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# Assignment Report

SFWRENG 3S03 (2026W)

## Assignment 1

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GitHub URL

<https://github.com/hydrowoxy/3S03-A1>

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# 1 Testing with generative AI

## 1.1 a)

I asked ChatGPT 5.2 to specify three types of tests for the game described above.

The specific prompt I used was:

Suppose I am developing an action-adventure game such that: a) players explore a post-apocalyptic version of McMaster University; b) up to eight players may be accosted by zombies, mutated professors, angry Deans, killer squirrels, and more; c) gameplay can be both competitive and cooperative; and d) the game will be released on the PS5, Xbox Series X, Nintendo Switch and Sega Genesis (which is 16-bit and hasn't been manufactured since 1997).

Specify three types of tests for such a game.

The response I recieved was as follows (it originally included more emojis and markdown formatting, which I removed (and re-formatted) so that my document would compile and be legible):

For a game like this — especially one that spans **modern consoles and a 16-bit relic like the Sega Genesis** — testing needs to cover functionality, performance, and platform constraints very carefully.

Here are **three distinct and appropriate types of testing**:

### 1. Functional Testing (Gameplay & Mechanics)

**Purpose:** Ensure the game works according to design.

This would verify:

- Players can explore the post-apocalyptic McMaster campus without falling through geometry
- Zombies, mutated professors, angry Deans, and killer squirrels spawn correctly
- Combat, health, inventory, and abilities function as intended
- Competitive and cooperative modes behave correctly
- Up to eight players connect and interact properly

Examples of functional test cases:

- If 8 players join a session, all characters spawn correctly.
- If a Dean is defeated, loot drops trigger.

- Friendly fire behaves correctly depending on mode (co-op vs competitive).
- Save/load restores correct state.

This ensures the **core gameplay logic works**.

## 2. Performance & Stress Testing (Multiplayer & AI Load)

**Purpose:** Ensure the game runs smoothly under load.

Your game supports:

- Up to 8 players
- Multiple enemy types
- Large explorable campus
- Both modern and legacy hardware

Testing would include:

- Frame rate stability (60 FPS on PS5/Xbox, acceptable performance on Switch)
- Mass zombie swarm scenarios
- Network latency under 8-player online sessions
- Memory usage limits

Especially important:

- The **Nintendo Switch** has weaker hardware.
- The **Sega Genesis** has extreme memory and CPU constraints (16-bit, limited RAM, cartridge storage).

Stress testing would reveal:

- Frame drops when 50 squirrels attack simultaneously
- Network desync in competitive mode
- AI pathfinding breakdowns under heavy load

## 3. Compatibility & Platform Testing (Cross-Console + 16-bit Constraints)

**Purpose:** Ensure the game works correctly across very different hardware environments.

You are releasing on:

- PlayStation 5
- Xbox Series X
- Nintendo Switch
- Sega Genesis

Key concerns:

Modern Consoles (PS5 / Xbox Series X)

- 4K rendering compatibility
- Ray tracing support (if implemented)
- SSD load speed optimization
- Controller haptics

Nintendo Switch

- Lower resolution scaling
- Docked vs handheld mode behavior
- Limited GPU power

Sega Genesis

- 16-bit graphics limitations
- Severe RAM restrictions
- Cartridge size constraints
- No modern multiplayer networking
- Likely redesigned gameplay mechanics

Compatibility testing ensures:

- UI scaling works at different resolutions
- Input mapping works on each controller
- Save systems comply with platform standards
- The Genesis version doesn't exceed hardware limits

Summary

The three appropriate testing types are:

1. **Functional Testing** – Does the game behave correctly?
2. **Performance & Stress Testing** – Does it run smoothly under load?
3. **Compatibility/Platform Testing** – Does it work properly across PS5, Xbox, Switch, and Genesis?

Given the extreme hardware diversity (especially including a 1990s 16-bit console), **platform compatibility testing would be especially critical** for this project.

## 1.2 b)

Two poor, incorrect, or unclear aspects of the response are:

1. Tests are categorized by type (functional, performance, compatibility) but not granularity (unit, integration, system).

We have seen in class that unit and integration testing are often conflated. This is bad because the distinction is important for understanding feedback speed, debugging difficulty, and test design. The AI response not only fails to make this distinction, but also fails to even mention unit testing; it is unclear whether the tests it suggests are to be implemented as unit, integration or system tests (though it seems the AI is relying only on system-level tests based on the descriptions provided). This is a significant omission, as unit tests are crucial for verifying the correctness of individual components in isolation.

2. No measurable adequacy criteria are provided for any of the tests.

Adequacy criteria such as statement, branch, or MC/DC coverage are completely omitted. Coverage is defined as a way to measure a proportion of the structure or domain that a program, test case, or test suite exercises: this helps us understand when testing is sufficient. The AI response provides no guidance on how to determine when testing is adequate.

## 2 Testing with Junit

## 3 Testing parts of large systems

## 4 Test driven development (TDD)

## 5 Test coverage and AI