SYLLABUS

GAME DESIGN

This Computer Science course aims to introduce students to the concepts and patterns used in both game design and development.

INSTRUCTOR - J. TYLER MCGOFFIN

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Bio: Currently a Senior Software Engineer at CircleCI, Mr. McGoffin has an eclectic background. He has been teaching for over a decade, all while pursuing his interests and passions. He began his career as a research scientist studying solar panel physics before moving abroad to teach. Later, he joined the indie game studio Offworld Games (since disbanded) and helped design and develop two titles that were released on Steam. He later transitioned to a permanent software development role, while continuing his passion for game design, and currently has a board game and a digital game in development. Throughout all of this, his love for teaching has never subsided, and he continues to mentor and teach students in the topics he loves.

COURSE TEXTS AND RESOURCES

Software/development languages: Python 3, Pygame, VSCode (and several extensions), Git, Zoom, Slack, fork my repo

Websites: Github, Trello, Google Docs, InVision

Resources: *Making Games with Python & Pygame* by Al Sweigart (optional)

COURSE SYNOPSIS

This course is intended for students who, most importantly, have a love of games and gaming. Additionally, it is expected that each student has had an introduction to computer science, such as a coding camp, AP CS course, or equivalent.

In this course, each day will typically be split into 3 sections: game design concepts, game development concepts, and exercises. The game design concepts will discuss game theory, design principles, and similar, to equip students with the skills they need to begin designing interesting and captivating games. The game development concepts will focus on coding principles and patterns that allow students to create the games they design. Finally, the exercises portion will break students into smaller groups to put what they've learned into practice, through design and coding challenges alike.

The course will be taught using the Python coding language using the Pygame engine. Additionally, we will learn some simple command line tools and git.

PROJECTS

Throughout the lectures, the students will complete 5 games:

1. RoShamBo - aka Rock, Paper, Scissors
2. Escape the Island - a text base escape adventure game.
3. Wormy - like snake, but without the copyright violations.
4. Space Shooter - an arcade style, asteroid blasting game.
5. Beardman - your first foray into platformers.

Additionally, we will work through “Python Koans” - interactive python challenges to help improve our understanding of python and code. There are 16 modules we will complete in week one, and 28 more available for the students to work on later if they wish to continue learning concepts beyond the scope of our course.

SCHEDULE

Sequence	Lecture	Activity
Day 1	Icebreaker, Setup Development Environment, and an Introduction to Python Koans and Testing	Python Koans: 1. `about_1.1.1_asserts.py` 2. `about_1.1.2_true_and_false.py` 3. `about_1.1.3_none.py`
Day 2	Game Genres and Mechanics Lecture and Python Types and Syntax	Python Koans: 1. `about_1.2.1_strings.py` 2. `about_1.2.2_string_manipulation.py` 3. `about_1.2.3_lists.py` 4. `about_1.2.4_list_assignments.py` 5. `about_1.2.5_tuples.py` 6. `about_1.2.6_dictionaries.py`
Day 3	The Game Space and Control Structures: RoShamBo	Python Koans: 1. `about_1.3.1_control_statements.py` “The Heist” puzzle challenge
Day 4	Making a Good Game and Intro to OOP: Escape the Island Game	Python Koans: 1. `about_1.4.1_classes.py` 2. `about_1.4.2_class_attributes.py`

		3. `about_1.4.3_attribute_access.py` 4. `about_1.4.4_methods.py` 5. `about_1.4.5_method_bindings.py`
Day 5	Intro to Video Game AI and OOP Continued: Finish Escape the Island Game	"Escape the Island" game monster AI
Day 6	Intro to Pygame and Animations	Bouncing Ball Optional Challenge
Day 7	Wormy	Wormy
Day 8	UI/UX Design and begin building Space Shooter	Space Shooter
Day 9	Finish building Space Shooter	Space Shooter
Day 10	Introduction to Beardman the Platformer	Free design on beardman

Course Conduct

The field of Game Design and Development is expansive. There are many opportunities for people of every discipline to get involved. Games need artists, programmers, designers, project managers, accountants, salespeople and marketing teams, writers, actors, the list goes on and on.

However, the most important thing about working on games is the same across all these disciplines: a love of games and gaming! It is likely not all of you will end up as developers (coders). Throughout this course, some of you may find you enjoy designing the game content more than coding it, while others might enjoy making the art or graphics look just right. The more diverse the group you have working on a game, the better it will be.

So help each other, encourage each other, and respect any and all differences, for it is through these differences that we will make the best games possible.

Now to be blunt, I have a zero tolerance policy for disrespect, discrimination of any kind, and harassment. If anyone witnesses or falls victim to any of the above, reach out to me or any administrator in the program. No one will be punished for speaking out.