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NPTEL (https://swayam.gov.in/explorer?ncCode=NPTEL) » Information Security - 5 - Secure Systems Engineering (course)

Week 5 : Assignment 5

The due date for submitting this assignment has passed.

Due on 2025-02-26, 23:59 IST.

Assignment submitted on 2025-02-25, 19:24 IST

1) Which of the following best describes the relationship between Software Fault Isolation (SFI) and Native Client (NaCl)? ***1 point***

- (●) NaCl uses SFI to prevent memory access outside defined boundaries
- ( ) NaCl and SFI are competing technologies that serve the same purpose
- ( ) SFI is a subset of NaCl's security features
- ( ) NaCl replaced SFI in modern browsers

Yes, the answer is correct.
Score: 1

Accepted Answers:
NaCl uses SFI to prevent memory access outside defined boundaries

2) When implementing software fault isolation, which of the following techniques would LEAST likely be used to ensure memory safety? ***1 point***

- ( ) Inserting runtime bounds checks before memory operations
- ( ) Using segment registers to partition memory
- (●) Regular expression validation of user input
- ( ) Sandboxing memory access through instruction rewriting

Yes, the answer is correct.

Score: 1
Accepted Answers:
Regular expression validation of user input

3) In the context of application confinement, what is the primary difference between chroot and Linux containers? ***1 point***

- chroot provides network isolation while containers don't
- Containers share the same root filesystem while chroot environments don't
- Containers provide resource isolation and namespace separation while chroot only restricts filesystem access
- chroot supports process isolation while containers don't

Yes, the answer is correct.
Score: 1
Accepted Answers:
Containers provide resource isolation and namespace separation while chroot only restricts filesystem access

4) In the Bell-LaPadula model, if a process is running at "Confidential" level and creates a new file, the file must be labeled at "Confidential" or higher level to maintain the *-property ***1 point***

- True
- False

Yes, the answer is correct.
Score: 1
Accepted Answers:
True

5) In a system implementing mandatory access control, what happens if a user with security level "Secret" tries to write data to a file labeled "Top Secret"? ***1 point***

- The write is allowed because the user has sufficient clearance
- The write is denied due to the *-property (no write up)
- The write is allowed only if discretionary access control permits it
- The write is allowed if the user has special privileges

No, the answer is incorrect.
Score: 0
Accepted Answers:
*The write is denied due to the *-property (no write up)*

6) When implementing application confinement through seccomp-bpf, which system call would most likely be allowed in a restrictive filter while maintaining security? ***1 point***

- execve()
- read()
- ptrace()
- mount()

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Yes, the answer is correct.
Score: 1
Accepted Answers:
read()

7) Software fault isolation techniques can completely eliminate the need for hardware memory protection mechanisms in modern operating systems. ***1 point***

- True
- False

Yes, the answer is correct.
Score: 1
Accepted Answers:
False

8) Which of the following is a key difference between Role-Based Access Control (RBAC) and Mandatory Access Control (MAC)? ***1 point***

- RBAC is enforced by the operating system, whereas MAC is discretionary
- RBAC allows users to change their roles dynamically, whereas MAC enforces strict policies
- MAC is based on user roles, whereas RBAC is based on security labels
- MAC is primarily used in commercial environments, while RBAC is used in military systems

Yes, the answer is correct.
Score: 1
Accepted Answers:
RBAC allows users to change their roles dynamically, whereas MAC enforces strict policies

9) Which of the following is a major challenge in implementing Software Fault Isolation (SFI)? ***1 point***

- Performance overhead due to instruction rewriting
- Lack of support for multi-threaded applications
- Inability to enforce memory isolation
- Difficulty in integrating with modern compilers

Yes, the answer is correct.
Score: 1
Accepted Answers:
Performance overhead due to instruction rewriting

10) According to the Bell-LaPadula model's "Simple Security Property," a subject with a "Secret" clearance can read a document classified as "Top Secret" as long as they have discretionary access rights. ***1 point***

- True
- False

Yes, the answer is correct.
Score: 1

Accepted Answers:
False