Preview: IT4079 : Python Scripting

Syllabus

Course Overview

This course focuses on the role scripting plays in information security. Learners gain and demonstrate knowledge of the fundamentals of Python scripting by developing a range of security-related scripts.

Course Competencies

(Read Only)

To successfully complete this course, you will be expected to:

1. Apply the Python scripting language to write simple scripts.
2. Write linear and looping Python scripts.
3. Write simple and compound conditions within a Python programming language.
4. Apply Python scripting language to solve complex security-related problems.
5. Communicate effectively.

Course Prerequisites

Prerequisite(s): IT2249 or IT2240 and IT4803.

Syllabus >> Course Materials

Required

The materials listed below are required to complete the learning activities in this course.

Library

The following required readings are provided in the Capella University Library or linked directly in this course. To find specific readings by journal or book title, use Journal and Book Locator. Refer to the Journal and Book Locator library guide to learn how to use this tool.

- Hetland, M. L. (2017). Beginning python: From novice to professional (3rd ed.). Berkeley, CA: Apress.
- Kalb, I. (2016). Learn to program with python (1st ed.). Berkeley, CA: Apress.

External Resource

Please note that URLs change frequently. While the URLs were current when this course was designed, some may no longer be valid. If you cannot access a specific link, contact your instructor for an alternative URL. Permissions for the following links have been either granted or deemed appropriate for educational use at the time of course publication.

- After Hours Programming. (n.d.). Python comments. Retrieved from http://www.afterhoursprogramming.com/tutorial/Python/Comments/
- After Hours Programming. (n.d.). Python introduction. Retrieved from https://www.afterhoursprogramming.com/tutorial/python/introduction-python/
- After Hours Programming. (n.d.). Python overview. Retrieved from https://www.afterhoursprogramming.com/tutorial/python/python-overview/
- Biondi, P. and the Scapy Community. (n.d.). Scapy Download and Installation. Retrieved from https://scapy.readthedocs.io/en/latest/installation.html
- Biondi, P. and the Scapy Community. (n.d.). Welcome to Scapy's Documentation! Retrieved from https://scapy.readthedocs.io/en/latest/introduction.html
- LearnPython.org. (n.d.). Classes and objects. Retrieved from http://www.learnpython.org/en/Classes_and_Objects
- LearnPython.org. (n.d.). Hello, world! Retrieved from www.learnpython.org/en/Hello%2C_World%21
- Python Releases for Mac OS X. (n.d.). Python Releases for Mac OS X. Retrieved from https://www.python.org/downloads/mac-osx/
- Python Software Foundation. (2018). Python. Retrieved from https://www.python.org
- Python.org. (n.d.). Beginner's Guide to Python. Retrieved from https://wiki.python.org/moin/BeginnersGuide
- Python.org. (n.d.). Downloading Python. Retrieved from https://wiki.python.org/moin/BeginnersGuide/Download
- Real Python. (2018). Which Python IDE is right for you? Retrieved from https://realpython.com/python-ides-code-editors-guide/#which-python-ide-is-right-for-you
- Richardson, L. (n.d.). Beautiful Soup documentation. Retrieved from https://www.crummy.com/software/BeautifulSoup/bs4/doc/
- Richardson, L. (n.d.). Installing Beautiful Soup. Retrieved from https://www.crummy.com/software/BeautifulSoup/bs4/doc/#installing-beautiful-soup

Suggested

The following materials are recommended to provide you with a better understanding of the topics in this course. These materials are not required to complete the course, but they are aligned to course activities and assessments and are highly recommended for your use.

Optional

The following optional materials are offered to provide you with a better understanding of the topics in this course. These materials are not required to complete the course.

Library

The following optional Skillsoft resources available via the Capella University Library.

- Miller, Wesley. Skillsoft. (2016). Python for data science: Lists and dictionaries. [Video].
- O'Connor, T. J. (2013). Violent python: A cookbook for hackers, forensic analysts, penetration testers, and security engineers. Waltham, MA: Syngress, an imprint of Elsevier.
- Skillsoft. (n.d.) Python Fundamentals: Installing Python 3 on Windows [Video].
- Skillsoft. (n.d.) Python Fundamentals: Python IDEs. [Video].
- Skillsoft. (n.d.). Python Fundamentals: An Overview of Python [Video].
- Skillsoft. (n.d.). Python Fundamentals: Basic Iteration. [Video].
- Skillsoft. (n.d.). Python Fundamentals: Classes and Types. [Video].
- Skillsoft. (n.d.). Python Fundamentals: Hello World. [Video].
- Skillsoft. (n.d.). Python Fundamentals: Importing a Module at the REPL. [Video].
- Skillsoft. (n.d.). Python Fundamentals: The While Loop in Python. [Video].
- Skillsoft. (n.d.). Python Fundamentals: Writing Data. [Video].
- Skillsoft. (n.d.). Python: Creating and Executing Loops. [Video].
- Skillsoft. (n.d.). Python: Paths, Directories, and Filenames. [Video].
- Skillsoft. (n.d.). Python: What is a Module? [Video].
- Skillsoft. (n.d.). Python: Working with Strings. [Video].

External Resource

Please note that URLs change frequently. While the URLs were current when this course was designed, some may no longer be valid. If you cannot access a specific link, contact your instructor for an alternative URL. Permissions for the following links have been either granted or deemed appropriate for educational use at the time of course publication.

- Hack This Site. (n.d.). Retrieved from https://www.hackthissite.org/

Unit 1 >> Getting Started with Python

Introduction

In Unit 1, you are introduced to Python and its software development environment. Python is a general-purpose programming language that is easy to learn, yet incredibly powerful. With Python you can build everything from simple scripts to complex applications. There are many software development environments available for use in Python development. In this course, we will primarily use an integrated development and learning environment, known as IDLE, which is free and packaged with the Python installer. However, feel free to explore and experiment with other IDEs (integrated development environments).

Learning Activities

u01s1 - Studies

Readings

Use your textbook to complete the following:

- Kalb, I. (2016). Learn to program with python (1st ed.).
  - Read Chapter 1, "Getting Started," and Chapter 2, "Variables and Assignment Statements."
- Hetland, M. L. (2017). Beginning python: From novice to professional (3rd ed.).
  - Read Chapter 1, "Instant Hacking: The Basics."

Internet

- Real Python. (2018). Which Python IDE is right for you? Retrieved from https://realpython.com/python-ides-code-editors-guide/#which-python-ide-is-right-for-you
  - Find your perfect Python development setup with this review of Python IDEs and code editors.

Self-Paced Tutorials

Complete the following tutorials and lessons:

- LearnPython.org. (n.d.). Hello, world! Retrieved from www.learnpython.org/en/Hello%2C_World%21
- After Hours Programming. (n.d.). Python overview. Retrieved from https://www.afterhoursprogramming.com/tutorial/python/python-overview/
- After Hours Programming. (n.d.). Python introduction. Retrieved from https://www.afterhoursprogramming.com/tutorial/python/introduction-python/
- After Hours Programming. (n.d.). Python comments. Retrieved from http://www.afterhoursprogramming.com/tutorial/Python/Comments/

Optional Skillsoft Resources

- Skillsoft. (n.d.). Python Fundamentals: An Overview of Python [Video].
- Skillsoft. (n.d.). Python Fundamentals: Installing Python 3 on Windows [Video].
- Skillsoft. (n.d.). Python Fundamentals: Python IDEs. [Video].
- Skillsoft. (n.d.). Python Fundamentals: Hello World. [Video].

u01s1 - Learning Components

- Download and the Install Python and its Integrated Development Learning Environment.

u01s2 - Software Preparation and Technology Access

In this course, you will be using software and technology that is needed to complete designated activities and assignments. There is no additional cost for this software and technology. Some software packages will be made available to you at no additional cost through Capella's subscription with Microsoft, while other software packages are available for free download through open-source licensing.

Capella University requires learners to meet certain minimum computer requirements. Please note that some software required for a course may exceed these minimum requirements. Check the requirements for the software you may need to download and install to make sure it will work on your device. Most software will require a Windows PC. If you use a Mac, refer to Installing a Virtual Environment and Windows on a Mac.

The software and technologies below are strongly recommended to support you in completing the course objectives. If you have access to other tools that you believe may still meet the requirements of this course, please discuss your selected alternatives with your instructor.

If you use assistive technology or any alternative communication methods to access course content, please contact DisabilityServices@Capella.edu with any access-related questions or to request accommodations.

For this course, follow the instructions provided through the links below to download and install software or register for an account, as required.

Open-Source Software

- Python: Go to the Download section of the Python Beginners Guide to download the latest version of Python. **Note:** SQLite3 is included as part of the Python installation.
    - If you have a Mac, got to Python Releases for Mac OS to get the latest version.
- Beautiful Soup: Go to Installing Beautiful Soup to download the latest version. Review the Beautiful Soup Documentation.
- Scapy: Go to the Download and Installation instructions to download Scapy. Review the Introduction About Scapy information.

If you encounter any difficulties in the download and installation process, post a detailed question in the Ask Your Instructor section of the course. Your instructor should be able to help you or point you in the right direction for the answers you need.

Additional Online Resources

Note: As a Capella learner, you have access to IT online resources through Capella's Skillsoft subscription, where you can find helpful materials.

u01s2 - Learning Components

- Download and the Install Python and its Integrated Development Learning Environment.

u01a1 - Introduction to Python Concepts

For this assignment, you will download and install Python and get hands-on experience with Python's default editor IDLE (Integrated Development and Learning Environment) by creating three variations of the classic "Hello World" program. Review the Real Python article "Which Python IDE is right for you?" if you choose to use an alternative IDE.

Writing Python Program Instructions:

1. Following along with "Installing Python" in Beginning python: From novice to professional (3rd ed.), for your specific operating system (Windows, Macintosh, or Linux) download and install the latest version of Python.
2. Using Python's Integrated Development and Learning Environment (IDLE) create the following three variations of the classic "Hello World" program.
   a. For your first Python program, write *hello_world.py* that simply prints "Hello, world!"
   b. For your second Python program, write *hello_world2.py* to make use of variables.
   c. For your third Python program, write a program that accepts the user's first and last name as input (e.g., you may use your name or fictitious name). The program should output a sentence containing the following welcome message. "Hello [firstname][lastname], welcome to IT4079!"
3. Test your applications and document testing by taking screenshots.
4. Explain the approach taken to complete this assignment and the major decisions made.
5. Use the **Weekly Solutions Submission Template** in the Resources area. Your writing should be generally free from spelling, grammatical, or other mechanical errors.

Submit your completed documents in the assignment area.

Course Resources

Hetland, M. L. (2017). Beginning python: From novice to professional (3rd ed.). Berkeley, CA: Apress. ISBN:9781484200292

Real Python. (2018). Which Python IDE is right for you? Retrieved from https://realpython.com/python-ides-code-editors-guide/#which-python-ide-is-right-for-you

Python Software Foundation. (2018). Python. Retrieved from https://www.python.org

Weekly Solutions Submission Template

u01d1 - Your Initial Experience Working with Python

Discuss your initial experience working with Python. Summarize which Integrated Development Environment (IDE) you have tried and describe your experience. What issues did you run into and what questions do you have at this point?

Response Guidelines

Review the postings of your peers and respond to at least two, describing whether you agree or disagree with their strategies and why.

Course Resources

Undergraduate Discussion Participation Scoring Guide

Real Python. (2018). Which Python IDE is right for you? Retrieved from https://realpython.com/python-ides-code-editors-guide/#which-python-ide-is-right-for-you

u01d1 - Learning Components

- Download and the Install Python and its Integrated Development Learning Environment.

Unit 2 >> Data Types

Introduction

In Unit 1 you received an introduction to Python. Units 2 through 4 builds on that experience and dives into the fundamentals of Python. Many of the things you will learn are common to programming in other languages. This

unit covers:

- Lists.
- Tuples.
- Dictionaries.
- Control.
- Selection Statements.

Learning Activities

u02s1 - Studies

Readings

Use your textbook to complete the following:

- In Kalb, I. (2016). Learn to program with python (1st ed.), read:
  - Chapter 5, "if, else, and elif Statements."
  - Chapter 6, "Loops."
  - Chapter 7, "Lists."

Optional Readings

Use your textbook to complete the following:

- In Hetland, M. L. (2017). Beginning python: From novice to professional (3rd ed.), read:
  - Chapter 2, "Lists and Tuples."
  - Chapter 5, "Conditionals, Loops, and Some Other Statements."

Optional Skillsoft Resources

- Skillsoft. (n.d.). Python Fundamentals: Basic Iteration. [Video].
- Skillsoft. (n.d.). Python Fundamentals: Creating and Executing Loops. [Video].
- Skillsoft. (n.d.). Python Fundamentals: The While Loop in Python. [Video].
- Skillsoft. (n.d.). Python for data science: Lists and dictionaries. [Video].

u02s1 - Learning Components

- Write a new function by modifying the function above to store three people in a list, and call your function from a for loop.

u02a1 - Python Fundamentals

For this assignment, you will design and code three simple Python applications utilizing Lists, Tuples, and Dictionaries, Control, and Selection Statements. You can use Python's default editor IDLE (Integrated Development and Learning Environment) or a Python editor of your choice to complete this assignment.

Your assignment will be scored on the following criteria:

1. Write a Python application that takes in a first name and a last name, and prints the following greeting "Hello, full_name".
2. Write a Python application (based on your application from exercise #1) that stores names for three people in a list, and makes use of a *for loop* for printing the greeting "Hello, full name".
3. Write a simple Python calculator application that performs addition, subtraction, multiplication, and division.
4. Test the three Python applications and document your testing by taking screenshots.
5. Explain the approach taken to complete this assignment and the major decisions made.
6. Use the **Weekly Solutions Submission Template** in the Resources area. Your writing should be generally free from spelling, grammatical, or other mechanical errors.

Submit your completed documents in the assignment area.

Course Resources
Python Software Foundation. (2018). Python. Retrieved from https://www.python.org
Weekly Solutions Submission Template

u02d1 - Lists

A tuple resembles a list, but it is immutable. Discuss how to create and use tuples, stressing the syntax differences between creating lists and creating tuples.

Response Guidelines

Review the postings of your peers and respond to at least two. Discuss and share your experience on how you created and used tuples and the syntax differences.

Course Resources

Undergraduate Discussion Participation Scoring Guide

u02d1 - Learning Components

- Code three Python applications using simple script with lists, tuples, and dictionaries, control and selection statement, and functions.

Unit 3 >> Functions

Introduction

In Unit 3 we will look at Python's built-in functions and standard libraries, as well as how to group statements and create our own functions.

Learning Activities

u03s1 - Studies

Readings

Use your textbook to complete the following:

- In Kalb, I. (2016). Learn to program with python (1st ed.), read:
  - Chapter 3, "Built-in Functions."
  - Chapter 4, "User-Defined Functions."

Optional Skillsoft Resources

- Skillsoft. (n.d.). Python: What is a Module? [Video].
- Skillsoft. (n.d.). Python Fundamentals: Importing a Module at the REPL. [Video].

u03s1 - Learning Components

- Write an application using a third-party package.
- Download and install a third-party Python library to handle Excel files.
- Test third-party Python library for handling Excel files.

u03a1 - Modules

For this assignment, you will design and code a Python application (utilizing a third-party library of your choice) that will read a csv file and export its contents as an Excel file. You can use Python's default editor IDLE (Integrated Development and Learning Environment) or a Python editor of your choice to complete this assignment.

Your assignment will be scored on the following criteria:

1. Research, download and install a third-party Python library for handling Excel files. *Hint: available libraries include – pandas, xlutils or pyexcel*.
2. Using a third-party package of your choice, write a program that reads the contents of a csv file and saves it to an Excel file. The program should take two arguments. The name of the input file and the name of the output file.
3. Test your application and document testing by taking screenshots.
4. Explain the approach taken to complete this assignment and the major decisions made.
5. Use the **Weekly Solutions Submission Template** in the Resources area. Your writing should be generally free from spelling, grammatical, or other mechanical errors.

Submit your completed documents in the assignment area.

Course Resources
Python Software Foundation. (2018). Python. Retrieved from https://www.python.org
Weekly Solutions Submission Template

u03d1 - Security Toolkits

Discuss and explain the functions of Python modules. Compile a detailed description of five commonly used toolkits and how they might be used in security related scripts.

Response Guidelines

Review the postings of your peers and respond to at least two, describing whether you agree or disagree with their strategies and why.

Course Resources
Undergraduate Discussion Participation Scoring Guide

u03d1 - Learning Components

- Write an application using a third-party package.
- Download and install a third-party Python library to handle Excel files.

Unit 4 >> Abstraction

Introduction

Classes provide a way to bundle data and functionality together. In Unit 4, we will learn object-oriented concepts in Python.

Learning Activities

u04s1 - Studies

Readings

Use your textbook to complete the following:

- In Hetland, M. L. (2017). Beginning python: From novice to professional (3rd ed.), read:
  - Chapter 6, "Abstraction."
  - Chapter 7, "More Abstraction."
  - Chapter 9, "Magic Methods, Properties, and Iterators."

Self-Paced Tutorials

Complete the following:

- LearnPython.org. (n.d.). Classes and objects.

Optional Skillsoft Resource

- Skillsoft. (n.d.). Python Fundamentals: Classes and Types. [Video].

u04s1 - Learning Components

- Write a Python class using two methods getSring and printString.
- Write a simple Python class to reverse a string word-by-word.

u04a1 - Abstraction

For this assignment, you will design and code two simple object-oriented Python applications by using classes to bundle functionality together. You can use Python's default editor IDLE (Integrated Development and Learning Environment) or a Python editor of your choice to complete this assignment.

Your assignment will be scored on the following criteria:

1. Write a simple Python class to reverse a string word-by-word.
2. Write a Python class that has two methods getSring and printString. The getString method should accept a string from the user, and printString should print the string in upper case.
3. Test your applications and document testing by taking screenshots.
4. Explain the approach taken to complete this assignment and the major decisions made.
5. Use the **Weekly Solutions Submission Template** in the Resources area. Your writing should be generally free from spelling, grammatical, or other mechanical errors.

Submit your completed documents in the assignment area.

Course Resources
Python Software Foundation. (2018). Python. Retrieved from https://www.python.org
Weekly Solutions Submission Template

u04d1 - Strings

Compare the exception mechanisms provided by C++ or Java languages to the one provided by Python (try-except statement).

Response Guidelines

Review the postings of your peers and respond to at least two, describing whether you agree or disagree with their strategies and why.

Course Resources
Undergraduate Discussion Participation Scoring Guide

u04d1 - Learning Components

- Write a Python class using two methods getSring and printString.

Unit 5 >> Working with Strings and Files

Introduction

In Unit 5 we will learn about working with strings and files. We will compare the exception mechanisms provided by C++ or Java languages to the one provided by Python (try-except statement).

Learning Activities

u05s1 - Studies

Readings

Use your textbook to complete the following:

- In Hetland, M. L. (2017). Beginning python: From novice to professional (3rd ed.), read.
  - Chapter 3, "Working with Strings."
  - Chapter 11, "Files and Stuff."

Optional Readings

- In Kalb, I. (2016). Learn to program with python (1st ed.), read:
  - Chapter 9, "File Input/Output."

Optional Skillsoft Resources

- Skillsoft. (n.d.). Python: Working with Strings. [Video].
- Skillsoft. (n.d.). Python: Paths, Directories, and Filenames. [Video].
- Skillsoft. (n.d.). Python Fundamentals: Writing Data. [Video].

u05s1 - Learning Components

- Apply Python language using Python's built-in functionsto create and manipulate files, and common string operations.

u05a1 - Working with Strings and Files

For this assignment, you will design and code two Python applications by using Python's built-in functions to create and manipulate files, as well as common string operations. You can use Python's default editor IDLE (Integrated Development and Learning Environment) or a Python editor of your choice to complete this assignment.

Your assignment will be scored on the following criteria:

1. Write a Python program to print in reverse order the lines in a file. The last line of text will be the first line printed.
2. Write a Python program to print the words in each line of text of a text file in reverse order.
3. Test your applications and document testing by taking screenshots.
4. Explain the approach taken to complete this assignment and the major decisions made.
5. Use the **Weekly Solutions Submission Template** in the Resources area. Your writing should be generally free from spelling, grammatical, or other mechanical errors.

Submit your completed documents in the assignment area.

Course Resources
Python Software Foundation. (2018). Python. Retrieved from https://www.python.org
Weekly Solutions Submission Template

u05d1 - Lists

You will need to research modules related to file and directory access. Next, summarize some of the functions that you found useful.

Response Guidelines

Review the postings of your peers and respond to at least two, describing whether you agree or disagree with their strategies and why.

Course Resources

Undergraduate Discussion Participation Scoring Guide

u05d1 - Learning Components

- Apply Python language using Python's built-in functionsto create and manipulate files, and common string operations.

Unit 6 >> Working with SQL Part 1

Introduction

In Units 6 and 7, we will take a look at how you can access a database from a general-purpose programming language such as Python. We will use the SQLite3 library to execute SQL queries.

Learning Activities

u06s1 - Studies

Readings

Use your textbook to complete the following:

- In Hetland, M. L. (2017). Beginning python: From novice to professional (3rd ed.), read:
  - Chapter 13, "Database Support."

u06s1 - Learning Components

- Create an SQL database table with five columns to store contact data.
- Execute a SELECT statement to retrieve all the columns of data from your contacts table.
- Add rows to the SQL database contacts table.

u06a1 - Working with SQL Part 1

For this assignment, you will use the SQLite3 library to perform common database tasks using Python. You can use Python's default editor IDLE (Integrated Development and Learning Environment) or a Python editor of your choice to complete this assignment.

Note: SQLite3 is included as part of the Python installation.

Your assignment will be scored on the following criteria:

1. Create a SQLite3 database named 'contacts.db'.
2. Create a contact table with the following columns:
    - ContactID int primary key.
    - FirstName char(50).
    - LastName char(50).
    - PhoneNumber char(15).
    - EmailAddress char(50).
3. Create at least five fictitious contacts and insert the data into your contacts table.
4. Execute a SELECT statement to retrieve all the columns of data from your contacts table.
5. Test your code and document testing by taking screenshots.
6. Explain the approach taken to complete this assignment and the major decisions made.
7. Use the **Weekly Solutions Submission Template** in the Resources area. Your writing should be generally free from spelling, grammatical, or other mechanical errors.

Submit your completed documents in the assignment area.

Course Resources
Python Software Foundation. (2018). Python. Retrieved from https://www.python.org
Weekly Solutions Submission Template

u06d1 - Using SQL Part 1

What are your initial thoughts of using a general-purpose programming language like Python to program databases? What issues did you run into and what questions do you have at this point?

Response Guidelines

Review the postings of your peers and respond to at least two, describing whether you agree or disagree with their strategies and why.

Course Resources
Undergraduate Discussion Participation Scoring Guide

u06d1 - Learning Components

- Create an SQL database table with five columns to store contact data.
- Execute a SELECT statement to retrieve all the columns of data from your contacts table.

Unit 7 >> Working with SQL Part 2

Introduction

In Unit 7, we will continue programming databases with Python using the SQLite3 library.

Learning Activities

u07s1 - Studies

Optional Readings

Use your textbook to review the following:

- In Hetland, M. L. (2017). Beginning python: From novice to professional (3rd ed.), read:
  - Chapter 13, "Database Support."

u07s1 - Learning Components

- Write SQL query using a SELECT statement with only FirstName, LastName, and EmailAddress from the contacts table.
- Write an SQL UPDATE statement that updates a contacts EmailAddress and PhoneNumber.
- Write an SQL DELETE statement to delete last contact added to table.

u07a1 - Working with SQL Part 2

For this assignment, you will continue to use the SQLite3 library to perform common database tasks using Python. You can use Python's default editor IDLE (Integrated Development and Learning Environment) or a Python editor of your choice to complete this assignment.

Note: SQLite3 is included as part of the Python installation.

Your assignment will be scored on the following criteria:

1. Create a SELECT statement that contains only FirstName, LastName, and EmailAddress from the contacts table.
2. Create an UPDATE statement that updates a contacts EmailAddress and PhoneNumber.
3. Delete the information for the last contact added to the contacts table.
4. Execute a SELECT statement to retrieve all the columns of data from your contacts table.
5. Test your code and document testing by taking screenshots.
6. Explain the approach taken to complete this assignment and the major decisions made.
7. Use the **Weekly Solutions Submission Template** in the Resources area. Your writing should be generally free from spelling, grammatical, or other mechanical errors.

Submit your completed documents in the assignment area.

Course Resources
Python Software Foundation. (2018). Python. Retrieved from https://www.python.org
Weekly Solutions Submission Template

u07d1 - Using SQL Part 2

Research and summarize a Python database library. What do you find most interesting about this library?

Response Guidelines

Review the postings of your peers and respond to at least two, describing whether you agree or disagree with their strategies and why.

Course Resources
Undergraduate Discussion Participation Scoring Guide

u07d1 - Learning Components

- Write SQL query using a SELECT statement with only FirstName, LastName, and EmailAddress from the contacts table.
- Write an SQL UPDATE statement that updates a contacts EmailAddress and PhoneNumber.
- Write an SQL DELETE statement to delete last contact added to table.

Unit 8 >> Web Recon

Introduction

There are many times that you might have a need to use data found on the Internet. In Unit 8, you will learn how to use a technique called web scraping to get data from a web page.

Learning Activities

u08s1 - Studies

Readings

Use your textbook to complete the following:

- In Hetland, M. L. (2017). Beginning python: From novice to professional (3rd ed.), read:
  - Chapter 15, "Python and the Web."
- In Kalb, I. (2016). Learn to program with python (1st ed.), read:
  - Chapter 10, "Internet Data."

Internet

- Richardson, L. (n.d.). Installing Beautiful Soup. Retrieved from https://www.crummy.com/software/BeautifulSoup/bs4/doc/#installing-beautiful-soup
- Richardson, L. (n.d.). Beautiful Soup documentation. Retrieved from https://www.crummy.com/software/BeautifulSoup/bs4/doc/

Optional Readings

- In O'Connor, T. J. (2013). Violent python: A cookbook for hackers, forensic analysts, penetration testers, and security engineers, read:
  - Chapter 6, "Web Recon with Python."

u08s1 - Learning Components

- Retrieve data from the Internet using both Python built-in functions and third-party libraries.
- Apply the third-party library to write Python program to extract all of the HTML links from a website.
- Write a Python program to download and display the content of robots.txt.

u08a1 - Web Recon

For this assignment, you will use techniques such as web scraping to retrieve data from the Internet using both Python built-in functions as well as third-party libraries. You can use Python's default editor IDLE (Integrated Development and Learning Environment) or a Python editor of your choice to complete this assignment.

Your assignment will be scored on the following criteria:

1. Write a program to test if a given page is found or not on the server.
2. Write a Python program to download and display the content of robots.txt for http://www.capella.edu.
3. Install the third-party library Beautiful Soup and review the Beautiful Soup Documentation, linked in the Resources.
4. Use Beautiful Soup to write a Python program that will extract all of the HTML links from http://www.capella.edu.
5. Test your code and document testing by taking screenshots.
6. Explain the approach taken to complete this assignment and the major decisions made.
7. Use the **Weekly Solutions Submission Template** in the Resources area. Your writing should be generally free from spelling, grammatical, or other mechanical errors.

Submit your completed documents in the assignment area.

Course Resources
Richardson, L. (n.d.). Installing Beautiful Soup. Retrieved from https://www.crummy.com/software/BeautifulSoup/bs4/doc/#installing-beautiful-soup
Richardson, L. (n.d.). Beautiful Soup documentation. Retrieved from https://www.crummy.com/software/BeautifulSoup/bs4/doc/
Python Software Foundation. (2018). Python. Retrieved from https://www.python.org
Weekly Solutions Submission Template

u08d1 - Python Web Libraries

Research Python modules related to the Internet programming and summarize some of the functions you find interesting.

Response Guidelines

Review the postings of your peers and respond to at least two, describing whether you agree or disagree with their strategies and why.

Course Resources
Undergraduate Discussion Participation Scoring Guide

u08d1 - Learning Components

- Retrieve data from the Internet using both Python built-in functions and third-party libraries.

Unit 9 >> Port Scanning

Introduction

A network scanner is the main tool used for analyzing which ports are available on a host. In Unit 9, we will build our own simple Python Port Scanner.

Learning Activities

u09s1 - Studies

Readings

Use your textbook to complete the following:

- In Hetland, M. L. (2017). Beginning python: From novice to professional (3rd ed.), read:
  - Chapter 14, "Network Programming."

Optional Readings

- In O'Connor, T. J. (2013). Violent python: A cookbook for hackers, forensic analysts, penetration testers, and security engineers, read:
  - Chapter 4, "Network Traffic Analysis with Python."

u09s1 - Learning Components

- Research Python modules related to Network Scanning.
- Create a simple Python port scanner using Python's built-in functions.
- Write a simple port scanner program using the built-in Socket module.

u09a1 - Port Scanning

For this assignment, you will create a simple Python port scanner using Python's built-in functions. You can use Python's default editor IDLE (Integrated Development and Learning Environment) or a Python editor of your choice to complete this assignment.

NOTE: Port scanning can be construed as a crime. You should never execute a port scanner against any website or IP address without explicit written permission from the owner of the server or computer that you are targeting. The website referenced in this assignment, https://www.hackthissite.org, is a special case provided for practice purposes.

Your assignment will be scored on the following criteria:

1. Research Python modules related to Network Scanning and summarize in 1-2 paragraphs some of the functions you find interesting.
2. Write a simple port scanner program using the built-in Socket module. Test your port scanner by targeting your own computer or you can reference https://www.hackthissite.org
3. Test your code and document testing by taking screenshots.
4. Explain the approach taken to complete this assignment and the major decisions made.
5. Use the **Weekly Solutions Submission Template** in the Resources area. Your writing should be generally free from spelling, grammatical, or other mechanical errors.

Submit your completed documents in the assignment area.

Course Resources
Hack This Site. (n.d.).
Python Software Foundation. (2018). Python. Retrieved from https://www.python.org
Weekly Solutions Submission Template

u09d1 - Python Network Libraries

Research Python modules related to Network Scanning and summarize some of the functions you find interesting.

Response Guidelines

Review the postings of your peers and respond to at least two, describing whether you agree or disagree with their strategies and why.

Course Resources
Undergraduate Discussion Participation Scoring Guide

u09d1 - Learning Components

- Research Python modules related to Network Scanning.
- Create a simple Python port scanner using Python's built-in functions.
- Write a simple port scanner program using the built-in Socket module.

Unit 10 >> Packet Sniffing

Introduction

Python is a very powerful tool for network programming. In this unit, we will see how easy network programming can be using available third party network libraries.

Learning Activities

u10s1 - Studies

Internet

Read the following:

- Biondi, P. and the Scapy Community. (n.d.). Scapy Download and Installation. Retrieved from https://scapy.readthedocs.io/en/latest/installation.html
- Biondi, P. and the Scapy Community. (n.d.). Welcome to Scapy's Documentation! Retrieved from https://scapy.readthedocs.io/en/latest/introduction.html

Optional Readings

Use your textbook to review the following:

- In Hetland, M. L. (2017). Beginning python: From novice to professional (3rd ed.), read:
  - Chapter 14, "Network Programming."

u10s1 - Learning Components

- Create a simple Python packet sniffing application using the third-party library Scapy.
- Demonstrate HTTP packet sniffer by capturing a request to http://www.capella.edu.

u10a1 - Packet Sniffing

For this assignment, you will create a simple Python packet sniffing application using the third-party library Scapy. You can use Python's default editor IDLE (Integrated Development and Learning Environment) or a Python editor of your choice to complete this assignment.

Your assignment will be scored on the following criteria:

1. Read the Scapy Download and Installation instructions and the Welcome to Scapy's Documentation.
2. Using Scapy, write a simple program to capture HTTP header packets.
3. Demonstrate your HTTP packet sniffer by capturing a request to http://www.capella.edu.
4. Test your code and document testing by taking screenshots.
5. Explain the approach taken to complete this assignment and the major decisions made.
6. Use the **Weekly Solutions Submission Template** in the Resources area. Your writing should be generally free from spelling, grammatical, or other mechanical errors.

Submit your completed documents in the assignment area.

Course Resources
Scapy Download and Installation
Welcome to Scapy's Documentation!
Python Software Foundation. (2018). Python. Retrieved from https://www.python.org
Weekly Solutions Submission Template