for Loop

In this exercise you will:

- Use a `for` loop to read lines from a file
- Use a `for` loop to iterate through devices in a list
- Use Python formatting capabilities to print nice output

Step 1

This exercise will use the `devices` file that is located in the **~/Desktop/PRNE/section10** folder. Note that two of the devices have the same IP address–this is intentional:

```
d01-is,ios,Mgmt:10.3.21.5,Version 5.3.1,cisco,cisco
d02-is,ios,Mgmt:10.3.21.6,Version 4.22.18,cisco,cisco
d03-nx,nx-os,Mgmt:10.3.21.7,Version 5.3.1,cisco,cisco
d04-nx,nx-os,Mgmt:10.3.21.8,Version 5.3.1,cisco,cisco
d05-xr,ios-xr,Mgmt:10.3.21.8,Version 4.16.9,cisco,cisco
d06-xr,ios-xr,Mgmt:10.3.21.10,Version 5.3.0,cisco,cisco
d07-xe,ios-xe,Mgmt:10.3.21.19,Version 4.16.0,cisco,cisco
d08-xe,ios-xe,Mgmt:10.3.21.22,Version 5.3.0,cisco,cisco
```

Step 2

Create a Python application that uses a `for` loop to iterate through lines of the `devices` file. You will read information about all devices from the file, one line at a time, placing the devices into a list. For each device, store the device information in a list. The result of reading this information should be a list of devices, where each device is a list of device information.

Answer

```
devices_list = [] # Create the outer list for all devices

# Read in the devices from the file
file = open('devices','r')
for line in file:

    device_info_list = line.strip().split(',') # Get device info into list
    devices_list.append(device_info_list)

file.close() # Close the file since we are done with it
```

Step 3

Create a second `for` loop that iterates through the list of devices. For every device, print the device information. The output should be a nice table, such as the following:

```
Name     OS-type   IP address           Software
-------  --------  -------------------  --------------------
d01-is   ios       Mgmt:10.3.21.5       Version 5.3.1
d02-is   ios       Mgmt:10.3.21.6       Version 4.22.18
d03-nx   nx-os     Mgmt:10.3.21.7       Version 5.3.1
d04-nx   nx-os     Mgmt:10.3.21.8       Version 5.3.1
d05-xr   ios-xr    Mgmt:10.3.21.8       Version 4.16.9
d06-xr   ios-xr    Mgmt:10.3.21.10      Version 5.3.0
d07-xe   ios-xe    Mgmt:10.3.21.19      Version 4.16.0
d08-xe   ios-xe    Mgmt:10.3.21.22      Version 5.3.0
```

You will need to use print formatting functionality in Python. The simplest version of the print statement will look similar to:

```
print '{0:8} {1:8} {2:20} {3:20}'.format(device[0],device[1],
                                         device[2],device[3]
```

Answer

```
print ''
print 'Name     OS-type  IP address           Software         '
print '------   -------  ------------------   ------------------'

# Go through the list of devices, printing out values in nice format
for device in devices_list:

    print '{0:8} {1:8} {2:20} {3:20}'.format(device[0],device[1],
                                             device[2],device[3])

print ''
```

```
cisco@ubuntu:~/Desktop/PRNE/section10$ python for.py

Name     OS-Type    IP Address           Software
-----    -------    ---------------      -----------------
d01-is   ios      Mgmt:10.3.21.5       Version 5.3.1
d02-is   ios      Mgmt:10.3.21.6       Version 4.22.18
d03-nx   nx-os    Mgmt:10.3.21.7       Version 5.3.1
d04-nx   nx-os    Mgmt:10.3.21.8       Version 5.3.1
d05-xr   ios-xr   Mgmt:10.3.21.8       Version 4.16.9
d06-xr   ios-xr   Mgmt:10.3.21.10      Version 5.3.0
d07-xe   ios-xe   Mgmt:10.3.21.19      Version 4.16.0
d08-xe   ios-xe   Mgmt:10.3.21.22      Version 5.3.0

cisco@ubuntu:~/Desktop/PRNE/section10$ cat for.py
dev_list = []

file = open('devices','r')

for line in file:

        dev_info_list = line.strip().split(',')
        dev_list.append(dev_info_list)

file.close()

print ''
print 'Name     OS-Type    IP Address           Software          '
print '-----    -------    ---------------      -----------------'

for dev in dev_list:

        print '{0:8} {1:8} {2:20} {3:20}'.format(dev[0], dev[1], dev[2], dev[3])

print ''
```

while Loop

In this exercise you will:

- Use a `while` loop to read input from a file, utilizing the `readline()` function
- Use a `while` loop to iterate through devices in a list, using your own index variable in order to manually perform the iteration.

This exercise will also use the devices file in the **~/Desktop/PRNE/section10** folder.

Step 4

Create a Python application that uses a `while` loop to iterate through lines of the `devices` file. You will read information about all devices from the file, one line at a time, placing the devices into a list. For each device, store the device information in a dictionary. The result of reading this information should be a list of devices where every device is a dictionary of device information.

Note that reading information from a text file requires reading the lines manually using `file.readline()`.

Answer

NOTE: You must read one line of the file before executing the `while` loop. If you do not, the condition will be false and the code block associated with the `while` loop will not be executed.

```
devices_list = [] # Create the outer list for all devices

file = open('devices','r')
line = file.readline()
while line:

    device_info_list = line.strip().split(',') # Get device info into list

    # Put device information into dictionary for this one device
    device_info = {} # Create the inner dictionary of device info
    device_info['name'] = device_info_list[0]
    device_info['os-type'] = device_info_list[1]
    device_info['ip'] = device_info_list[2]
    device_info['version'] = device_info_list[3]

    # Now append our device and its info onto our 'devices' list
    devices_list.append(device_info)

    line = file.readline()
```

Step 5

Create a second `while` loop that iterates through the list of devices. For every device, print the device information.

The output should be a nice table, such as the following:

```
Name     OS-type   IP address           Software
-------  --------  -------------------  --------------------
d01-is   ios       Mgmt:10.3.21.5       Version 5.3.1
d02-is   ios       Mgmt:10.3.21.6       Version 4.22.18
d03-nx   nx-os     Mgmt:10.3.21.7       Version 5.3.1
d04-nx   nx-os     Mgmt:10.3.21.8       Version 5.3.1
d05-xr   ios-xr    Mgmt:10.3.21.8       Version 4.16.9
d06-xr   ios-xr    Mgmt:10.3.21.10      Version 5.3.0
d07-xe   ios-xe    Mgmt:10.3.21.19      Version 4.16.0
d08-xe   ios-xe    Mgmt:10.3.21.22      Version 5.3.0
```

Answer

Important: you will have to manually iterate through the indexes of the list of devices. Setting the list index to 0 at the start, check that the index is less than the length of the list as the while statement condition, and increment the index at the bottom of the while loop.

```
# Use while loop to print the results
print ''
print 'Name     OS-type  IP address           Software         '
print '------   -------  ------------------   ------------------'

index = 0
while index < len(devices_list):

    device = devices_list[index]

    print '{0:8} {1:8} {2:20} {3:20}'.format(device['name'],
                                             device['os-type'],
                                             device['ip'],
                                             device['version'])

    index += 1

print ''
```

** The code above threw an error, where the index must be a integer and not a string

```
cisco@ubuntu:~/Desktop/PRNE/section10$ nano while.py
cisco@ubuntu:~/Desktop/PRNE/section10$ python while.py

Name     OS-Type    IP Address           Software
-----    -------    --------------       ----------------
Traceback (most recent call last):
  File "while.py", line 22, in <module>
    print '{0:8} {1:8} {2:20} {3:20}'.format(dev['name'], dev['os-type'], dev['ip'], dev['version'])
TypeError: list indices must be integers, not str
```

This worked:

```
cisco@ubuntu:~/Desktop/PRNE/section10$ cat while.py
dev_list = []

file = open('devices','r')

for line in file:

        dev_info_list = line.strip().split(',')
        dev_list.append(dev_info_list)

file.close()

print ''
print 'Name     OS-Type    IP Address           Software          '
print '-----    -------    ---------------      -----------------'

index = 0

while index < len(dev_list):

        dev = dev_list[index]

        print '{0:8} {1:8} {2:20} {3:20}'.format(dev[0], dev[1], dev[2], dev[3])

        index += 1

print ''
```

```
cisco@ubuntu:~/Desktop/PRNE/section10$ python while.py

Name     OS-Type    IP Address           Software
-----    -------    ---------------      -----------------
d01-is   ios        Mgmt:10.3.21.5       Version 5.3.1
d02-is   ios        Mgmt:10.3.21.6       Version 4.22.18
d03-nx   nx-os      Mgmt:10.3.21.7       Version 5.3.1
d04-nx   nx-os      Mgmt:10.3.21.8       Version 5.3.1
d05-xr   ios-xr     Mgmt:10.3.21.8       Version 4.16.9
d06-xr   ios-xr     Mgmt:10.3.21.10      Version 5.3.0
d07-xe   ios-xe     Mgmt:10.3.21.19      Version 4.16.0
d08-xe   ios-xe     Mgmt:10.3.21.22      Version 5.3.0
```