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Template based on the Centers for Medicare & Medicaid Services, Information Security & Privacy Management’s Assessment

**Security Assessment Report**

Version N.0

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# Summary

The goal of the security assessment for the Breakout game project was to identify and mitigate potential security vulnerabilities that could compromise the experience of its users.

## Assessment Scope

* C++ -
  + entire project is written using C++.
* SFML Graphics Library –
  + the project relies on SFML to render the graphics and shapes.
* Github –
  + used as a code repository and version control tool in the Breakout game project, enabling the tracking of changes made to the codebase.

## Summary of Findings

During the assessment, 0 were considered High risks, 4 Moderate risks, 0 Low, and 0 Informational risks. The SWOT used for planning the assessment are broken down as shown in Figure 2.  
Several major issues found in the Breakout game project were identified. One of the primary concerns was the lack of file encryption, which could allow any users to open and modify files if they had them downloaded. Additionally, the report highlighted the SFML library setup process as a weakness, as it was not user-friendly for inexperienced users. Finally, the report noted the absence of a point tracking system, which could affect the integrity of user skill levels. By addressing these identified vulnerabilities, the security of the Breakout game project could be significantly improved.

Figure 1. Findings by Risk Level

Graphical user interface, diagram

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Figure 2. SWOT

The SWOT addressed weaknesses and threats related to the SFML library setup process and file encryption.

## Summary of Recommendations

The changes that were made to the project was a time tracking feature, a restart feature, and a documentation feature that would print how long the program ran for, and how many times the player restarted. File encryption is the last change that is needed for extra security.

# Goals, Findings, and Recommendations

## Assessment Goals

The purpose of this assessment was to do the following:

* Ensure that the system was in compliance with a basic user-friendly program.
* Determine if the application was securely maintained.
* Improve coding methodologies.
* Add robustness to the applications overall security.

## Detailed Findings

The SFML library setup process was found to be not user-friendly for inexperienced users. The risk associated with this vulnerability is that inexperienced users may not be able to set up the library correctly, leading to the program not running.

The project was found to have no point tracking system to maintain the integrity of user skill. The risk associated with this vulnerability is that users may not be motivated to continue playing the game without the ability to track their progress, leading to a decrease in user engagement.

Found was a lack of file encryption, and files can be opened and edited by downloaders. The risk associated with this vulnerability is that hackers can manipulate the game files to cheat, which can ruin the gameplay experience for other users.

## Recommendations

The addition of a time tracking, restart, and documentation features are all beneficial enhancements to the game. The time tracking feature allows players to track their progress and monitor their performance over time. The restart feature provides players with the ability to easily start over when they make a mistake, and the documentation feature allows players to keep track of their progress by seeing how long they played and how many times they restarted. These features not only improve the user experience but also add an extra layer of engagement to the game. The time feature, tracking feature and restart feature fall under the moderate category in Table 2 as they do not pose any significant risk to the game's security.

On the other hand, file encryption is a necessary change to ensure the security of the game. Without file encryption, the source code can be easily accessed and edited by anyone, leading to potential exploits of the game's integrity.

# Methodology for the Security Control Assessment

**3.1.1 Risk Level Assessment**

Each Business Risk has been assigned a Risk Level value of High, Moderate, or Low. The rating is, in actuality, an assessment of the priority with which each Business Risk will be viewed. The definitions in Table 1 apply to risk level assessment values (based on probability and severity of risk). While Table 2 describes the estimation values used for a risk’s “ease-of-fix”.

Table - Risk Values

| Rating | Definition of Risk Rating |
| --- | --- |
| High Risk | Exploitation of the technical or procedural vulnerability will cause substantial harm to the business processes. Significant political, financial, and legal damage is likely to result |
| Moderate Risk | Exploitation of the technical or procedural vulnerability will significantly impact the confidentiality, integrity and/or availability of the system, or data. Exploitation of the vulnerability may cause moderate financial loss or public embarrassment to organization. |
| Low Risk | Exploitation of the technical or procedural vulnerability will cause minimal impact to operations. The confidentiality, integrity and availability of sensitive information are not at risk of compromise. Exploitation of the vulnerability may cause slight financial loss or public embarrassment |
| Informational | An “Informational” finding, is a risk that has been identified during this assessment which is reassigned to another Major Application (MA) or General Support System (GSS). As these already exist or are handled by a different department, the informational finding will simply be noted as it is not the responsibility of this group to create a Corrective Action Plan. |
| Observations | An observation risk will need to be “watched” as it may arise as a result of various changes raising it to a higher risk category. However, until and unless the change happens it remains a low risk. |

Table - Ease of Fix Definitions

| Rating | Definition of Risk Rating |
| --- | --- |
| Easy | The corrective action(s) can be completed quickly with minimal resources, and without causing disruption to the system or data |
| Moderately Difficult | Remediation efforts will likely cause a noticeable service disruption   * A vendor patch or major configuration change may be required to close the vulnerability * An upgrade to a different version of the software may be required to address the impact severity * The system may require a reconfiguration to mitigate the threat exposure * Corrective action may require construction or significant alterations to the manner in which business is undertaken |
| Very Difficult | The high risk of substantial service disruption makes it impractical to complete the corrective action for mission critical systems without careful scheduling   * An obscure, hard-to-find vendor patch may be required to close the vulnerability * Significant, time-consuming configuration changes may be required to address the threat exposure or impact severity * Corrective action requires major construction or redesign of an entire business process |
| No Known Fix | No known solution to the problem currently exists. The Risk may require the Business Owner to:   * Discontinue use of the software or protocol * Isolate the information system within the enterprise, thereby eliminating reliance on the system   In some cases, the vulnerability is due to a design-level flaw that cannot be resolved through the application of vendor patches or the reconfiguration of the system. If the system is critical and must be used to support on-going business functions, no less than quarterly monitoring shall be conducted by the Business Owner, and reviewed by IS Management, to validate that security incidents have not occurred |

# Figures and Code

**Changes made**: [Commits · Justinrubio/BreakOutGame (github.com)](https://github.com/Justinrubio/BreakOutGame/commits/main)

Fix 1 -

* There was no logging or documentation being done by the program, so a clock was implemented to log how long the game is played for until exiting.
* Included <chrono> library to use the clock.
* Text

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* Clock starts at the beginning of main:
  + 
* After exiting main game loop, captures when it stops and compares the difference from the start time. Then prints to log.
* Text

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Fix 2 –

* There were many cmake files that were not in use and were taking up memory and slowing execution time. (too many to show all)
* A screenshot of a computer

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Fix 3 –

* Once the user had started the game, there was no way to restart the ball back to the paddle.
* A restart button was added to fix this, which resets the balls location.
* This is beneficial for testing the wall and ball mechanics, that way there is no wait in between testing shots.
* A counter was added to count how many times a user reset the ball in one game. This promotes game integrity and skill.

|  |
| --- |
| BreakoutGame.cpp file  Text  Description automatically generated  Text  Description automatically generated with medium confidence  A screenshot of a computer screen  Description automatically generated with medium confidence |

|  |
| --- |
| Breakout\_defs.h file |

# Works Cited

[**Fix 1:**](https://github.com/Justinrubio/BreakOutGame/commit/246fe4d4638cfeb2154557ce140131b672c1265f)

* **https://github.com/Justinrubio/BreakOutGame/commit/246fe4d4638cfeb2154557ce140131b672c1265f**

[**Fix**](https://github.com/Justinrubio/BreakOutGame/commit/3077eec317ba9866560a6be7c394b08b2502fc75) **2:**

* **https://github.com/Justinrubio/BreakOutGame/commit/3077eec317ba9866560a6be7c394b08b2502fc75**

**Fix 3:**

* [**https://github.com/Justinrubio/BreakOutGame/commit/93316d619a2de5718950df94605afaf8bf30b97c**](https://github.com/Justinrubio/BreakOutGame/commit/93316d619a2de5718950df94605afaf8bf30b97c)
* [**https://github.com/Justinrubio/BreakOutGame/commit/f693e94d7cf68f515872c58cb69547430fbc8dcc**](https://github.com/Justinrubio/BreakOutGame/commit/f693e94d7cf68f515872c58cb69547430fbc8dcc)