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Computer Security

Homework 2 Part 3

<center>Vulnerability Rationale Explanation</center>

I identified several vulnerabilities in my original reference monitor, particularly concerning concurrent access and file operations. One significant vulnerability in the original reference monitor involved the lack of a proper locking mechanism. This oversight allowed multiple threads or processes to potentially modify the file simultaneously, risking data corruption. To address this, I introduced a locking mechanism using self.lock to ensure exclusive access to the file, preventing data inconsistencies.

Another issue in the original reference monitor was the inaccurate file size updating. I forgot to update the file size when undoing a write, leading to misleading file information and possibly access to unauthorized parts of data. To resolve this, I redefined the undo method by updating the file size when undoing changes, ensuring it always reflects the file's true state.

In addition to these improvements, I paid attention to error handling in the updated reference monitor. I implemented specific error-raising mechanisms to address different scenarios. For instance, I introduced a FileClosedError to handle operations on closed files, preventing unexpected behavior. I also added a RepyArgumentError to address issues related to invalid arguments, such as negative offsets or non-string data types, thereby preserving program stability. I also considered error precedence, ensuring that errors are raised in a hierarchical manner and prioritizing more critical issues.