Input Validation Connection to Security Goals and Concepts

Target Course

CS1

Learning Goals

A student shall be able to:

1. Describe foundational security concepts in securing networks and systems.
2. Describe security design principles and identify security issues associated with common threats and attacks.

IAS Outcomes

The CS2013 Information Assurance and Security outcomes addressed by this module are:

IAS Knowledge Topic	Outcome
Defensive Programming	1. Explain why input validation and data sanitization is necessary in the face of adversarial control of the input channel. [Familiarity]
Foundational Concepts in Security	1. Analyze the tradeoffs of balancing key security properties (Confidentiality, Integrity, and Availability). [Usage]
	2. Describe the concepts of risk, threats, vulnerabilities and attack vectors (including the fact that there is no such thing as perfect security). [Familiarity]
	3. Explain the concepts of authentication, authorization, access control. [Familiarity]
	4. Explain the concept of trust and trustworthiness. [Familiarity]
Principles of Secure Design	2. Summarize the principle of fail-safe and deny-by-default. [Familiarity]

Dependencies

- Assumes knowledge of cybersecurity principles.
- Assumes coverage of input validation modules 1 through 5.

Summary

Draw connections between input validation and data sanitization to security goals and foundational security concepts.

Estimated Time

[Provide the estimated amount of lecture time to cover this module, using the notion of time as defined in CS2013.]

Materials

How does input validation balance the security goals of Confidentiality, Integrity and Availability?

Input validation helps provide data integrity by validating user inputs. When an input error is detected by the **deny-by-default** design principal the program should immediately reject the request rather than attempting to interpret erroneous input into something meaningful. This approach decreases availability (or usability since from a user's perspective an easy to correct input may need to be reentered).

How does input validation relate to the security concepts of Assurance, Authenticity and Anonymity?

Input validation increases and supports assurance of system's data. By validating data, system demonstrates to user that data is sensible. A user builds trust in a system that does not allow bad data to be processed.

Assessment Methods

[List the assessment methods that have been used to assess student learning for this module. The format of these methods is fairly flexible, but should be applied consistently within the module.]

References

None.