3D environment in the Unreal Engine, that can allow creators to download the showcase mechanics and apply them to their own projects, so they can create their own games and levels using the mechanics created in this project.

1.1 Deliverables

For this project to be successful, I had to make sure that I set deliverables that were achievable, especially when I was working on creating my own blueprint scripting and design mechanics I had never worked with before. I also placed in deliverables that I could accomplish if I had time and the main part of the project was completed to my expectations.

Achievable Deliverables

- Player mechanics that include a melee combo system.
- Fully working HUD, that includes score and a level timer.
- Character Select Screen.
- Enemy AI that has a similar combo or random attack generator to player.
- Main Menu and UI System
- End of level score and end of game score with scoreboard
- Mechanic showcase
- One fully playable level
- Deployable .exe

Extra Deliverables

- Up to three playable levels.
- Have custom artwork.
- Multiplayer.

2 RESEARCH REVIEW

Due to the nature of this project, it was important that the brunt of the research went into gathering inspiration from existing sources that have been successful and try to replicate them for the project in a way that looked and felt different. Also, research about what can be achieved in the Unreal engine has to be investigated, so the limitations of the engine are brought forward, especially when working solely on blueprint scripting and not coding

2.1 Source Material

Arcade Classics

(All the games reference I either played as I own original copy, or I played via emulators)

Double Dragon (1987) - the first mainstream arcade game to cross platform from arcade machine to console. When playing this game, the first thing I noticed was that the players HUD was across the bottom of the screen, the timer counted down every 2 seconds and the players combo system varied each time the player attacked and enemy, from a mix of punches and kicks.

Realistically thinking, without the skills to use the animation blend space in UE4, considering using a simple combat system would be the best option, however, implanting this once when there is time is definitely an option.



Figure 1 – Double Dragon, Technōs, Japan (1987)

The HUD at the bottom of the screen seemed more of a distraction than a helpful tool, especially with all its contents. It doesn't really cater for a beat-em up style game, but as this was one of the first mainstream beat-em ups it is understandable that it was placed there due to trial and error. When creating the HUD following the more modern layout and have the HUD across the top of the screen, seems more beneficial especially as it is what modern gamers are used to.

Also noticeable about this game is the player cannot jump they can only move around the plane of the battle space.

Golden Axe (1989) – The first beat-em up to introduce more than one type of attack as well as mountable creatures, that also had a variant attack, for example; the dragons could either spit a fire ball or a flame depending on the colour of dragon. The players two attacks were main combat and a special ability which could have up to 7 different actions depending on which character you selected each with its own animation.

Unlike Double Dragon you can also choose your character, in Double Dragon you are given Billy if you are player one or Jimmy if you are player two, where as in Golden Axe you can choose from either Ax, Gillius or Tyrus. Each one of these characters also has a distinctive look, build and height, playstyle and height again unlike Double Dragon where Billy and Jimmy are the same mechanics just one is red and one is blue.



Figure 2 – Golden Axe, SEGA AM1, Japan (1989)

The main thing that stands out from Golden Axe and Double Dragon is the HUD it splits it between the bottom and the top of the screen. The players health is big and bold taking up the bottom of the screen and their special ability sits in the top section of the screen. This seems like it would be again a slight distraction as in moments of then game when you are forced to use your special early but are focusing on your health due to the number of enemies on the screen at once, the player could be constantly moving their eyes up and down the screen rather than focusing on the action of the game and having a brief look at HUD.

Unlike Double Dragon though, Golden Axe doesn't feature a level timer meaning the player can take as much time to combat enemies, which does take a certain aspect of fast paced action out of the game, which is a shame considering in the late 80's early 90's SEGA were advertising their Megadrive/Genesis system as a fast-paced console with games such as; Sonic the Hedgehog.

Streets of Rage (1989) – Streets of Rage is the main source of inspiration for this project, it is probably the most well known side-scroller beat-em up. The game improves on the HUD system of both Double Dragon and Golden Axe by placing everything altogether. This is more visually appealing to the player and as mentioned earlier a lot of modern games use this system, that's seems to have been adopted from Capcom series' such as; Final Fight and Street Fighter Streets of Rage's time system runs on a 4 second delay, so every time the unit goes down by 1, 4 seconds have passed. Time is added to the game every time the player defeats a set number of enemies and continues along the screen.

The players special is shown as a number which is different to Golden Axe in that there is nothing to collect you are given it when you hit a specific score in the game and there is no variant each character has the same special.

The game has a nice immersive feature that uses foreground images that the player walks behind, be very nice to add this effect into the 3D game, to make the street more realistic. Another aspect that I think would be interesting to do is allow the

player to walk down alleyways in street levels, there doesn't seem to be a game on the market that is a side-scrolling beat-em up that does this.



Figure 3 – Streets of Rage, SEGA AM7, Japan (1991)

The character select screen in Streets of Rage is very user friendly, it explains character abilities and also give a brief animation reel of the characters combat motion.



Figure 4 – Streets of Rage, SEGA AM7, Japan (1991)

2.2 Technical Research

I have using UE4 throughout the entire 3 years at Teesside University and 1 year prior at Darlington College, so I have had a lot of hand on experience with various blueprints engine techniques. There are a few areas I have never touched but luckily enough the Unreal website has a lot of UE4 documentation to help anyone from any level of experience. Because of my knowledge in specific area that I have already worked on be it GUI or level design, I think the beginning process of the project will be done to a satisfactory level.

However, I have not really touched character animations or blendspaces, so I will be learning this as I go along, I do feel this may hinder the production of the project, but I wanted to challenge myself and do something different. Not only this but speaking with peers on the project a lot of people were doing First-person type variants and I wanted something different that was going to stand out.

I have also looked at Reddit and YouTube for assistance as there is a lot of free resources out there to help game design creation. However, I only want to use these as a last resort and focus mainly on creating my own blueprints, using them as assistance if I make mistakes. Especially when I start working on character animation importing and blending

A couple of these users include “Titanic Games”, “Moize Opel” and “Unreal Tefel”.

Software and Tools

Adobe – I intend to use Adobe products to help create my game for the art side of the game. Currently the plan is to focus on the game mechanics and the art work is an afterthought, but I can use basic art for items such as; Menu, HUD, Character Select screen etc in Photoshop. Another Adobe product I could utilise is Premier Pro, to create a trailer for the game or a game intro which can be converted into the Unreal Engine. However, there is a limitation to the engine that won’t allow 1080p videos only 720p.

Audacity – Audacity is a free source audio software editing studio in which I can compose and create my own sound effects. I can trim down music for sound cues.

Microsoft Office – I will be using Office to collate all my documentation via Word. I could use Excel to create a timeline chart and PowerPoint to create presentations for the year such as the Proposal and Product review.

Unreal Engine – As I have already stated I am creating this project in the UE4 engine using either version 16.3 or 17.2 as they are the two main versions running in the University, whereas at home I am running up to 14.9. If I was to use a newer version

compared to the University, this would limit the amount of accessibility I could have meaning I would be stuck doing the project at home. This is because the projects can easily be ported to a higher version sometimes with no faults, but to lower the engine can cause a lot of problems.

3 DESIGN

3.1 Concept Design and Planning

Due to starting the project two weeks in from being behind in semester one there wasn't really have time to focus on a core concept for the project. Due to the amount of research done on previous games with a similar nature and knowing the game was going to be a simple side-scroller, meant level design wasn't particularly needed as the level could have just been one long walk with enemy spawns and waves at certain junctions, very similar to the original Streets of Rage game. This meant that the focus was on the actual mechanics needed for the game that would make the game come to life.

Desired Mechanic List

Side scroll character moving in 8 directions
Health System
Power Special Move System
Score
End of Level Score update
Level Timer
Lives System
Melee Combat
Melee Combo
HUD that shows off all the above (except melee)
Enemy AI
AI to finds player and roams otherwise
Enemy combat
Character Select Screen
Menu that uses controller

Planning

Week 1	Generate Ideas
Week 2	Get feedback from tutor and peers about ideas and create proposal
Milestone 1	Proposal Submission
Week 3	Start Work on white box and character animations
Week 4	Finish white box level and character animations. Begin on enemy AI
Week 5	Work on enemy AI and start on User interface
Week 6	Both user interface and enemy AI completed, Start on scoreboard
Milestone 2	Progress Review
Week 7	Finish off scoreboard and work on timer
Week 8	Finish off timer and being to flesh out level, so spring break can be used to rest
Week 9	Flesh out level and create .exe for peers to test for feedback. If time create a white box for level 2 or a boss area.
Week 10 – Week 12	Spring-break, have contingency plan ready for this time period
Week 13	Revisit level one and check that it is polished, if so flesh out level 2 if white boxed
Week 14	Create .exe and get more tests before final submission
Week 15	Create final polished .exe for hand in
Milestone 3	Artefact hand-in
Week 16	Report and documentation
Milestone 4	Hand in report and documentation
Milestone 5	Await VIVA date and present game.

3.2 Development Problems and Solutions

Engine

The main software problems that hindered the progress of this project where inside Unreal Engine itself, especially when creating custom blueprints and scripting because if a bit of coding isn't perfect it can ruin an entire character of level blueprint. This was most notable when creating the enemy AI, which came with a lot of issues and bugs. The enemy would run into a wall and get stuck or the enemy

upon finding the player wouldn't initiate its attack phase and would just transition to an idle animation, as it could see the player but couldn't figure out what to do.

About 10 iterations of the scripting went into making the enemy AI successfully work and because of this changed the desired outcome of the project file.

Other minor software problems came from small problems such as the timer, when the player would pick up additional time instead of it stopping at 59 and rolling over to 00 it would continue to count and would go to 60 - 99 before rolling the minute over. This was an easy fix though and required an ABS formula which made a complete absolute value based on the origin.

Personal Difficulties

Not necessarily a software issue but definitely something that has stalled production on this project was my mental health, over the past 24 months my life had spiralled out of control from losing my fiancé and then losing both my grandparents within 6 months of each other in 2017, who were both supportive of what I wanted to do and accomplish, left me with what sometimes felt like a crippling anxiety and there were times during this course and more so during this project when I would wake up and just not move from my bed. So, when I finally sat at my desk to proceed with something and I wasn't happy with it I would just scrap that section and start again. This felt like I was wasting time and effort on trivial things in the project, as mentioned above the enemy AI took a lot of fixing and that was mainly due to me constantly being frustrated with myself about how un-perfect it was.

I am lucky that I have a few close peers at the University that would support me during specific dips and knew how to help me remember the passion that I have for games design, so even though it was difficult to do I preserved and from being at a low point and really hating my production I began to love the project and my work flow definitely improved because of this.

4 EVALUATION

4.1 Overall result

The originally deliverables and desired outcome changed from this project, firstly it went from being a side-scrolling beat-em up level to a mechanics showcase. The reasoning behind the changes where mainly because the mechanics took longer then expected to complete and it ate into the time needed to create models and artwork. However, this being a design project the sole focus should be on the mechanics working and being able to be used in another project to create a new game and levels and the simple answer to that statement is yes.

4.2 Evaluation Pros and Cons

Pros

Character Mechanics

The player mechanics seem to all work perfectly with very few bugs, the only bugs that appear are the ones that are extensions. For example, the character death works and can end a game, but when adding the respawn functionality, it fully resets the game instead of saving specific score or dropping the life counter by one.

HUD

User interface is possibly my favourite area to work and working on this HUD was no different, it had various elements that all work according to specific pick ups and interactions around the showcase. The only downfall to this is part of me was thinking I should of just focused on a game user interface as I know that's my strong suit.

Showcase

I managed to pull of a full showcase that demonstrates the full use of all the mechanics in the game. During the course of this project I still didn't know what I wanted to do after University was over and it hit me that I like to pass on knowledge and impart wisdom so what better way then to become a tutor and have a showcase that's teaches, creators who may use this how they can use these blueprints for their own personally projects.

Cons

Enemy AI

Took longer than it should have to work. Is still filled with minor bugs such as collision boxes that touch player and damaging without the combat animation being played. When the enemy dies and drops an item sometimes the player cannot interact with the object.

Lack of Art

This is a pro and con in my personal opinion as yes the focus of the project is the mechanics but sometimes you need visual aid to help bring what you have created to life.

No Sound

Due to time constraints I never got to add any sound effects or music to my blueprints, menus or various widgets. I really think it doesn't hinder the showcase, but if I made a level and had no sound it would have been awful.

5 CONCLUSION

In conclusion I am quite pleased in successfully being able to create a mechanics showcase. I feel that I somewhat achieved part of the challenge that I set myself at the beginning of creating my own blueprints and working in specific areas I had never touched before, such as the animation blendspace and blueprint tree.

This project will be getting revisited in the future as I would still like to be able to create some levels for it and see a prototype game from the mechanics created. I think a lot of time will be spent on making it visually appealing and I have a few peers whom have already expressed interest in creating models for the game be it character or scenery. Potentially this project has only just begun as a new project and would be nice in a few months' time to review this report compared to one in 6 months' time.

The project has definitely been a learning experience for me and although I didn't take the safe option of creating something I had before for an easy grade, I have shown will and determination to get this project completed even when I was feeling burnout out and completely sick of the project. I feel in the future before making the commitment to something I have never done more research is needed. But I feel that my skill base has greatly improved because of this project.

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Capcom 1989, *Final Fight*, video game, Super Nintendo, Capcom, Japan.

Sega 1991, *Streets of Rage*, video game, Sega Megadrive, Sega, Japan.

APPENDIX A

Blog

Please find my blog and development diary at

<https://preenlewis.wixsite.com/portfolio/final-year-project>

