Gamified Security Awareness For Developers Training Platform

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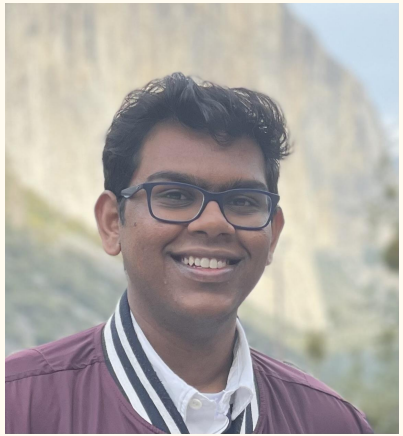

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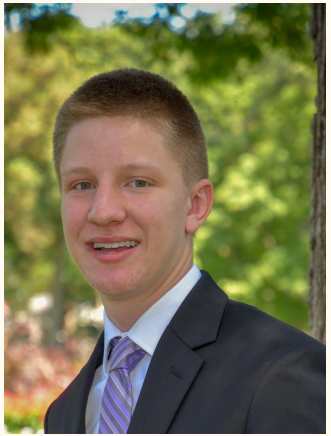

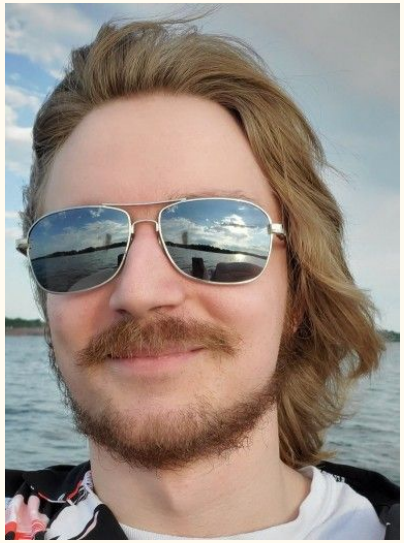

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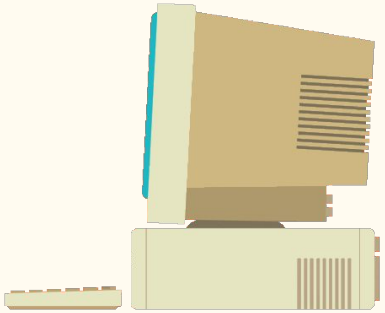
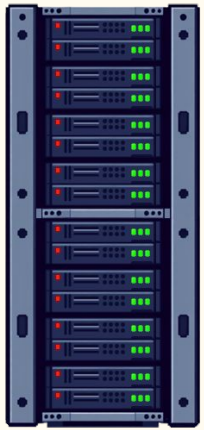
Outline

- Introduction
- Requirements
- Design Overview
- Project Outcomes
- Demonstration
- Conclusion





Introduction

Problem Statement

- Our client challenged us to design an engaging cybersecurity game that teaches secure OWASP coding concepts to software developers.
- While resources exist to teach security concepts to individuals of all levels, they often lack a compelling story, purpose, and engagement.

Stakeholders

- AllState Insurance Group
  - Sudesh Kannan - Cyber Security & Privacy Professional
  - Ethan Wilder - Principal Security & Engineering Leader

Our Solution

Market Research

- Applicable Challenges
  - Enterprise Level
  - Well-Regarded
- Steep Learning Curve
  - Complex Challenges
  - No Particular Narrative
- Not Entry Friendly
  - College Junior/Senior
  - Cybersecurity Engineer

Market Research

- Applicable Challenges
  - Basic Foundations
  - Not Enterprise Level
- Great For New Learners
  - High School Student
  - College 1st/2nd Year
- Resonates With Audience
  - Interesting Narratives
  - Scholarship Incentive

Introduction

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Our Solution

- We developed CyEscape, a dystopian-style video game with a narrative about rediscovering identity. Each level presents an OWASP Top 10 challenge that the player must overcome.

Technology Platform(s) Used

- No Hardware Specifications
- Unity Game Engine
  - Game Development
  - Game Testing
- GitLab
  - Version Control
  - Task Listing
- Krita
  - 2D Asset Creation
  - Compatible With Unity
- Microsoft Teams
  - Communication
  - Weekly Meetings

KRITA

Requirements Pt. 1

OWASP-2024-Release
M1: Improper Credential Usage
M2: Inadequate Supply Chain Security
M3: Insecure Authentication / Authorization
M4: Insufficient Input/Output Validation
M5: Insecure Communication
M6: Inadequate Privacy Controls
M7: Insufficient Binary Protections
M8: Security Misconfiguration
M9: Insecure Data Storage
M10: Insufficient Cryptography

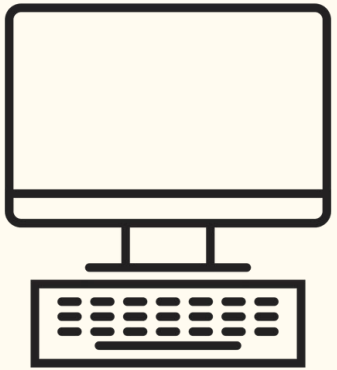
<u>Functional</u>

- **Unity Game Engine**
  - Free Student Subscription
  - Robust Game Design Tools
  - Open Source Tutorials
- Hands-on security challenges that provide basic experience.
  - Incorporates OWASP Top 10
- The player can interact with the environment in each level.

<u>Resource</u>

- Integrated *help* command in the terminal to provide level hints.
- Design Document for the client outlining game objectives.
- **Optional** game manual for player guidance and reference.

Requirements Pt. 2



User Experience

- A visually appealing interface enhances the immersive experience.
- Engaging game clues and rewards are integrated to motivate player.
- Difficulty progression is gradual to accommodate players of all skills.
    - 4 levels are education-focused on OWASP
    - 2 serve as fun mini-games to provide a break

Performance

- Ensure the game runs smoothly on all supported platforms.
- Optimize resource usage for lower-end device compatibility.
- Support simultaneous interactions and environmental elements.

Engineering Standards

IEEE 830-1998 (Software Requirements Specifications)

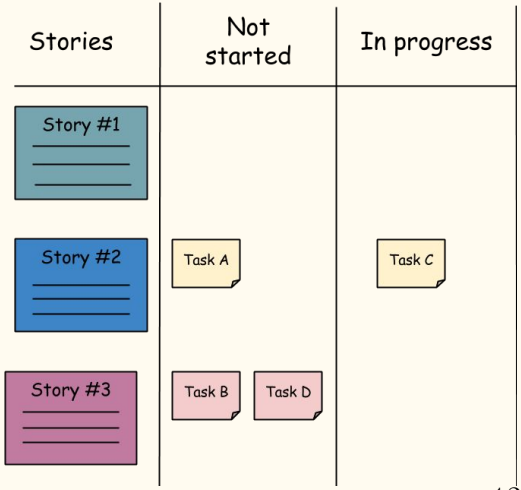
- Ensures clear specifications for both client and educational goals.
- Helps specify functional requirements and in-game interactions.

IEEE 29119-2017 (Software Testing Standards)

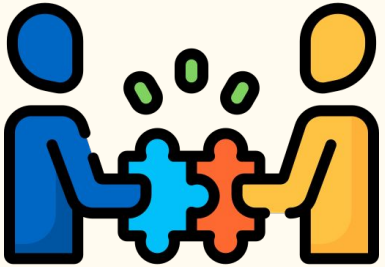
- Structured approach to stress-testing levels after new features.
- Ensures optimal user experience by addressing in-game bugs.

IEEE 12207-2017 (Software Lifecycle Processes)

- Supports tracking progress through SDLC phases.
- Facilitates client communication proceeding sprints.



Potential Risks & Mitigations



Game Experience

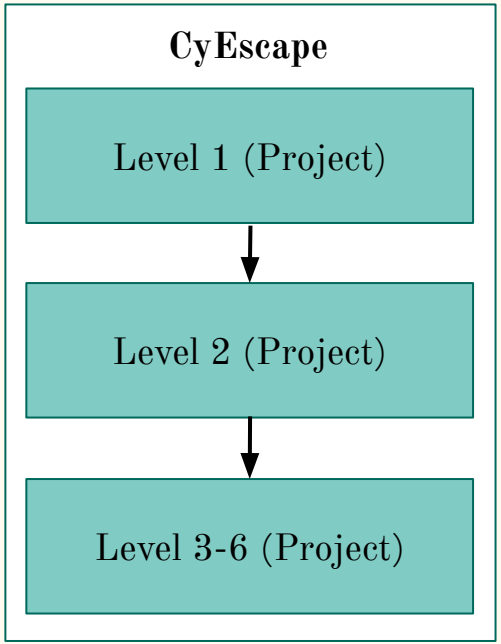
- Minimal game development experience within the group.
- Unfamiliar with Agile methods, sprints, and user stories.

Software Development

- Diverse coding styles among group members.
- Unity does not allow multi-user collaboration.
- Git is challenging to navigate and use efficiently.

No “Role Model”

- Our project is *unique*, required us to learn concepts from scratch.
- The process involved continuous brainstorming and iteration.
- Previous semester planning was less helpful due to evolving ideas.



Design Overview Pt. 1

6 Levels On OWASP Top 10

Level 1 - Wake Up!

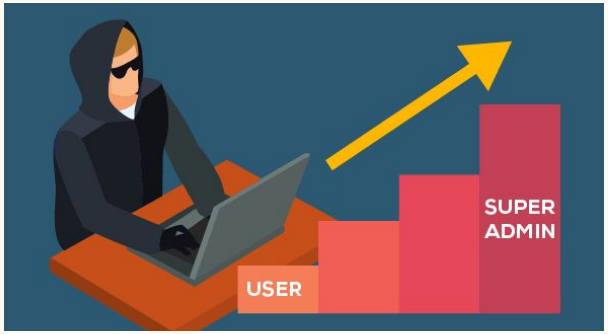
- Basic Terminal Commands (e.g., *ls*, *pwd*, *cat)*
- Open Locked Door With Password Found In *.txt* File

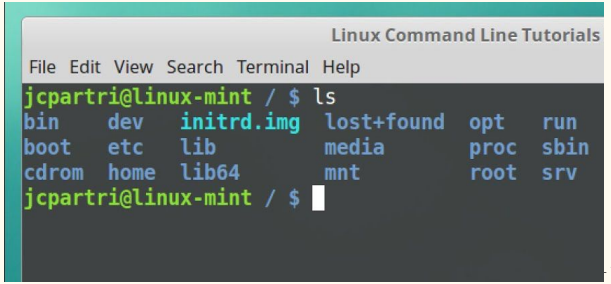
Level 2 - Hallway Encounter

- Social Engineering Challenge
- Get Past 2 Guards Using Dialogue

Level 3 - Terminal Mayhem

- Privilege Escalation (Escalating To Admin)
- Minor Cryptographic Failures (Cracking Password)





Design Overview Pt.2

6 Levels On OWASP Top 10

Level 4 - **Identity...**

- Outdated Components (Version Downgrade)
- Password Injection (Basic SQL Injection)
- Security Misconfigurations (Altering Permissions)

Level 5 - **Regaining Control**

- Insecure Design (Open SSH Port)
- Authentication Failure (Insecure Password)

Level 6 - **GET OUT!**

- Jetpack Joyride-Style Game
- Projectile Shooting Mechanics

Game Demonstration - Level 4

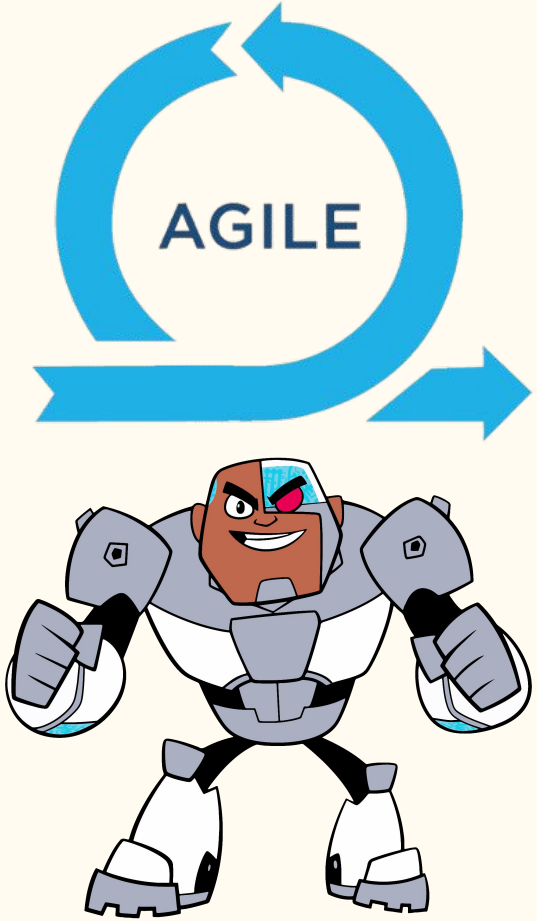
Project Outcomes

Technical Outcomes

- Level 1 | Status: Complete
- Level 2 | Status: Complete
- Level 3 | Status: Complete
- Level 4 | Status: Complete
- Level 5 | Status: Complete
- Level 6 | Status: Complete

Non-Technical Outcomes

- Well-Crafted Game Narrative.
- Adequate Team Documentation.
- Improved Team Collaboration.



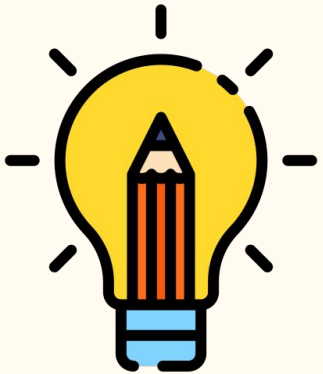
Design Tradeoffs & Innovativeness

<u>Trade Offs</u>

- Unity Game Engine
  - Unreal Engine offers better platform support and realism (2D/3D) but requires a paid subscription.
- Some story elements feel rushed due to time constraints.
- The game has minor bugs and is not yet fully streamlined.
- Focused on quality over quantity with hand-designed sprites.

<u>Accomplishments</u>

- Custom narrative designed entirely from scratch.
- Targets a broad audience, beyond software developers.
- Successfully developed all six levels by deadline.
  - Covered all OWASP Top 10 vulnerabilities.
- Released the game on GitHub, publicly accessible.



Conclusion

Handoff

- Publish the game on Unity Hub. Download for Free and Start Playing Today!
- Transfer project resources and documentation to a team member for future development.
- Entrust the project to Sebastian Wallace, a client member and game designer, who has contributed significantly to our design process and possesses strong Unity expertise.

Q & A

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