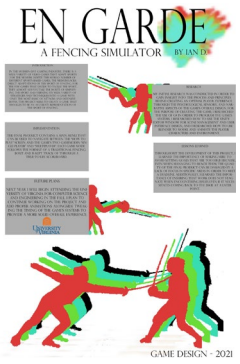
SENIOR CAPSTONE EXTRAVAGANZA

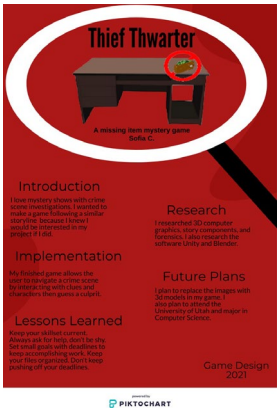
Game Design

Click the thumbnail to learn more about the project

Slightly Up-and-to-the-Left Earth
A Multipurpose Fictional World
Leo B.



EN GARDE
A Fencing Simulator
Ian D.



Thief Thwarter
A missing item mystery game
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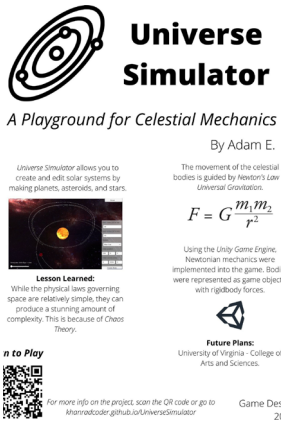

Universe Simulator
A Playground for Celestial Mechanics
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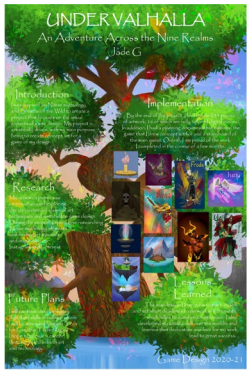
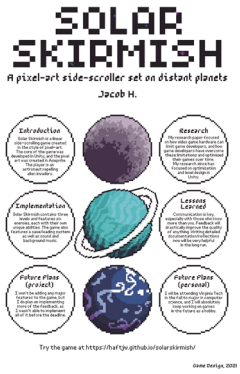


Under Valhalla
An Adventure Across the Nine Realms
Jade G.



Solar Skirmish
A pixel-art side-scroller set on distant planets
Jacob H.

More Projects —>

Game Design

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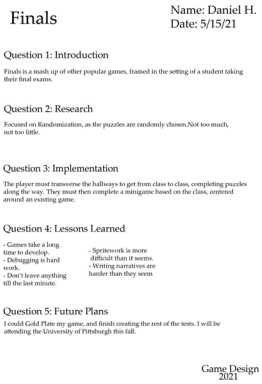
Opus 1.

The soundtrack that tried to be more

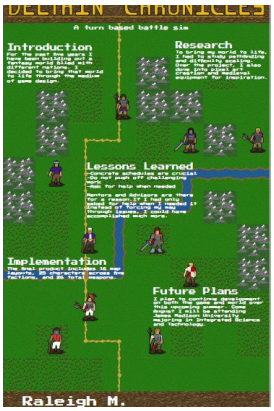
Luke H.



Finals

Mash up of other popular games

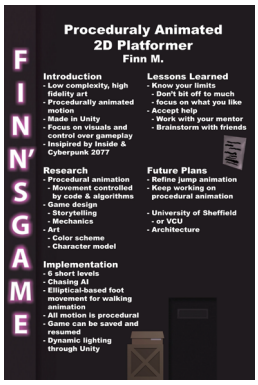
Daniel H.



Deltain Chronicles

A turn based battle sim

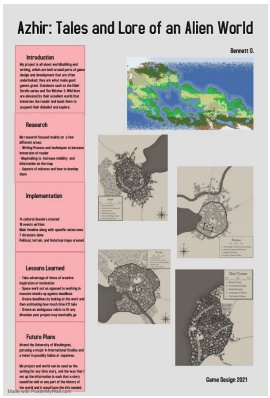
Raleigh M.



Finn's Game

Procedurally Animated 2D Platformer

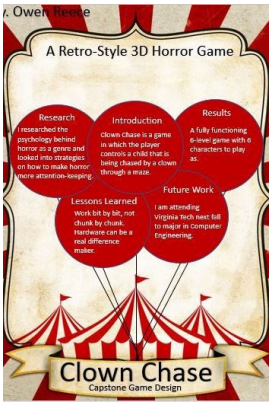
Finn M.



Azhir

Tales and Lore of an Alien World

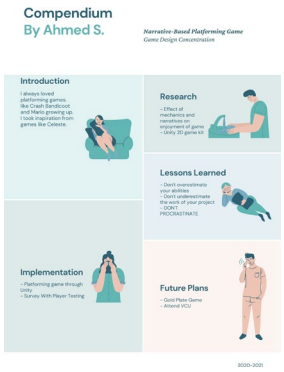
Bennett O.



Clown Chase

A Retro-Style 3D Horror Game

Owen R.



Compendium

Narrative-Based Platformer Game

Ahmed S.

Voyage

A Relaxing Role Playing Game

Mollie M.

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Slightly Up-and-to-the-Left Earth

A Multipurpose Fictional World that has yet to be Named

by Leo B.

Hills of Exposition

I love storytelling, and one of my favorite things about stories is the world and setting they take place in. Learning about the world from different characters' points of view fascinates me, and this is one of the reasons I am drawn so much to fantasy. Fantasy stories always take place in such wonderful, complex worlds with unique peoples and things and magics. I have always wanted my own world of such wonder and complexity to be use as a setting for my own stories, so I decided to use Capstone to make one.

Desert of Lessons

A lot was learned about creative design and long-term project management. I learned that sometimes it is important just to write, even if I lack inspiration, so I do not get stuck. I can always fix it later! I also got a lot better at writing in general because I had to write so much. I learned that flexibility is important in projects, especially ones that are so large: As the project is done and unexpected roadblocks pop up, timetables may have to shift. Also, this was really my first project a mentor watched the whole time and gave me feedback on every step; that experience will be useful in the future.

Plains of Research

I split the research into two "spheres": The Natural and "Settled" Worlds. I wanted to Natural World to to look and feel similar to Earth so that it would be easier for a reader or player to become immersed. I researched geography such as mountain and river formation, how such geographic features work, how various features affect climate and biome, etc. For the "Settled World," I researched extensively about cultures and countries and what makes those up. I also researched how fantasy concepts like magic may interact with the world and its people.

Gulf of Implementation

The final project took the form of a forty page text written from the perspective of Bernard Srevnos, a character in the world. In this book, the "Natural World" was demonstrated through maps showing rivers, mountain ranges, biomes, and other regions. The "Settled World" was demonstrated through nine fantasy races, ten unique cultures, and ten unique countries. Various appendicies expanded on the concepts in the "Settled World."

The Beyond

I plan to continue working on the world in the future. I hope to run a Dungeons and Dragons or similar Tabletop RPG campaign in the world. I have also started writing some short stories that take place in the world! As far as my schooling goes, I am going to UVA in the fall.

Game Design
2021

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EN GARDE

A FENCING SIMULATOR

BY IAN D.

INTRODUCTION

IN THE MODERN-DAY GAMING INDUSTRY, THERE IS A WIDE VARIETY OF VIDEO GAMES THAT ADAPT SPORTS FOR THE MEDIUM. DESPITE THIS MYRIAD NUMBER OF DIFFERENT SPORTS-BASED GAMES, THE MEDIUM LACKS DIRECT ADAPTATIONS OF THE SPORT OF FENCING. FOR THE FEW GAMES THAT DECIDE TO TACKLE THE SPORT, THEY ALMOST ALWAYS TAKE THE ROUTE OF SIMPLIFYING THE SPORT AND TURNING ITS WIDE VARIETY OF STRATEGIES AND TECHNIQUES INTO A GAME WITH ONLY THE MOST BASIC OF ATTACKS AND DEFENSIVE MOVES. THIS PROJECT SEEKS TO CREATE A GAME THAT MANAGES TO BE AN ACCURATE REPRESENTATION OF THE SPORT OF FENCING.

RESEARCH

MY INITIAL RESEARCH WAS CONDUCTED IN ORDER TO GAIN INSIGHT INTO THE PROCESS AND PRINCIPLES BEHIND CREATING AN OPTIMAL PLAYER EXPERIENCE THROUGH THE PSYCHOLOGICAL, SENSORY, AND NARRATIVE ASPECTS OF THE GAME'S OVERALL DESIGN. FOR THE PURPOSE OF CREATING THE GAME, I RESEARCHED THE USE OF C# IN ORDER TO PROGRAM THE GAME'S SYSTEMS, I RESEARCHED HOW TO USE THE UNITY EDITOR WINDOW FOR SCENE MANAGEMENT AND USER INTERFACE DESIGN, AND I RESEARCHED HOW TO USE BLENDER TO MODEL AND ANIMATE THE PLAYER CHARACTERS AND ENVIRONMENT.

IMPLEMENTATION

THE FINAL PRODUCT CONTAINS A MAIN MENU THAT CAN BE USED TO NAVIGATE BETWEEN THE "HOW TO PLAY" SCREEN AND THE GAME'S TWO GAMEMODES: "SINGLE-PLAYER" AND "MULTIPLAYER". EACH GAME MODE FOLLOWS THE FORMAT OF A TRADITIONAL FENCING BOUT AND IS KEPT TRACK OF THROUGH A TRUE-TO-LIFE SCOREBOARD.

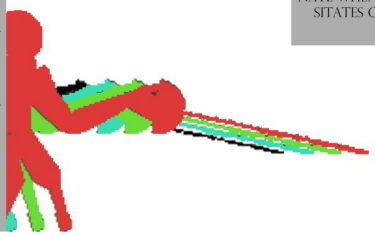
LESSONS LEARNED

THROUGHOUT THE DEVELOPMENT OF THIS PROJECT, I LEARNED THE IMPORTANCE OF MAKING SURE TO AVOID SETTING GOALS THAT ARE TOO HIGH BECAUSE, EVEN WHEN MANAGING TO REACH THEM, THE QUALITY OF THE FINAL PRODUCT CAN BE DAMAGED BY A LACK OF FOCUS IN SPECIFIC AREAS IN ORDER TO MEET A DEADLINE. ADDITIONALLY, I LEARNED THE IMPORTANCE OF ENSURING THAT WORK DOES NOT STAGNATE WHEN ENCOUNTERING ISSUES EVEN IF IT NECESSITATES COMING BACK TO THE ISSUE AT A LATER POINT.

FUTURE PLANS

NEXT YEAR I WILL BEGIN ATTENDING THE UNIVERSITY OF VIRGINIA FOR COMPUTER SCIENCE AND ENGINEERING IN THE FALL. I PLAN TO CONTINUE WORKING ON THE PROJECT AND ADD PROPER ANIMATIONS ALONGSIDE TWEAKING THE TIMING OF THE GAME'S SYSTEMS TO PROVIDE A MORE SOLID OVERALL EXPERIENCE.

UNIVERSITY of VIRGINIA



GAME DESIGN - 2021

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Thief Thwarter

A missing item mystery game
Sofia C.

Introduction

I love mystery shows with crime scene investigations. I wanted to make a game following a similar storyline because I knew I would be interested in my project if I did.

Research

I researched 3D computer graphics, story components, and forensics. I also research the software Unity and Blender.

Implementation

My finished game allows the user to navigate a crime scene by interacting with clues and characters then guess a culprit.

Future Plans

I plan to replace the images with 3d models in my game. I also plan to attend the University of Utah and major in Computer Science.

Lessons Learned

Keep your skillset current. Always ask for help, don't be shy. Set small goals with deadlines to keep accomplishing work. Keep your files organized. Don't keep pushing off your deadlines.

Game Design
2021

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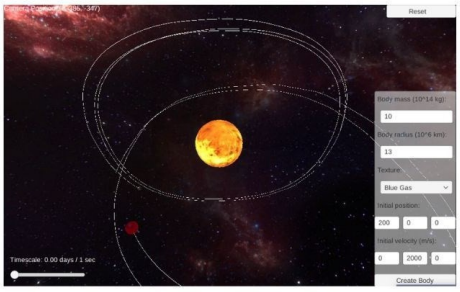
Universe Simulator

A Playground for Celestial Mechanics

By Adam E.

Universe Simulator allows you to create and edit solar systems by making planets, asteroids, and stars.



Lesson Learned:
While the physical laws governing space are relatively simple, they can produce a stunning amount of complexity. This is because of *Chaos Theory*.

The movement of the celestial bodies is guided by *Newton's Law of Universal Gravitation.*

$$F = G\frac{m_1 m_2}{r^2}$$

Using the *Unity Game Engine*, Newtonian mechanics were implemented into the game. Bodies were represented as game objects, with rigidbody forces.

Future Plans:
University of Virginia - College of Arts and Sciences.

Scan to Play

For more info on the project, scan the QR code or go to khanradcoder.github.io/UniverseSimulator

Game Design
2021

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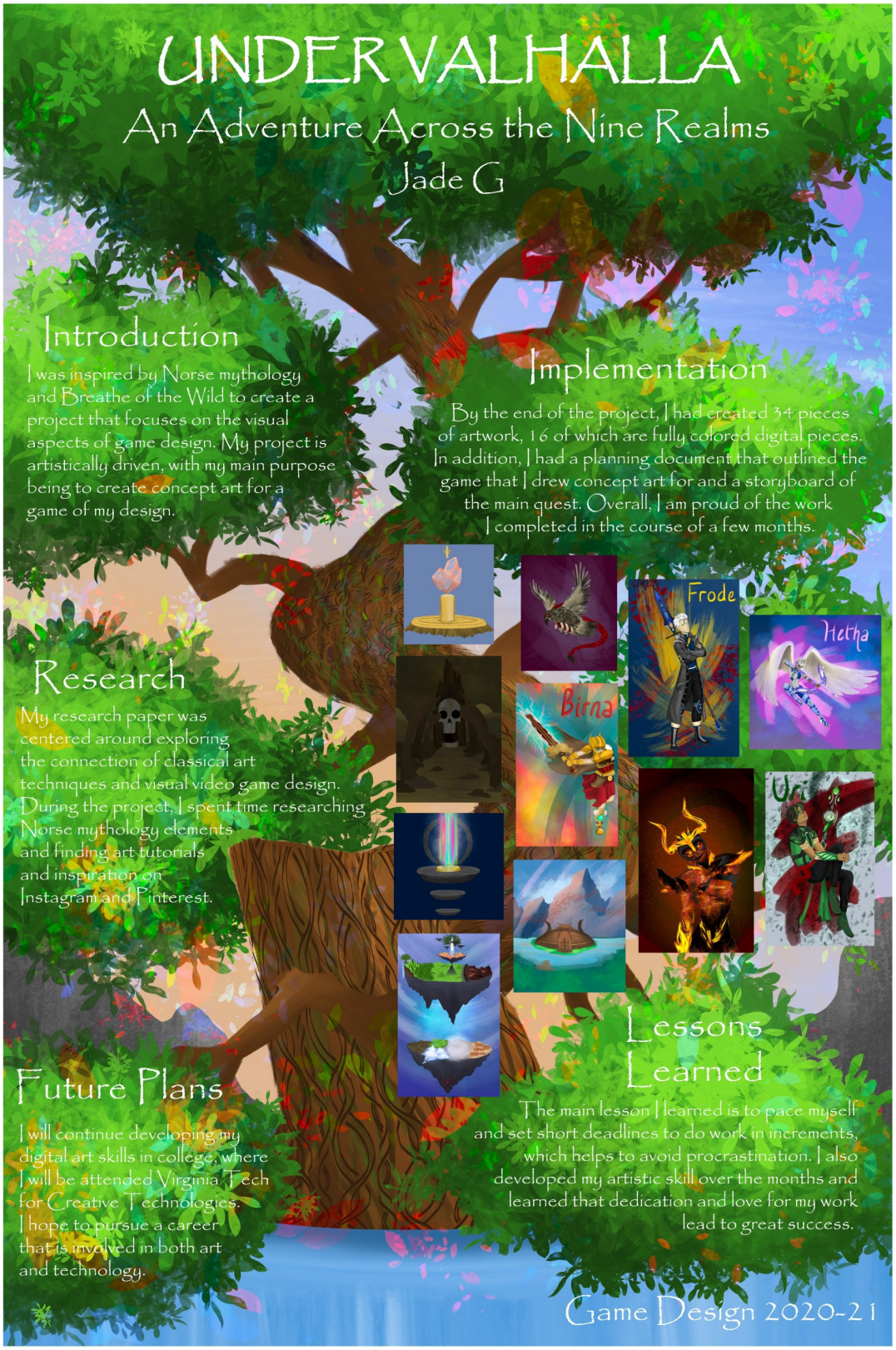

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SOLAR SKIRMISH

A pixel-art side-scroller set on distant planets

Jacob H.

Introduction

Solar Skirmish is a linear side-scrolling game created in the style of pixel-art. The core of the game was developed in Unity, and the pixel art was created in Aseprite. The player is an astronaut repelling alien invaders.

Research

My research paper focused on how video game hardware can limit game developers, and how game developers have overcome these limitations and optimized their games over time. My research since has focused on optimization and level design in Unity.

Implementation

Solar Skirmish contains three levels and features six enemies, each with their own unique abilities. The game also features a save/loading system as well as sound and background music.

Lessons Learned

Communication is key, especially with those who know more than you. Feedback will drastically improve the quality of anything. Writing detailed documentation/reflections now will be very helpful in the long run.

Future Plans (project)

I won't be adding any major features to the game, but I do plan on implementing more of the feedback, as I wasn't able to implement all of it before the deadline.

Future Plans (personal)

I will be attending Virginia Tech in the fall to major in computer science, and I will absolutely keep working on games in the future as a hobby.

Try the game at https://haftjw.github.io/solarskirmish/

Game Design, 2021

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Opus 1.

"The soundtrack that tried to be more"

Luke H.

Introduction

I've always had a fascination with literary devices and how they manage to tell stories in interesting, new ways. I also have a love for classical music, and I thought it would be interesting to merge those two fields of art and use musical devices as literary devices.

Research

My research focussed on the psychological effects of music and literature, and I tried to find out where the two overlapped. E.g. What area of the brain is stimulated by symbolism, and how does music interact with that same area.

Implementation

My deliverables fell short of my expectations, and I ended up with a pretty basic six song score for a videogame. I also wrote a mediocre story consisting of six scenes, as well as a demo which showed the story and score coming together.

Lessons Learned

My main lessons were setting realistic, concise goals, having shorter iteration cycles, collaborating, being dedicated, and being inspired and challenged

Future Plans – project / college

I plan on going to the University of Virginia next year. My major is undecided, but I'm looking forward to taking classes that explore the same areas as this project.

Capstone Game design, 2021

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Finals

Name: Daniel H.
Date: 5/15/21

Question 1: Introduction

Finals is a mash up of other popular games, framed in the setting of a student taking their final exams.

Question 2: Research

Focused on Randomization, as the puzzles are randomly chosen.Not too much, not too little.

Question 3: Implementation

The player must transverse the hallways to get from class to class, completing puzzles along the way. They must then complete a minigame based on the class, centered around an existing game.

Question 4: Lessons Learned

- Games take a long time to develop.
- Debugging is hard work.
- Don't leave anything till the last minute.
- Spritework is more difficult than it seems.
- Writing narratives are harder than they seem

Question 5: Future Plans

I could Gold Plate my game, and finish creating the rest of the tests. I will be attending the University of Pittsburgh this fall.

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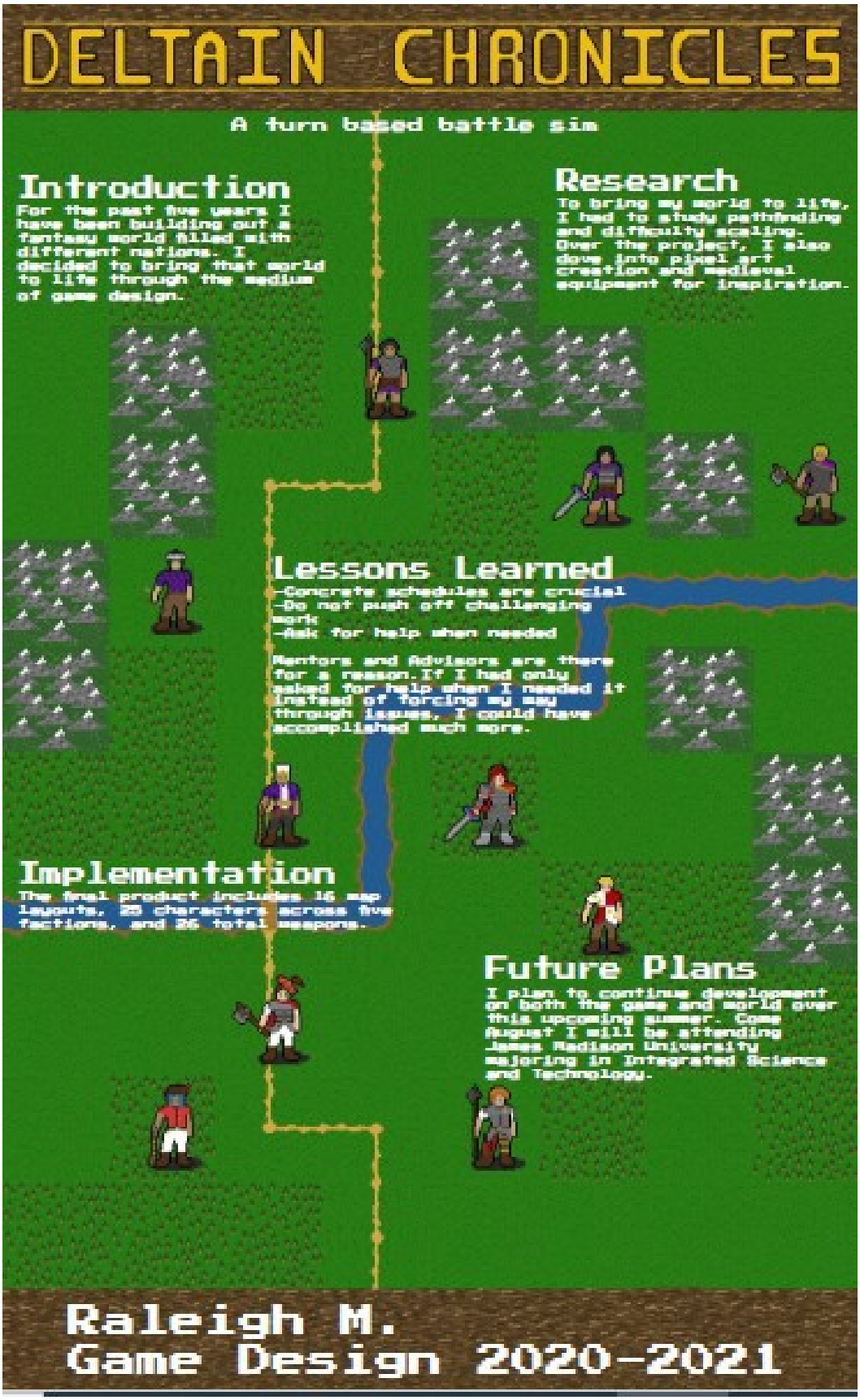

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Proceduraly Animated 2D Platformer

Finn M.

FINN'S GAME

Introduction
- Low complexity, high fidelity art
- Procedurally animated motion
- Made in Unity
- Focus on visuals and control over gameplay
- Insipired by Inside & Cyberpunk 2077

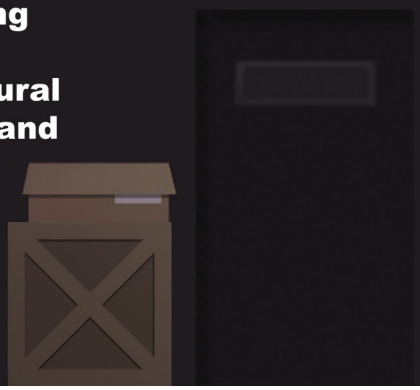
Research
- Procedural animation
  - Movement controlled by code & algorithms
- Game design
  - Storytelling
  - Mechanics
- Art
  - Color scheme
  - Character model

Implementation
- 6 short levels
- Chasing AI
- Elliptical-based foot movement for walking animation
- All motion is procedural
- Game can be saved and resumed
- Dynamic lighting through Unity

Lessons Learned
- Know your limits
  - Don't bit off to much
  - focus on what you like
- Accept help
  - Work with your mentor
  - Brainstorm with friends

Future Plans
- Refine jump animation
- Keep working on procedural animation

- University of Sheffield
  - or VCU
- Architecture



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Azhir: Tales and Lore of an Alien World

Bennett O.

Introduction

My project is all about worldbuilding and writing, which are both crucial parts of game design and development that are often underlooked; they are what make good games great. Standouts such as the Elder Scrolls series and The Witcher 3: Wild Hunt are elevated by their excellent world that immerses the reader and leads them to suspend their disbelief and explore.

Research

My research focused mainly on a few different areas:
- Writing Process and techniques to increase immersion of reader
- Mapmaking to increase visibility and information on the map
- Aspects of cultures and how to develop them

Implementation

14 cultural dossiers created
18 events written
Main timeline along with specific nation ones
7 characters done
Political, terrain, and historical maps created

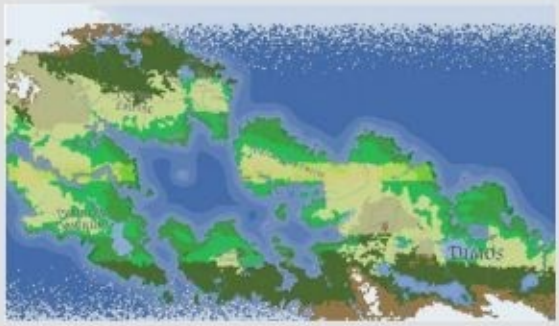
Lessons Learned

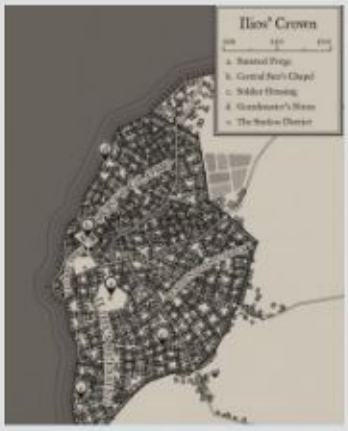
- Take advantage of times of creative inspiration or motivation
- Space work out as opposed to working in massive chunks up against deadlines
- Create deadlines by looking at the work and then estimating how much time it'll take
- Create an ambiguous rubric to fit any direction your project may inevitably go

Future Plans

Attend the University of Washington, pursuing a major in International Studies and a minor in possibly Italian or Japanese.

My project and world can be used as the setting for any time story, and the way that I set up the information is such that a story could be told at any part of the history of the world and it woud have the info needed.





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Compendium
By Ahmed S.

Narrative-Based Platforming Game
Game Design Concentration

Introduction

I always loved platforming games. like Crash Bandicoot and Mario growing up. I took inspiration from games like Celeste.

Research

- Effect of mechanics and narratives on enjoyment of game
- Unity 2D game kit

Lessons Learned

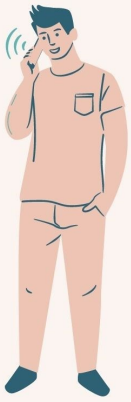
- Don't overestimate your abilities
- Don't underestimate the work of your project
- DON'T PROCRASTINATE

Implementation

- Platforming game through Unity
- Survey With Player Testing

Future Plans

- Gold Plate Game
- Attend VCU



2020-2021

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Voyage

A relaxing roleplaying game where players can build, explore, and connect on a remote island.

Introduction

Both artwork and video games have been studied to determine how they effect people psychologically. As those are both passions of Mine, I wanted to bridge the gap by creating different art pieces that convey specific emotions and thus contribute to the overall purpose of the game.

Research

My research showed that various elements of game design and art design impacted the emotion and purpose. Some of the most notable being character interactivity, plot, controls, difficulty, and objective for game design. And, use of shape, color, pattern, size, etc. for art design.

Ai Ps

Implementation

The final game took on the form of a story planning sheet and artwork for map design, character design, and scenes in the game.

Lessons Learned

Throughout my project, I set high expectations and created an unrealistic schedule. In the future, I plan on creating a schedule that divides personal time and work time, as well as better managing my expectations.

Future

I do not plan on visiting this specific project again in the future, however, I plan on keeping up with my interests in pixel art and psychology. In terms of college, I'm enrolled in Virginia Tech with the possible major of Computer Science.

VT

Mollie M.
Game Design 2020-2021

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