IT-2750: SCRIPTING FUNDAMENTALS FOR CYBERSECURITY

Cuyahoga Community College

Viewing: IT-2750 : Scripting Fundamentals for Cybersecurity

Board of Trustees:
May 2022

Academic Term:
Fall 2022

Subject Code
IT - Information Technology

Course Number:
2750

Title:
Scripting Fundamentals for Cybersecurity

Catalog Description:
Introduction to concepts important for popular cybersecurity scripting languages, including basic data types, control structures, regular expressions, input/output, and textual analysis. One or more common scripting languages relevant to the field of cybersecurity will be utilized in the course.

Credit Hour(s):
3

Lecture Hour(s):
2

Lab Hour(s):
2

Requisites

Prerequisite and Corequisite
IT-1025 Information Technology Concepts for Programmers

Outcomes

Course Outcome(s):
Script using language(s) appropriate for modern cybersecurity applications including basic data types, control structures, regular expressions, input/output, and textual analysis.

Objective(s):
1. Identify and explain common problem solving strategies applied to cybersecurity scripting.
2. Develop secure scripts using current languages and tools.
3. Comprehend and explain simple cryptographic algorithms.
4. Use algorithms to store, process and analyze internal and external data.
5. Apply scripting techniques to process images.
6. Use visualization as a means of displaying patterns.
7. Use brute force pattern matching techniques for cryptanalysis.

Methods of Evaluation:
Evaluation can include any combination of the following:
1. Assignments
2. Quizzes
3. Exams
4. Lab Assignments
5. Projects

6. Reports
7. Oral Evaluations

Course Content Outline:

1. Common problem solving strategies applied to cybersecurity scripting.
   a. Problem solving strategy of simplification as it applies to cybersecurity scripting.
   b. Problem solving strategy of generalization as it applies to cybersecurity scripting.
   c. Problem solving strategy of representation as it applies to cybersecurity scripting.
2. Secure scriptings using current languages and tools.
   a. Basic object-oriented concepts including classes, properties, methods, constructors, instances, and abstraction.
   b. Programming structures such as sequence, selection, and repetition.
   c. Value of program comments.
3. Simple cryptographic algorithms.
   a. Control logic and string processing methods.
   b. Message encoding using a variety of cipher techniques.
4. Algorithms to store, process and analyze internal and external data.
   a. Sort, manipulate, store, and retrieve data using a variety of list methods.
   b. Data spread and limits using central tendency, dispersion, and frequency distribution.
5. Scripting techniques to process images.
   a. Pixel-based image processing.
   b. Tuples and their use.
   c. Image processing algorithms.
   d. Explain passing functions as parameters.
6. Visualization as a means of displaying patterns.
   a. Data mining to find patterns for visualizations.
   b. Cluster analysis as an example of data visualization.
7. Brute force pattern matching techniques for cryptanalysis.
   a. Cryptanalysis.
   b. Brute force solutions.
8. Brute force pattern matching algorithm using regular expressions.

Resources

Miller, B. & Ranum, D. (2016) *Introduction to Scripting*, Burlington, MA: Jones & Bartlett Learning.

Guttag, J. (2016) *Introduction to Computation and Programming Using Python: With Application to Understanding Data*, Cambridge: The MIT Press.

Sinha, S. (2017) *Beginning Ethical Hacking with Python*, New York: Apress.

Jones, D. & Hicks, J. (2016) *Learn Windows PowerShell in a Month of Lunches*, Greenwich, CT: Manning Publications.

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