

### Assignment 2.3

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My prior submission of the reference monitor exhibited certain vulnerabilities that left it susceptible to attacks. I have rectified these issues as part of this assignment. The vulnerabilities included:

1. **End Of File Error Condition:** Previously, I did not account for situations where a user could attempt to write at an offset beyond the file's length, allowing multiple cases to bypass my reference monitor. To address this, I have now implemented handling for the EOF condition. If the offset is greater than the EOF, I raise an error as the original writeat would.
2. **Negative Offset Error Condition:** I had not incorporated measures to handle operations trying to write at negative offsets, exposing my reference monitor to potential attacks. To rectify this, I have added a condition within the writeat method, checking if the user's specified offset is invalid or negative. In such cases, it now directly raises a `RepyArgumentError` without revealing any details to the attacker.
3. **Threading:** My previous reference monitor was inadequately designed to handle operations on multiple threads, leading to the execution of invalid operations and producing incorrect outcomes. To address this, I have introduced the use of locks in my new reference monitor, enhancing its thread safety. The updated implementation creates locks, acquires them during operations, and subsequently releases them to ensure availability.
4. **Certain conditions of multiple writes and undos:** Some specific combinations of multiple write and undo operations were causing failures in my reference monitor, resulting in incorrect outputs. To resolve this issue, I have adjusted my approach to the handling of the undo function. Previously, it involved parsing through the write stack again during undo and adding contents back to the file. Now, after each write, the stack only contains one pending element, which has helped address these specific attack combinations and enhanced the security of my reference monitor.
5. **File Closed Error Condition:** I had not previously addressed the File Closed Error condition, allowing some attack cases attempting to access and perform operations on a closed file to trigger exceptions.
6. **Precedence of error:** The API indicated that `RepyArgumentError` should have higher precedence than `FileClosedError`. I have updated my reference monitor to reflect this change.