

Changemakers: Creativity and Value Creation ACCA5033

Assignment 1: Innovation & Project Management

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Independent Project Proposal

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Q1: Innovation

Developments in communication and the controlled use of fire were significant early milestones in human innovation. Language enabled the sharing of knowledge and collaborative problem solving, while the use of fire for cooking influenced diet and nutrition and is widely believed to have contributed to accelerated cognitive development.

The later emergence of agriculture further transformed human co-operation by establishing a more stable food supply, allowing populations to settle, share and trade resources. This marked a fundamental shift from hunter-gatherer lifestyles focused primarily on individual survival to more settled communities capable of addressing broader social, and organisational challenges.

As communities grew more complex, attention shifted toward improving living conditions. The introduction of sanitation systems and clean water dramatically reduced disease, and medical advances such as vaccines and antibiotics extended life expectancy. These developments have helped societies endure, allowing individuals to live longer and healthier lives.

The pace of change increased significantly during the Industrial Revolution. Mechanised production altered how goods were made, and steam powered transport changed how people and resources moved. Later developments in electricity and computing transformed communication and access to information, while the internet connected societies across vast distances. Each stage built on earlier advances, gradually these distinguishable innovations throughout history all contributed to shaping the modern world and the routines that now feel ordinary [1].

Kondratieff's long-wave theory proposes economic development as occurring in cycles of approximately 45 to 60 years, each associated with transformative technological innovation. Although the theory remains debated, the dominant technological interpretation, drawing on Schumpeter's theory of innovation, links sustained economic growth to major technological breakthroughs rather than incremental change. [2] [3]

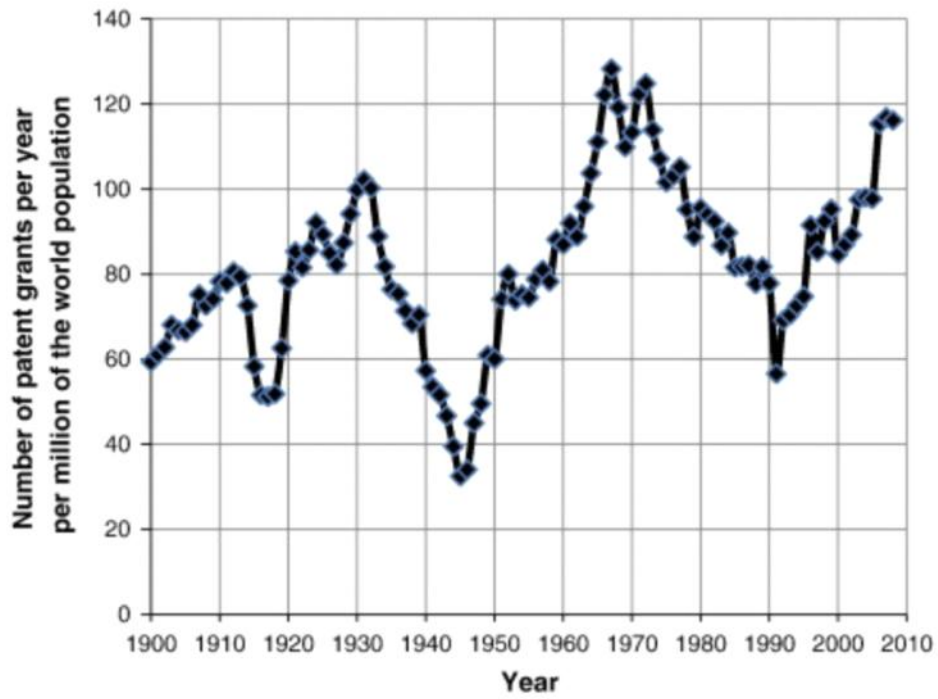


Figure 1, Example of Kondratieff's long-wave theory [3]

Q2: Ideation

Initial Project Ideas

Idea 1: An educational cyber awareness/social engineering game

Concept: A game that teaches users how to recognise and respond to social engineering through interactive scenarios and immediate feedback.

Value/Innovation: Improves cybersecurity awareness Combines education with engaging gameplay to make learning memorable and practical.

Idea 2: Password Strength Checker Application

Concept: A mobile or web app that evaluates the strength of passwords and suggests improvements.

Value/Innovation: Educates and helps users to practice good password hygiene, reduces risk of accounts being compromised.

Idea 3: Smart Device Privacy Advisor

Concept: An application that analyses IoT/smart devices on a home network and recommends privacy/security settings.

Value/Innovation: Many people are unaware of how their smart devices collect/share data. The app educates and guides users to reduce privacy risks. Social value through increased awareness.

Selected Project Idea

Project Title

The Human Firewall – An Educational Cybersecurity Game based on Social Engineering

Aim

The aim of this project is to develop an interactive game that teaches players how to identify and respond to common social engineering tactics in a safe, enjoyable, and engaging environment. Accessible and playable through a web browser.

Objectives

- Create a series of game stages based on common social engineering tactics such as urgency, familiarity, fear, and reward
- Include immediate feedback that explains the consequences of players' decisions
- Develop gameplay that is both enjoyable and reinforces education of cybersecurity concepts
- Evaluate the game's effectiveness through user testing and feedback

Conceptual Description

The Human Firewall guides players through a series of interactive scenarios simulating common social engineering tactics. Designed for students, employees, and general users, the game addresses a key vulnerability in cybersecurity, humans, who are often the weakest link in any security implementation. Each stage challenges players to make decisions, providing immediate feedback that explains the risks and consequences of their choices. By combining engaging gameplay with practical lessons, the game creates social value by increasing cybersecurity awareness.

Q3: Research

To achieve the aim and objectives of The Human Firewall, both practical development skills and structured project management knowledge are required.

For practical implementation, the GB Studio tutorial playlist by 'Pixel Pete – Sad Slime Games' provides step by step instruction on building games within GB Studio for beginners [4]. The playlist of videos will cover core requirements such as scene creation, dialogue systems, event triggers, and feedback mechanisms.

To support structured planning and delivery of the project, the LinkedIn Learning course Project Management Foundations by Bonnie Biafore [5] covers project planning, schedule development, monitoring progress, and formally closing a project. These skills ensure the game is developed within the academic timeframe and remains aligned with its defined objectives.

Additionally, Agile Foundations by Doug Rose [6] introduces the Agile mindset, core values, task prioritisation, user stories, and task boards within a software development context. Applying these principles will support the development of a Minimum Viable Product (MVP), iterative refinement, adaptability, and organised tracking of game features.

Together, these resources provide both the practical technical knowledge and the theory to take a structured approach, both necessary to successfully complete the project.

Q1: Project Scope

Proposed Solution

By gamifying education, the solution seeks to reinforce informed and critical decision making through interactive learning.

By being deployed through a web browser the game will be capable to achieve a wide reaching audience.

Development will begin by defining a Minimum Viable Product (MVP) using the MoSCoW prioritisation method. 'Must Have' requirements will establish the essential functionality required for a working prototype, including a core decision making system, immediate educational feedback, and at least one fully playable scenario. 'Should Have' and 'Could Have' features will then be implemented iteratively to expand the system into a complete and refined product. This approach supports prioritisation and mitigates early and unnecessary scope creep. [7] [8].

Required Technologies and Resources

- GB Studio will be the sole development platform, enabling creation of scenes, game logic, dialogue systems, branching decisions, and stage progression. GB Studio is open source and provides a web based export option, which generates the game as well as the necessary HTML files including an embedded Game Boy emulator to run the game in a web browser [9].
- binjgb Emulator, an open source JavaScript based Gameboy emulator, is automatically incorporated in the GB Studio HTML export process. This is required to interpret the .gb ROM file (the game itself) [10].
- Basic HTML and CSS will be used to refine the webpage presentation, scaling, and styling for a polished user experience. The webpage will be deployed and hosted via Itch.io for online accessibility.
- Itch.io also hosts community uploaded resources for GB studio, such as tile sets and sprites, which may support development by providing high quality assets that are ready for implementation. A combination of self-produced assets and selected community resources will be considered in order to balance creative control with development efficiency [11].
- **Aseprite**, an open source pixel art editor, will be used for the creation and modification of graphical assets required for the project [12].
- Academic research into recognised social engineering techniques will inform scenario content, ensuring educational accuracy.
- Project management and Agile principles will guide planning, prioritisation, iterative development, and staged delivery throughout the project.

Project Timeline and Task Schedule

- **11 February – 18 February:** Ideation and concept development, including initial project proposals and refinement of the selected idea.
 - **18 February – 4 March:** Research and requirements definition, including analysis of social engineering techniques, MoSCoW prioritisation, and identification of the Minimum Viable Product (MVP).
 - **4 March – 18 March:** Game design planning, including scenario structure, decision pathways, and feedback mechanisms.
 - **18 March – 25 March:** MVP implementation, delivering a functional core prototype.
 - **25 March – 15 April:** Iterative expansion, including development of additional stages and refinement of core mechanics.
 - **15 April – 29 April:** Testing, debugging, and educational review to ensure functional stability and clarity of learning outcomes.
 - **29 April – 6 May:** Deployment preparation, including webpage development, integration, and validation.
 - **7 May:** Final submission.
- A visual representation of these phases is provided in the Gantt chart in Q2.

Q2: Gantt Chart

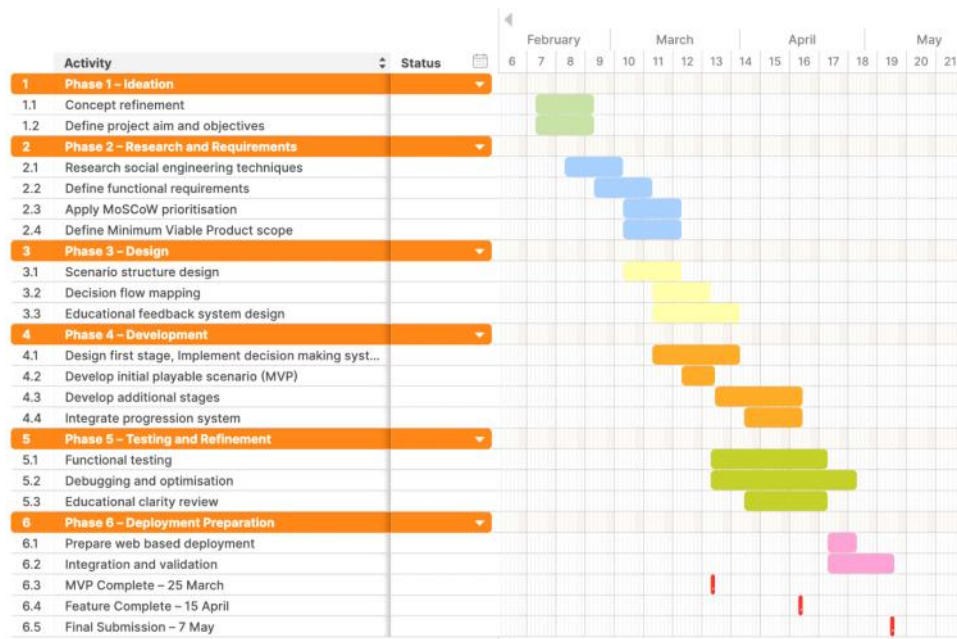


Figure 2, Project Gantt chart

Gantt chart details:

Phase 1 – Ideation

Refinement of the project concept and definition of the project aim and objectives.

Phase 2 – Research and Requirements

Analysis of social engineering techniques to inform design. Definition and prioritisation of functional requirements using MoSCoW, and identification of the Minimum Viable Product.

Phase 3 – Design

Development of scenario structure, decision pathways, and educational feedback mechanisms to translate requirements into an implementation plan.

Phase 4 – Development

Implementation of the core decision system and MVP scenario within GB Studio, followed by iterative development of additional stages.

Phase 5 – Testing and Refinement

Functional testing, debugging, and review of educational clarity to ensure stability and effectiveness.

Phase 6 – Deployment Preparation

Preparation for delivery, including integration into a web hosting structure and final validation prior to submission.

Q3: Risks and Challenges

The author has identified potential risks and challenges that could arise during the lifecycle of this project. By identifying these risks early, appropriate mitigation strategies can be considered and implemented to support successful project delivery.

One significant risk is scope creep, where additional features delay the completion of core requirements. This will be mitigated through adherence of the MoSCoW prioritisation method, ensuring that 'Must Have' features are completed before any optional enhancements are developed.

A second risk relates to technical constraints within GB Studio, particularly if planned mechanics prove more complex than anticipated. Early prototyping and incremental testing will be used to confirm feasibility before progressing to further stages.

Time management presents an additional challenge due to the fixed academic submission deadline of 7 May. Delays in early development phases could reduce time available for testing and refinement. This risk will be reduced through weekly milestone tracking, and continuous comparison against the Gantt chart.

Finally, there is a risk that the in-game scenarios may lack clarity or academic grounding. This will be mitigated by basing content on established research into social engineering and reviewing learning outcomes during testing.

Q1: Development Methodology

Justification for the Use of Agile Methodology

An Agile development methodology has been selected for this project due to its flexibility and suitability for small scale, iterative work. Its emphasis on adaptive planning and incremental refinement makes it particularly appropriate for The Human Firewall, where user engagement, scenario clarity, and learning outcomes cannot be fully predicted in advance. By supporting early prototyping and responsive adjustment, Agile allows the game to evolve naturally in response to testing and feedback [13] [14].

Development Approach

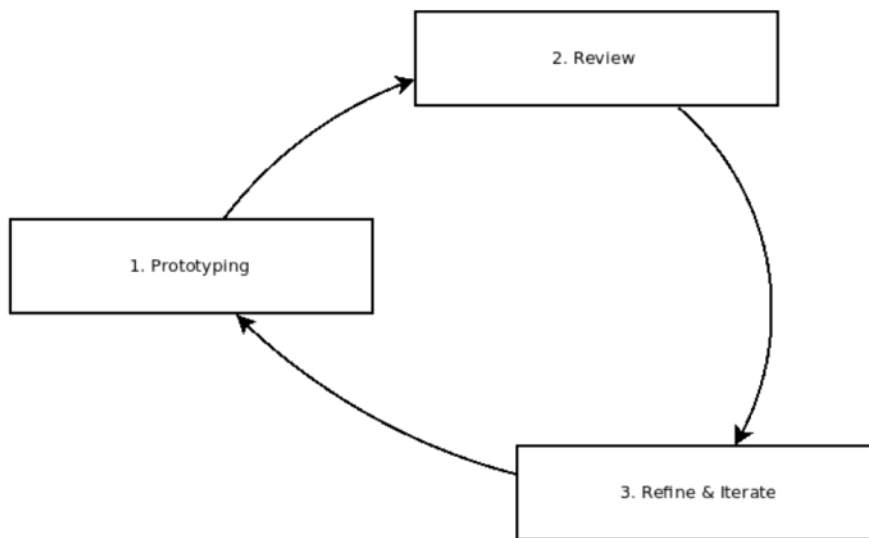


Figure 3, Rapid prototyping cycle [16]

The development process follows Agile principles and incorporates, Test driven development and the three stage Rapid Prototyping cycle: build/prototype, review, and refine. This cyclical process will be repeated throughout development to ensure continuous improvement and alignment with the project objectives [15] [16].

1. Initial Requirements Gathering

Development begins with requirements gathering to define:

- The target audience
- Core educational objectives (identifying and responding to social engineering tactics)
- Essential gameplay mechanics and feedback structures

These requirements provide the foundation for creating the first prototype and ensure that the game meets both the educational and the general usability goals.

2. Prototype (Minimum Viable Product)

An initial prototype will be developed, focusing on a single social engineering tactic (e.g., urgency). The MVP will include:

- A functional interface and title screen

- One interactive scenario
- Boolean Yes/No decision option
- Immediate feedback explaining consequences
- A clear outcome (success or failure)

The goal is to test the core gameplay loop. Scenario presentation, decision-making, and educational feedback, before introducing additional complexity.

3. Review (User Testing and Evaluation)

Once the prototype is complete, it will be deployed for user testing. Participants representative of the target audience will evaluate:

- Scenario clarity
- Engagement and usability
- Understanding of the social engineering tactic
- Educational effectiveness of feedback

Structured feedback will inform necessary improvements to ensure the game meets its learning objectives.

4. Refine (Iterative Improvement)

Based on user feedback, refinements may include:

- Revising scenario wording
- Adjusting difficulty or pacing
- Enhancing clarity of feedback
- Improving interface elements

After the core mechanic has been validated, additional stages representing other social engineering tactics (e.g., fear, familiarity, reward) will be developed, each following the same rapid prototyping cycle.

Summary of the Cyclical Development Process

The iterative development cycle can be summarised as:

- Gather initial requirements
- Develop a minimal functional prototype
- Deploy for user testing
- Evaluate feedback
- Implement refinements
- Repeat for subsequent stages

Q2: Design Work

Requirements Specification

ID	Title	Priority (MoSCoW)	Description
R01	Core Decision-Making Loop	Must Have	Players must be able to make decisions in scenarios, with each choice affecting outcomes.
R02	Immediate Educational Feedback	Must Have	Each decision must provide clear feedback explaining consequences and the social engineering tactic used.
R03	Initial Social Engineering Scenario	Must Have	At least one fully playable scenario (e.g., urgency) must be included in the first prototype.
R04	Scenario Progression	Must Have	Players must be able to progress to the next stage upon completing the current one.
R05	Replayability	Should Have	Players should be able to replay scenarios to practice decision-making and reinforce learning.
R06	Element of challenge / difficulty	Should Have	Include a life/health metric which is affected by decisions.
R07	Simple User Interface	Should Have	The interface should be intuitive, allowing users to focus on learning without distraction.
R08	Scoring / Performance Indicator	Could Have	Optionally provide a score or rating to track performance.
R09	Sound Effects / Audio Feedback	Could Have	Simple audio cues could enhance engagement.
R10	Advanced Visual Effects	Won't Have	Complex animations or visuals

Storyboards, detailing Core gameplay loop and Decision branch

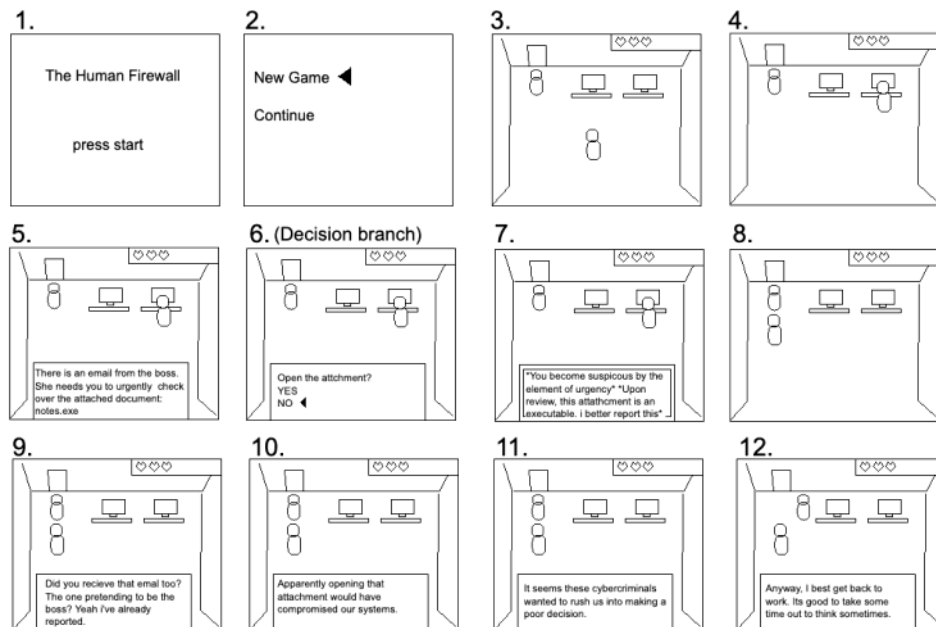


Figure 4, Storyboard: decision branching 1

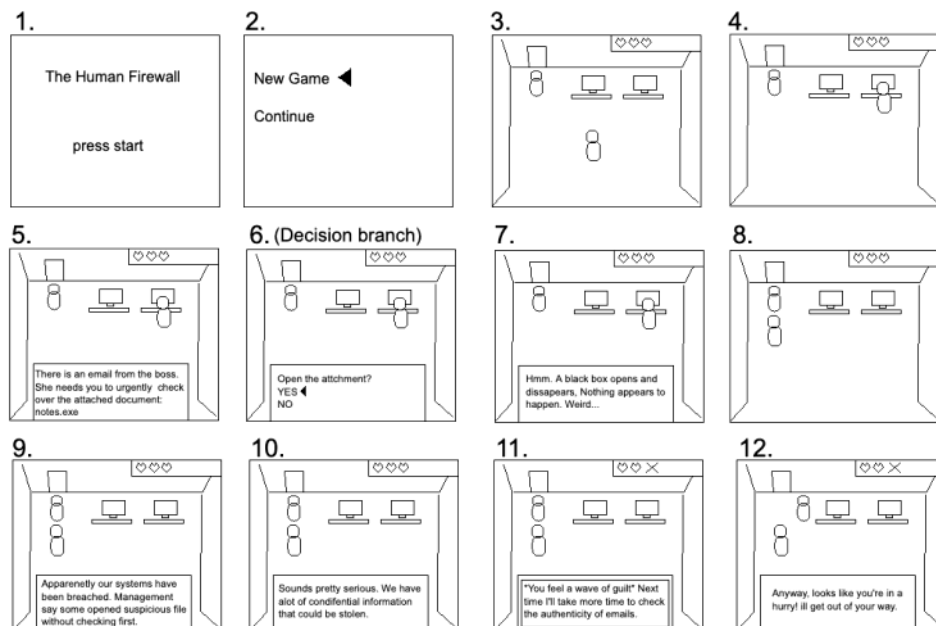


Figure 5, Storyboard: decision branching 2

Q3: Initial Practical Implementation

Initial practical work has been undertaken to develop a basic proof of concept. Default scenes and sprites were used to build a simple interactive environment. The primary aim of this exercise was to become familiar with the software and to understand the core functionality and features of GB Studio.

This first prototype enabled experimentation of how backgrounds, actors, and collision settings are used within the editor. Event triggers were implemented to test how interactions are activated, and dialogue boxes were added to evaluate how information can be presented during gameplay. Option selection mechanics were also tested to understand how player choices can be displayed within the interface, and how branching logic, through the use of conditions and variables, can influence game outcomes.

Note: As this is an ongoing project and the webpage is live, the game may have been updated since the time of writing. Furthermore, Access is currently password protected until the final release. Details are provided below:

URL: <https://dleone-uwtSD.itch.io/thehumanfirewall>

Password: uwtSD

This initial experimentation has provided foundational knowledge and demonstrates that the proposed objectives and overall scope of the project are realistic and achievable within the selected development and deployment environments.



Figure 6, Proof of concept prototype

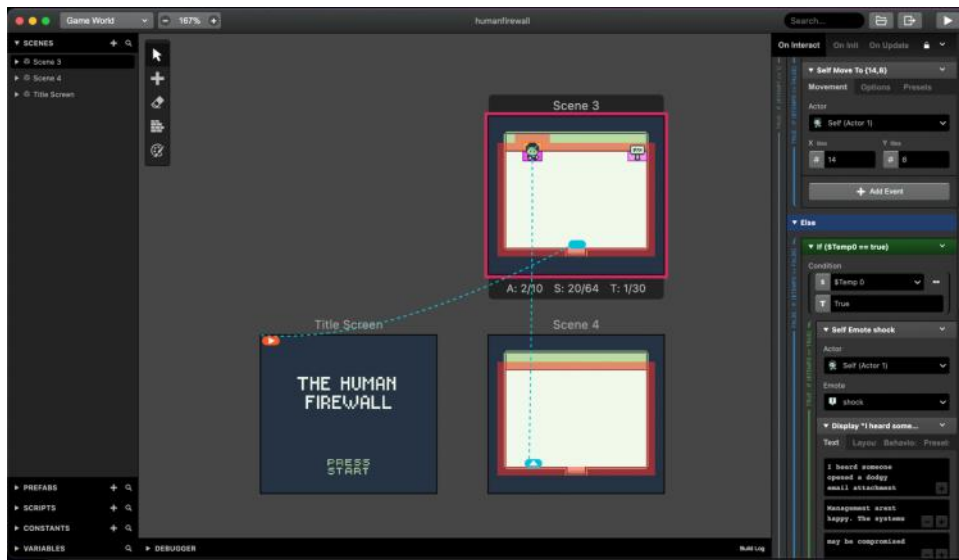


Figure 7, Prototyping and testing development tools

Appendices / Supplementary Information

Evidence of Independent Skills Development

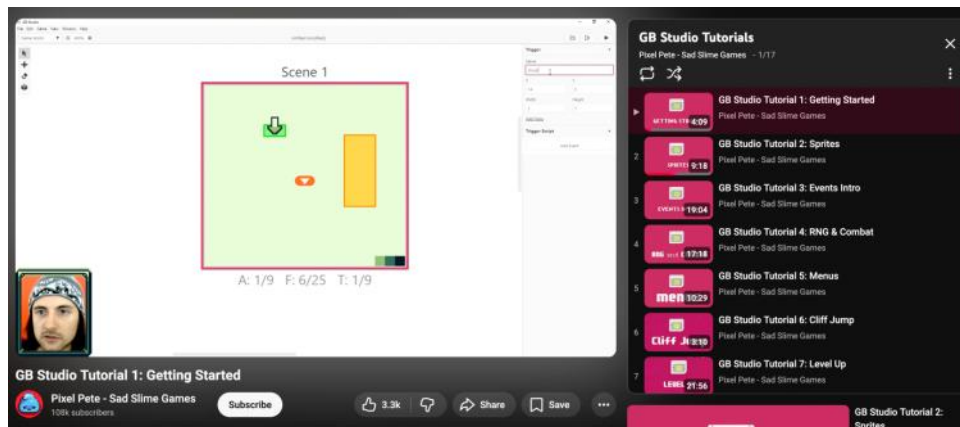


Figure 9, GB Studio Tutorial [4]

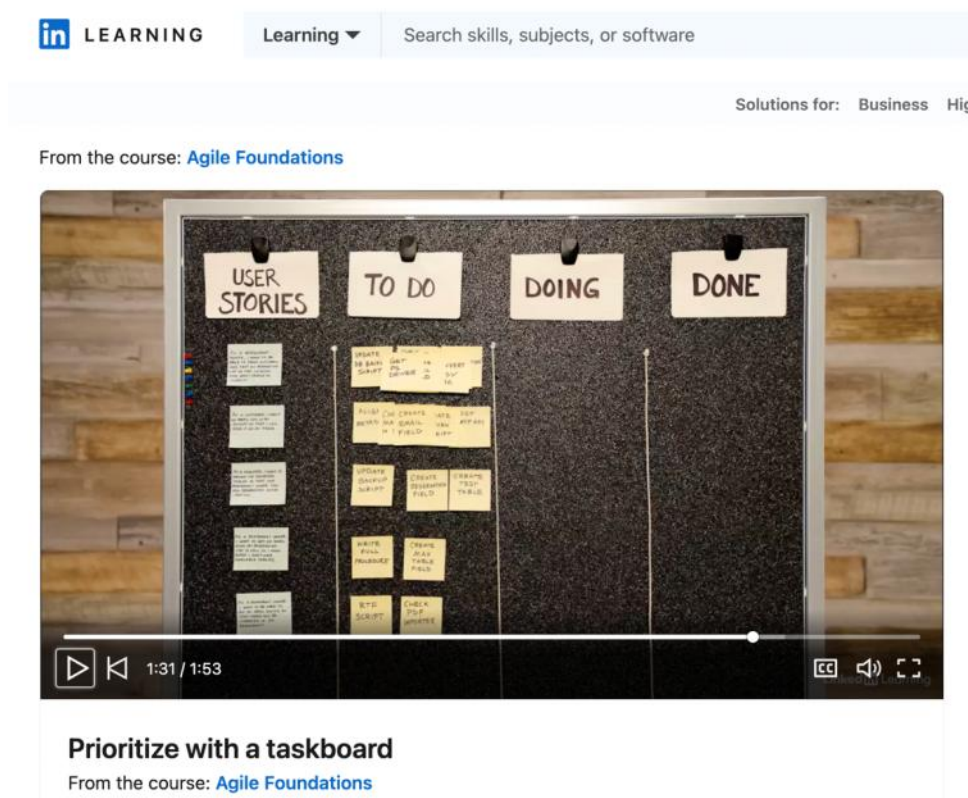


Figure 8, LinkedIn Learning: Agile Foundations [6]

Digital project planning tool: Using Miro to create user stories

User stories are descriptions of system functionality written from the user's perspective, typically structured as "As a..., I want..., so that...". They are used to define features in terms of user value and guide development prioritisation within an Agile workflow [17].



Figure 10, Using Miro for digital project planning [21]

Industry example informing Game Engine & Deployment Strategy

GB Studio is a game engine fundamentally designed to produce Nintendo Gameboy ROM files. While this choice may initially appear counterintuitive due to its association with legacy hardware, the platform's constraints are strategically valuable. Limitations in memory, processing power, visual resolution, and colour palette actively inform the design philosophy, encouraging simplified mechanics and increases focus on well-defined interactions. For a project operating within a fixed timeframe, these constraints can be considered advantageous.

A prominent example and direct inspiration of this approach comes from game Grimace's Birthday (2023), commissioned by McDonald's and developed using GB Studio within only a seven-week period. Despite the technical limitations, the game achieved a highly polished finish and was positively received. Additionally, it was deployed online and made playable through a web browser, demonstrating how a legacy format can easily be adapted to reach a wide audience on modern hardware. [18] [19].

Establishing Local Testing Workflow

In preparation for development, a streamlined local testing workflow was established. Establishing this workflow in advance supports the planned Agile approach by facilitating iterative testing and refinement. Specifically, this workflow involves the use a shell script (.command) file on macOS. ChatGPT has been used to support the creation of this script [20]. The script serves two primary functions:

1. Local Server Initialisation

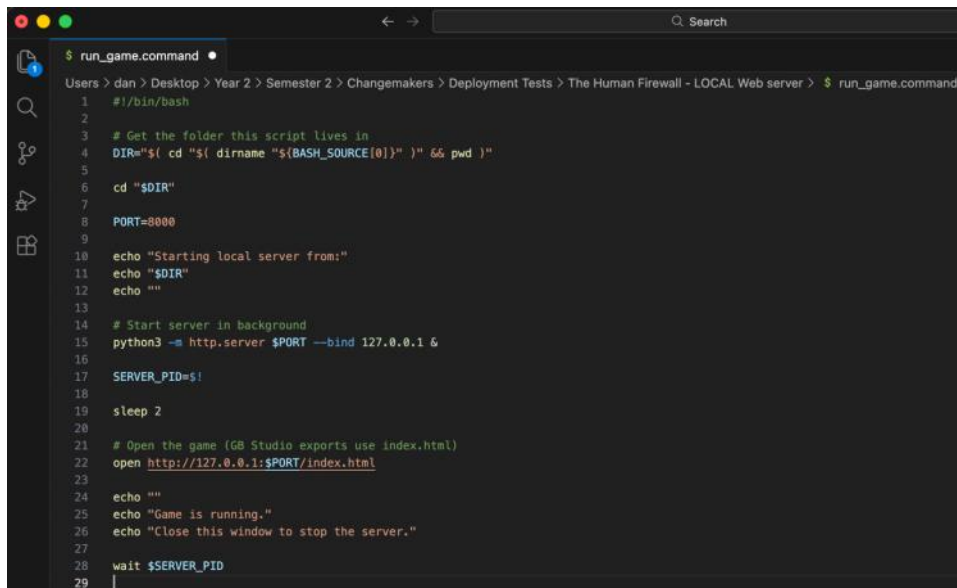
The script initiates a local HTTP server using Python.

2. Automatic Game Launch

Once the server is running, the script then automatically opens the 'index.html' file in the default web browser, further streamlining the local testing workflow.

The script has been tested and functions as desired. It is important to note that it is required only for local testing of the full game and webpage package. When the webpage is deployed to an online platform such as Itch.io, the hosting environment provides the web server, and

the script is not be necessary.



```
$ run_game.command
1  #!/bin/bash
2
3  # Get the folder this script lives in
4  DIR="$( cd "$( dirname "${BASH_SOURCE[0]}" )" && pwd )"
5
6  cd "$DIR"
7
8  PORT=8000
9
10 echo "Starting local server from:"
11 echo "$DIR"
12 echo ""
13
14 # Start server in background
15 python3 -m http.server $PORT --bind 127.0.0.1 &
16
17 SERVER_PID=$!
18
19 sleep 2
20
21 # Open the game (GB Studio exports use index.html)
22 open http://127.0.0.1:$PORT/index.html
23
24 echo ""
25 echo "Game is running."
26 echo "Close this window to stop the server."
27
28 wait $SERVER_PID
29
```

Figure 11, Local testing script [20]

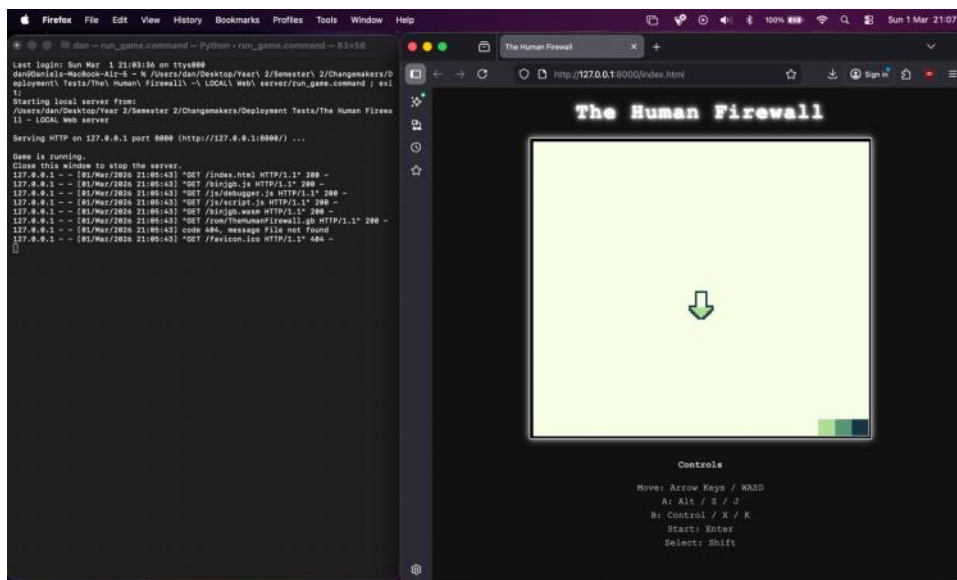


Figure 12, Local testing outcome

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