Defensive-Programming.py

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# Presentation for CSCI 405 – Principles of Cybersecurity
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def Introduction():
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    Defensive Programming:
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        Implement software to remain functional even under attack
        # (Stallings & Brown, 2024)

        Anticipating and preemptively correcting programming mistakes
        # (Carty, 2020)
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def Introduction():

Common Cyber Attacks:

- SQL Injection
- Buffer Overflow
- XSS Scripting
- Injection Attack

Defensive programming practices prevent these attack

def Mindset():

Common Input Assumptions:

- Has a value
- Correct data type
- Preferred format

Defensive Programming Input Assumptions:

- All input is dangerous
- Account for misuse

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def InputValidation():
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Blacklisting

Whitelisting

Regular Expression

Filtering

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def InputValidation(): # Blacklisting
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Blacklisting:

List known dangerous input

Reject input on the blacklist

Infinite possibilities of dangerous input

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def InputValidation(): # Whitelisting

    Whitelisting:

        List known safe input

        Only allow input on the whitelist

        Finite list

        Better than blacklisting


        Inefficient with large datasets
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def InputValidation(): # Regular Expression

    Regular Expression:

        Check for patterns

        Email Address Example:

            xxxx@xxxx.xxx

        Allow input if it matches the format


        Tedious to write
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def InputValidation(): # Filtering
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Filtering:

Replace dangerous characters with safe characters

Make input safe

Requires additional checks and validation

def Summary():

Defensive programming:

- Prevents common cyber attacks
- Changes the programmer’s mindset
- Deploys input validation practices
  - Blacklisting
  - Whitelisting
  - Regular Expression
  - Filtering

return Citations

Stallings, W., & Brown, L. (2024). *Computer security: Principles and practice*. Pearson Education Limited.

Carty, D. (2020, February 13). *Learn 5 defensive programming techniques from experts: TechTarget*. Search Software Quality. https://www.techtarget.com/searchsoftwarequality/feature/Learn-5-defensive-programming-techniques-from-experts

Teto, J. K., Bearden, R., & Lo, D. C.-T. (2017). The impact of defensive programming on I/O cybersecurity attacks. Proceedings of the SouthEast Conference, 102–111. https://doi.org/10.1145/3077286.3077571