Code and Communities of Practice

Code

Power of Code

Coding is a huge base...to build off of...to go in the direction [you] want to.

Chris Bosh

NBA All-Star

Everybody... should learn how to program a computer... because it teaches you how to think.

Steve Jobs

Founder, Apple

Great coders are today's rock stars.

will.i.am

Black Eye Peas Creator

[Coding] is the closest thing we have to a superpower.

Drew Houston

Dropbox Creator

The Power of Code

Communities of Practice

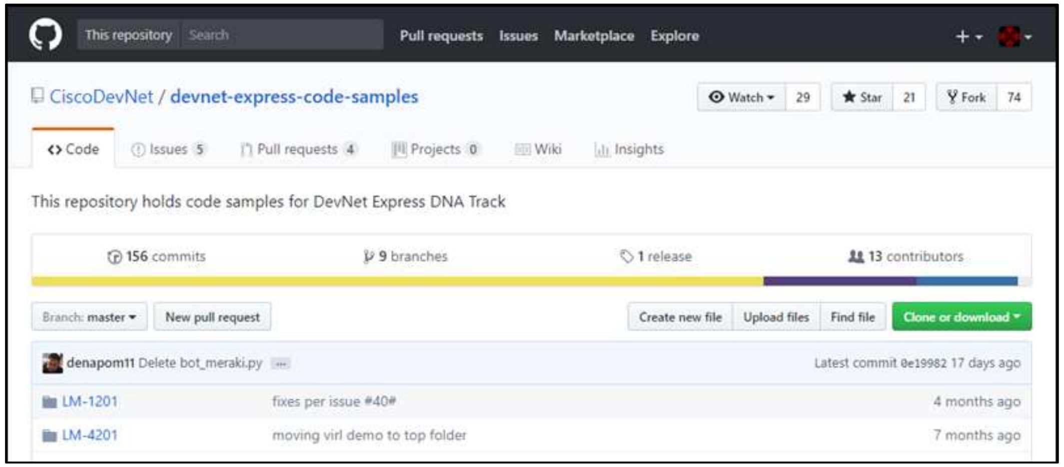
Communities of Practice (CoPs)

Communities of practice are groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly.

Jean Lave & Etienne Wenger

CoPs for Programmers - GitHub

GitHub is the open source software version control system started by Linus Torvalds, the creator of Linux.



CiscoDevNet / devnet-express-code-samples

This repository holds code samples for DevNet Express DNA Track

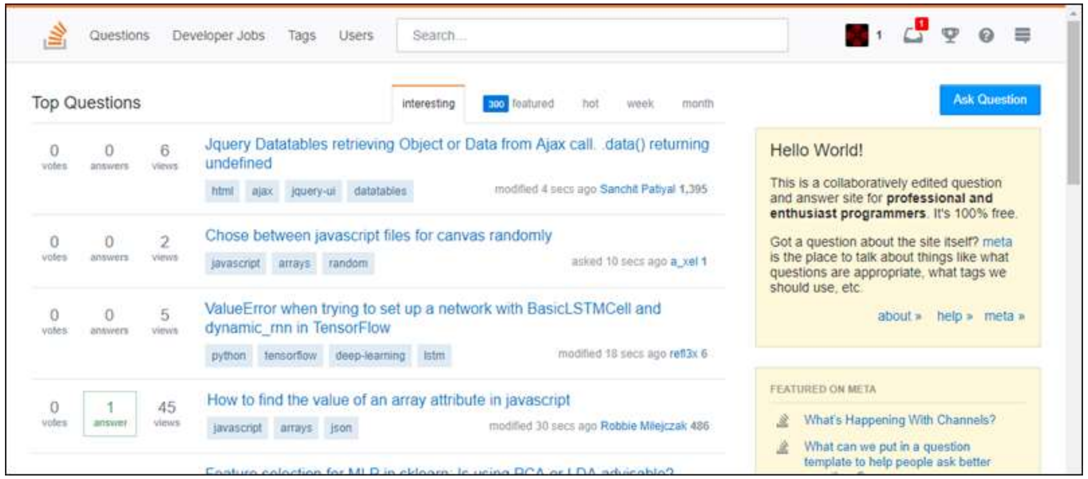
156 commits · 9 branches · 1 release · 13 contributors

denapom11 Delete bot_meraki.py		Latest commit 0e19982 17 days ago
LM-1201	fixes per issue #40#	4 months ago
LM-4201	moving virl demo to top folder	7 months ago

https://github.com/

CoPs for Programmers - Stack Overflow

Stack Overflow maintains a library of detailed answers to every question about programming.



Top Questions

0 votes 0 answers 6 views
Jquery Datatables retrieving Object or Data from Ajax call. .data() returning undefined
html ajax jquery-ui datatables
modified 4 secs ago Sanchit Patiyal 1,395

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javascript arrays random
asked 10 secs ago a_xel 1

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javascript arrays json
modified 30 secs ago Robbie Milejczak 486

Hello World!

This is a collaboratively edited question and answer site for **professional and enthusiast programmers**. It's 100% free.

Got a question about the site itself? meta is the place to talk about things like what questions are appropriate, what tags we should use, etc.

about » help » meta »

FEATURED ON META

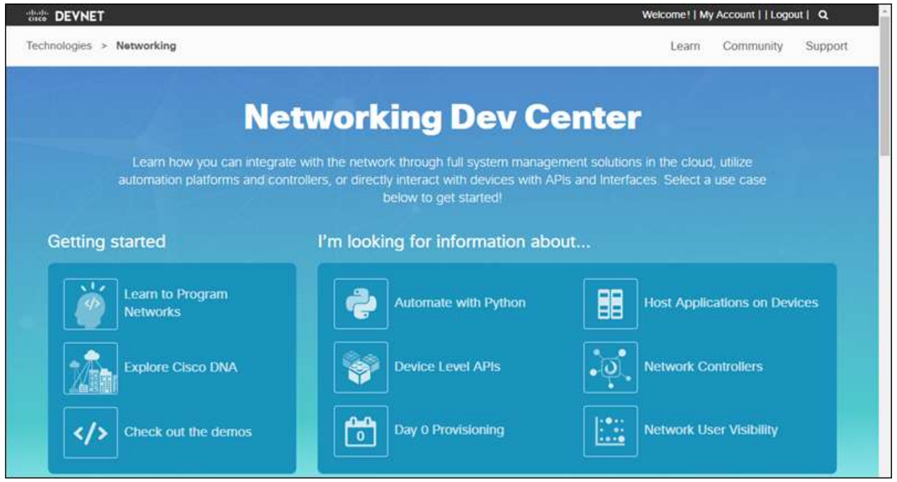
What's Happening With Channels?

What can we put in a question template to help people ask better

https://stackoverflow.com/

CoPs for Programmers - Cisco DevNet

Cisco DevNet offers support to developers and programmers who want to build Cisco-enable applications or use Cisco APIs to enhance and manage their networks



Networking Dev Center

Learn how you can integrate with the network through full system management solutions in the cloud, utilize automation platforms and controllers, or directly interact with devices with APIs and Interfaces. Select a use case below to get started!

https://developer.cisco.com

Python Basics

Python Interpreter

Start Python

Windows

```
C:\> python
Python 3.6.3 (v3.6.3:2c5fed8, Oct 3 2017, 17:26:49) [MSC v.1900 32 bit
(Intel)] on win32
Type "help", "copyright", "credits" or "license" for more information.
>>>
```

Mac or Linux

```
$ python3
Python 3.5.2 (default, Aug 18 2017, 17:48:00)
[GCC 5.4.0 20160609] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>>
```

Use Interactive Interpreter as a Calculator

```
$ python3
Python 3.5.2 (default, Aug 18 2017, 17:48:00)
[GCC 5.4.0 20160609] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>> 2+3
5
>>> 10-4
6
>>> 2*4
8
>>> 20/5
4
>>> 3**2
9
```

Operadores

- Una expresión es una combinación de valores (o variables, operadores, llamadas a funciones - usted aprenderá acerca de ellos en breve) que evalúa a un valor, por ejemplo, 1 + 2.
- Los operadores son símbolos o palabras clave que son capaces de operar en los valores y realizar operaciones (matemáticos), por ejemplo especiales, el *operador multiplica dos valores: x * y.
- Operadores aritméticos en Python: +(suma), -(resta), *(multiplicación), /(división clásica: devuelve un valor flotante si uno de los valores es de tipo flotante), %(módulo: divide el operando izquierdo por el operando derecho y devuelve el resto de la operación, por ejemplo, 5 % 2 = 1), **(exponenciación - operando izquierdo elevado a la potencia del operando derecho, por ejemplo, 2 ** 3 = 2 * 2 * 2 = 8).

//(división de piso / entero - devuelve un número resultante de la división, pero redondeado al número entero más cercano, por ejemplo, 3 // 2.0 = 1.0)

Un operador unario es un operador con un solo operando, por ejemplo -1, o +3.

Un operador binario es un operador con dos operandos, por ejemplo 4 + 5, o 12 % 5.

Algunos operadores actúan antes que otros: la jerarquía de prioridades :

unario **+ y -** tiene la máxima prioridad.

****, *, / %,** prioridad más baja: binario **+ y -.**

subexpresiones en paréntesis se calculan siempre primero, por ejemplo, 15 - 1 * (5 * (1 + 2)) = 0.

La exponenciación operador utiliza derecha del lado de unión , por ejemplo, 2 ** 2 ** 3 = 256.

Use Interpreter to print Hello World

- Strings can be enclosed with single quotes or double quotes.
- To remove the single quotes in the output, use the print command.

```
>>> "Hello World!"
'Hello World!'
>>> 'Hello World!'
'Hello World!'
>>> print("Hello World!")
Hello World!
```

Quit the Interpreter and Start IDLE

- Python includes the Integrated Development Environment (IDLE)
- Windows - open IDLE from the Start menu
- Mac or Linux - open IDLE from the command line.

Windows

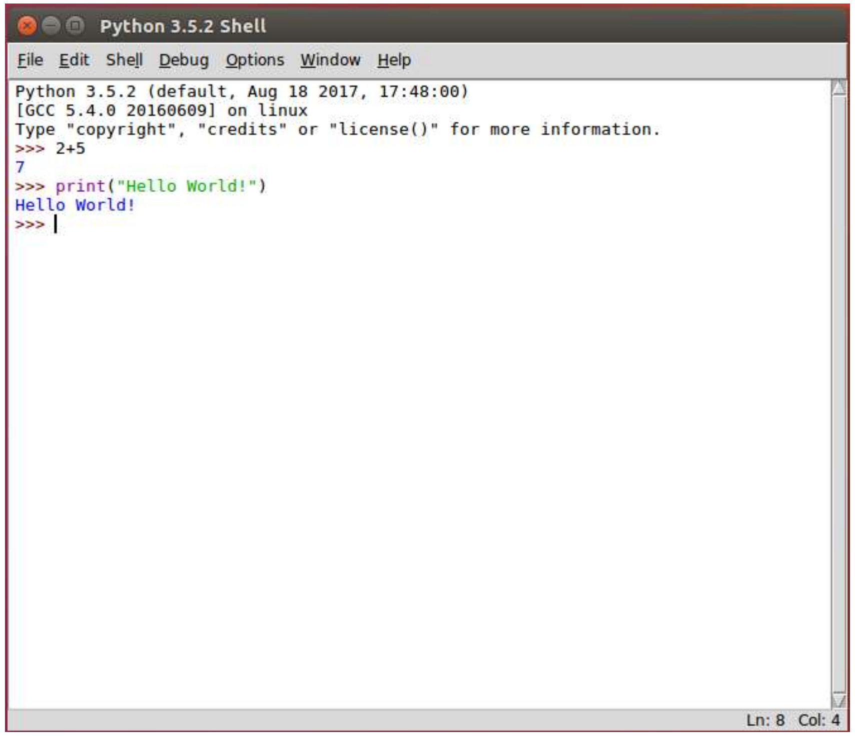
Start > Python 3.6 > IDLE (Python 3.6 32-bit).

Mac or Linux

```
>>> "Hello World!"
'Hello World!'
>>> 'Hello World!'
'Hello World!’
>>> quit()
$ idle3
```

IDLE Benefits

- Provides color coding
- Includes a text editor for writing programs
- Quickly save and run programs



```
Python 3.5.2 (default, Aug 18 2017, 17:48:00)
[GCC 5.4.0 20160609] on linux
Type "copyright", "credits" or "license()" for more information.
>>> 2+5
7
>>> print("Hello World!")
Hello World!
>>> 
```

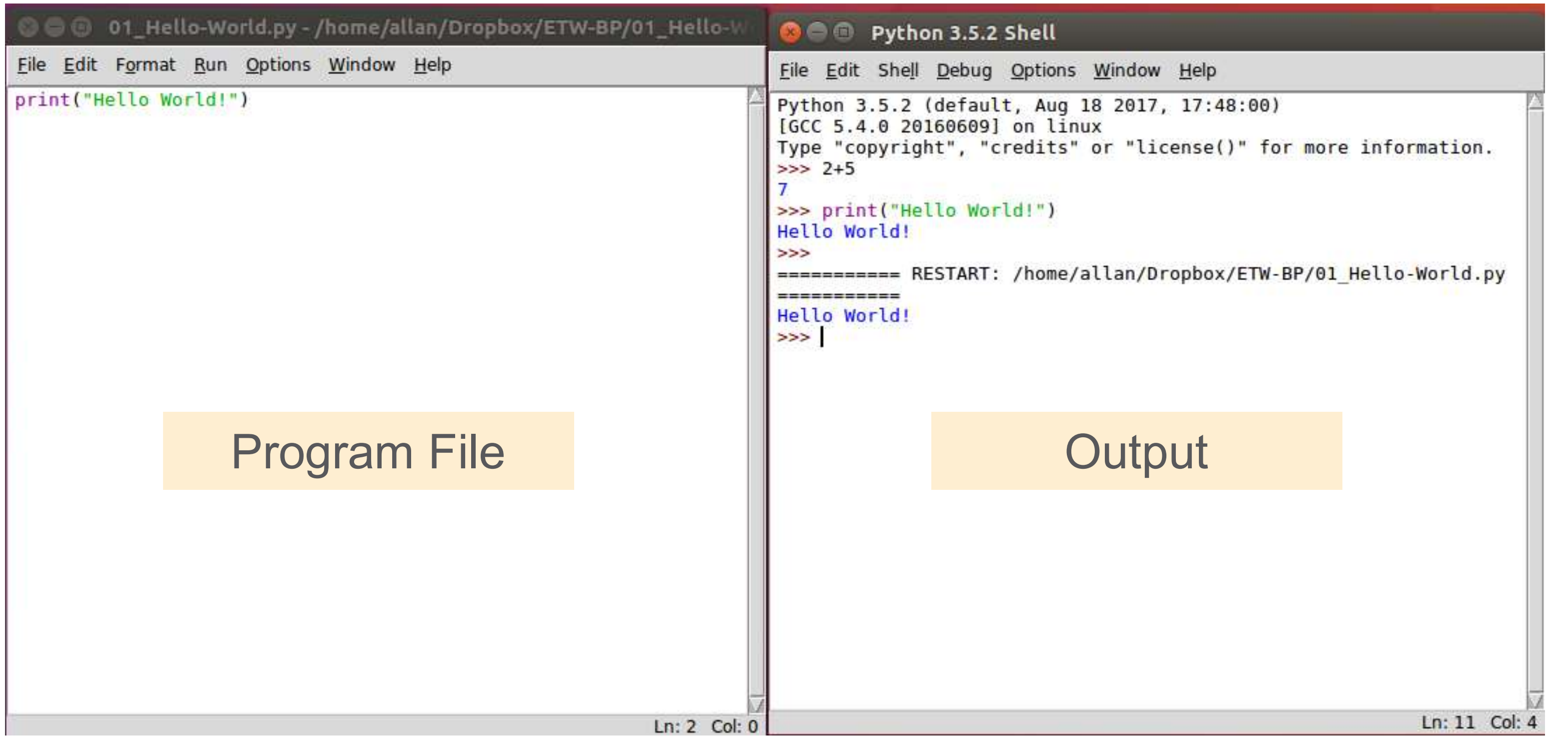
Activity - Write, Save, and Run Your First Program

1. In IDLE, click **File > New File (Ctrl+N)** to open an Untitled script file.
2. Save the file as 01_hello-world.py in your GitHub project directory.
3. Enter the following in the script:

```
print("Hello World!")
```

4. Save the script; click **File > Save (Ctrl+S)**
5. Run the script; click **Run > Run Module (F5)**

First Program and Output


01_Hello-World.py - /home/allan/Dropbox/ETW-BP/01_Hello-W
File Edit Format Run Options Window Help
Ln: 2 Col: 0
Python 3.5.2 Shell
File Edit Shell Debug Options Window Help
Ln: 11 Col: 4
Program File
Output

```
print("Hello World!")
```

```
Python 3.5.2 (default, Aug 18 2017, 17:48:00)
[GCC 5.4.0 20160609] on linux
Type "copyright", "credits" or "license()" for more information.
>>> 2+5
7
>>> print("Hello World!")
Hello World!
>>>
=========== RESTART: /home/allan/Dropbox/ETW-BP/01_Hello-World.py
===========
Hello World!
>>> |
```

Data Types, Variables, and Conversions

Basic Data Types

- The four basic data types we will use are:
  - Integer
  - Float
  - String
  - Boolean
- Use the type() command to determine the data type.

```
>>> type(98)
<class 'int'>
>>> type(98.6)
<class 'float'>
>>> type("Hi!")
<class 'str'>
>>> type(True)
<class 'bool'>
```

Boolean Comparison Operators

Operator	Meaning
>	Greater than
<	Less than
==	Equal to
!=	Not equal to
>=	Greater than or equal to
<=	Less than or equal to

```
>>> 1<2
True
>>> 1>2
False
>>> 1==1
True
>>> 1!=1
False
>>> 1>=1
True
>>> 1<=1
True
```

Creating and Using a Variable

- Use a single equal sign to assign a value to a variable.
- A variable can then be called for other operations.

```
>>> x=3
>>> x*5
15
>>> "Cisco"*x
'CiscoCiscoCisco'
```

Concatenate Multiple String Variables

- Concatenation is the process of combining multiple strings.

```
>>> str1="Cisco"
>>> str2="Networking"
>>> str3="Academy"
>>> space=" "
>>> print(str1+space+str2+space+str3)
Cisco Networking Academy
>>>
```

Converting Data Types

- Concatenation does not work for different data types.

```
>>> x=3
>>> print("This value of X is " + x)
Traceback (most recent call last):
  File "<pyshell#27>", line 1, in <module>
    print("This value of X is " + x)
TypeError: Can't convert 'int' object to str
implicitly
```

Converting Data Types

- Use the **str()** command to convert the data type to a string.

```
>>> x=3
>>> print("The value of x is " + x)
Traceback (most recent call last):
  File "<pyshell#27>", line 1, in <module>
    print("This value of X is " + x)
TypeError: Can't convert 'int' object to str
implicitly
>>> print("The value of x is " + str(x))
The value of x is 3
>>>
```

Converting Data Types

- The type for the variable x is still an integer.

```
>>> x=3
>>> print("The value of x is " + x)
Traceback (most recent call last):
  File "<pyshell#27>", line 1, in <module>
    print("This value of X is " + x)
TypeError: Can't convert 'int' object to str
implicitly
>>> print("The value of x is " + str(x))
The value of x is 3
>>> type(x)
<class 'int'>
```

Converting Data Types

- To convert the data type, reassign the variable to the new data type.

```
>>> x=3
>>> print("The value of x is " + x)
Traceback (most recent call last):
  File "<pyshell#27>", line 1, in <module>
    print("This value of X is " + x)
TypeError: Can't convert 'int' object to str
implicitly
>>> print("The value of x is " + str(x))
The value of x is 3
>>> type(x)
<class 'int'>
>>> x=str(x)
>>> type(x)
<class 'str'>
```

Converting Data Types

- Use **“{:.2f}”.format** to display a float to two decimal places.
- Change the **2** to increase or decrease decimal places.

```
>>> pi = 22/7
>>> print(pi)
3.142857142857143
>>> print("{:.2f}".format(pi))
3.14
>>>
```

Lists and Dictionaries

Lists

- A list is an ordered list of items.
  - Create a list using the brackets **[ ]** and enclosing each item in the list with quotes.
  - Use the **type()** command to verify the data type.
  - Use the **len()** command return the number of items in a list.
  - Call the list variable name to display it’s contents.

```
>>> hostnames=["R1","R2","R3","S1","S2"]
>>> type(hostnames)
<class 'list'>
>>> len(hostnames)
5
>>> hostnames
['R1', 'R2', 'R3', 'S1', 'S2']
```

Lists

- Use the index to refer to an item and manipulate the list
  - The first item in a list is indexed as zero, the second is indexed as one, and so on.
  - The last item can be referenced with index **[-1]**
  - Replace an item by assigning a new value to the index.
  - Use the **del()** command to remove an item from a list.

```
>>> hostnames=["R1","R2","R3","S1","S2"]
>>> type(hostnames)
<class 'list'>
>>> len(hostnames)
5
>>> hostnames
['R1', 'R2', 'R3', 'S1', 'S2']
>>> hostnames[0]
'R1'
>>> hostnames[-1]
'S2'
>>> hostnames[0]="RTR1"
>>> hostnames
['RTR1', 'R2', 'R3', 'S1', 'S2']
>>> del hostnames[3]
>>> hostnames
['RTR1', 'R2', 'R3', 'S2']
>>>
```

Dictionaries

- A list of unordered key/value pairs
  - Create a dictionary using the braces **{ }**
  - Each dictionary entry includes a key and a value.
  - Separate key and values with a colon.
  - Use quotes for keys and values that are strings.

```
>>> ipAddress =
{"R1":"10.1.1.1","R2":"10.2.2.1","R3":"10.3.3
.1"}
>>> type(ipAddress)
<class 'dict'>
```

Dictionaries

- Use the key to refer to an entry
  - The key is enclosed with brackets **[ ]**.
  - Keys that are strings can be referenced using single or double quotes.
  - Add a key/value pair by setting the new key equal to a value.
  - Use ***key* in *dictionary*** command to verify if a key exist in the dictionary

```
>>> ipAddress =
{"R1":"10.1.1.1","R2":"10.2.2.1","R3":"10.3.3
.1"}
>>> type(ipAddress)
<class 'dict'>
>>> ipAddress
{'R1': '10.1.1.1', 'R2': '10.2.2.1', 'R3':
'10.3.3.1'}
>>> ipAddress['R1']
'10.1.1.1'
>>> ipAddress["S1"]="10.1.1.10"
>>> ipAddress
{'R1': '10.1.1.1', 'R2': '10.2.2.1', 'R3':
'10.3.3.1', 'S1': '10.1.1.10'}
>>> "R3" in ipAddress
True
>>>
```

Activity - Troubleshoot List and Dictionary Code

1. Open 02_list-dicts.py.
2. Run the code.
3. Troubleshoot the code until the script runs without errors.
4. What errors did you fix in the script?

User Input

The Input Function

- The **input()** function provides a way to get information from the user.

```
>>> firstName = input("What is your first
name? ")
What is your first name? Bob
>>> print("Hello " + firstName +"!")
Hello Bob!
>>>
```

Activity - Create a Script to Collect Personal Information

1. Open a blank script file and save it in your GitHub project directory as 03_personal-info.py.
2. Create a script that asks for four pieces of information such as: first name, last name, location, and age.
3. Create a variable for a space: **space = " "**
4. Add a print statement that that combines all the information in one sentence.
5. Run the script and troubleshoot any errors.

If Functions and Loops

If/Else Function

- Open a blank script and save it as 04_if-vlan.py.
- Create a simple **if** function that compares two values and prints the results.
- Run the script and troubleshoot any errors.
- Change the values to test the **else** print statement.

```
nativeVLAN = 1
dataVLAN = 100
if nativeVLAN == dataVLAN:
    print("The native VLAN and the data VLAN 
are the same.")
else:
    print("This native VLAN and the data VLAN 
are different.")
```

If/Elif/Else Function

- Open a blank script and save it as 05_if-acl.py.
- Create a more complex **if** function that takes user input and includes an **elif** loop.
- Note that the input needs to be converted to an integer.

```
aclNum = int(input("What is the IPv4 ACL
number? "))
if aclNum >= 1 and aclNum <= 99:
    print("This is a standard IPv4 ACL.")
elif aclNum >=100 and aclNum <= 199:
    print("This is a extended IPv4 ACL.")
else:
    print("This is not a standard or extended
IPv4 ACL.")
```

For Loop

- A for loop iterates through items in a list, dictionary, or other sequenced data type.
- The variable name “item” is arbitrary and can be anything the programmer chooses.

```
>>> devices=["R1","R2","R3","S1","S2"]
>>> for item in devices:
        print(item)


R1
R2
R3
S1
S2
>>>
```

For Loop with Embedded If

- Using an If loop inside the For loop

```
>>> for item in devices:
        if "R" in item:
                print(item)


R1
R2
R3
>>>
```

Use a For Loop to Create a New List

- Create an empty list called switches.
- Iterate through the devices list to create the switch list.

```
>>> switches=[]
>>> for item in devices:
        if "S" in item:
                switches.append(item)


>>> switches
['S1', 'S2']
>>>
```

Create a While Loop

- Open a blank script and save it as 06_while-loop.py.
- Create a program with a while loop that counts to a user's supplied number.
  - Convert the string to an integer: **x = int(x)**
  - Set a variable to start the count: **y = 1**
  - **While y <= x**, print the value of y and increment y by 1.

```
x=input("Enter a number to count to: ")
x=int(x)
y=1
while y<=x:
    print(y)
    y=y+1
```

Modify the While Loop to Use Break

- Modify the while loop to use a Boolean check and break to stop the loop.
  - Replace **while y<=x** with **while True**
  - Add an if function to break the loop when **y>x**.

```
x=input("Enter a number to count to: ")
x=int(x)
y=1
while True:
    print(y)
    y=y+1
    if y>x:
        break
```

Use a While Loop to Check for User Quit

- Add another while loop to the beginning of the script which will check for a quit command.
- Add an if function to the while loop to check for ‘q’ or ‘quit’ .

```
while True:
    x=input("Enter a number to count to: ")
    if x == 'q' or x == 'quit':
        break
x=int(x)
y=1
while True:
    print(y)
    y=y+1
    if y>x:
        break
```

File Access

Read an External File and Print the Contents

- Open a blank script and save it as 07_file-access.py.
- Create a script to read and print the content of a file.
- The ‘devices.txt’ file should be in the same directory as your script.

```
file=open("devices.txt","r")
for item in file:
    print(item)
file.close()
```

Remove Blank Lines from the Output

- Use strip attribute to remove the blank lines.

```
file=open("devices.txt","r")
for item in file:
    item=item.strip()
    print(item)
file.close()
```

Copy File Content Into a List Variable

- Create an empty list.
- Use the **append** attribute to copy file content to the new list.

```
devices=[]
file=open("devices.txt","r")
for item in file:
    item=item.strip()
    devices.append(item)
file.close()
print(devices)
```

Activity – Modify the Script to Add an Item to the File

1. Open a new file and save it as **07_file-access_actvity.py**.
2. For the **open()** function use the mode **a**, which will allow you to append a item to the **devices.txt** file.
3. Inside a **while True:** loop, embed an **input()** function command that asks the user for the new device.
4. Set the value of the user's input to a variable named **newItem**.
5. Use an if statement that breaks the loop if the user types **exit** and prints the statement **"All done!"**
6. Use the command **file.write(newItem + “\n”)** to add the new user provided device.