Lab - Write Basic Scripts in Windows and Linux (Instructor Version)

**Instructor Note**: Red font color or gray highlights indicate text that appears in the instructor copy only.

# Objectives

In this lab, you will write basic scripts in different scripting languages to help understand how each language handles automating tasks.

# Background / Scenario

Writing scripts to automate common administration functions saves time and gives the administrator flexibility to perform other tasks. In the lab, you will write three types of scripts that will perform similar tasks. Compare the different languages as you automate some simple task.

# Required Resources

* Windows PC
* VM running a Linux distribution

# Instructions

## Create a Windows batch script.

* + - 1. In a text editor, such as Notepad, save a text file named **info.bat** in your home directory (C:\Users\*yourusername*) with the following text:

@echo off

echo Computer Name is: %computername%

echo Windows version is:

ver

echo CPU is: %PROCESSOR\_IDENTIFIER%

echo Total memory is:

**rem Windows Management Instrumentation Command (WMIC) is a command line utility that can retrieve information about local or remote computers. For more inline information, enter help wmic or wmic /? at the command prompt.**

wmic ComputerSystem get TotalPhysicalMemory

echo The disks that are installed and their freespace:

wmic logicaldisk get size,freespace,caption

echo All the %computername% IP addresses

**rem netsh is a command line scripting utility that allows the users to view or modify the network configurations of a running computer. For more inline information, enter netsh /? at the command prompt.**

**rem findstr is used for searching for a text string in files. For more inline information, enter findstr /? at the command prompt.**

netsh interface ip show address | findstr "IP Address"

* + - 1. Open a command prompt and navigate to your home directory.
      2. List the content of your home directory and verify that the file **info.bat** is saved with the correct filename. If not, rename the file, for example, **rename info.bat.txt info.bat**.
      3. At the prompt, enter **info.bat** to run the script.

#### Questions:

What was the output?

Type your answers here.

Answers will vary

Computer Name is: KDV-PC

Windows version is:

Microsoft Windows [Version 10.0.17763.437]

CPU is: Intel64 Family 6 Model 61 Stepping 4, GenuineIntel

Total memory is:

TotalPhysicalMemory

17091084288

The disks that are installed and their freespace:

Caption FreeSpace Size

C: 212692340736 997923037184

All the KDV-PC IP addresses

IP Address: 192.168.56.1

IP Address: 169.254.45.2

IP Address: 169.254.126.64

IP Address: 192.168.159.1

IP Address: 192.168.181.1

IP Address: 192.168.1.40

IP Address: 127.0.0.1

What are the %*text*% used for in the script?

Type your answers here.

Answers will vary. These are environment variables which hold values set by the operating system.

Identify what the following commands do in the script:

**echo:**

Type your answer here.

Displays on the screen whatever comes after it

**findstr**:

Type your answer here.

Look for a string of characters.

**netsh**:

Type your answer here.

Network shell allows to display and modify network settings.

**ver**:

Type your answer here.

Gives the current OS version.

**wmic**:

Type your answer here.

Windows management interface allows an administrator to view or modify settings.

## Create a Powershell ISE script.

* + - 1. Click **Start**, Search for **PowerShell ISE** and right-click the selection and click **Run as an administrator.**
      2. Verify that you are in your home directory: PS C:\Users\*YourUsername*
      3. To allow the script to run, enter **Set-ExecutionPolicy RemoteSigned** at the prompt. Click **Yes** to allow the script to run. The settings can be changed back to **No** after the script is complete.

PS C:\Users\*YourUsername*> **Set-ExecutionPolicy RemoteSigned**

* + - 1. Choose **File** -> **New** and create a new script.
      2. Enter the following text into the **Untitled.ps1** window and save it as **info.ps1** in your home directory.

Write-Output "Computer name is:"

get-content env:computername

Write-Output "Windows version is:"

(Get-WmiObject -class Win32\_OperatingSystem).Caption

Write-Output "CPU is:"

Get-WmiObject Win32\_Processor | findstr "Name"

Write-Output "Total Memory is:"

[Math]::Round((Get-WmiObject -Class win32\_computersystem -ComputerName localhost).TotalPhysicalMemory/1Gb)

Write-Output "The Disks that are installed and their freespace:"

Get-WmiObject -Class Win32\_logicaldisk -Filter "DriveType = '3'"

Write-Output "IPv4 addresses"

Get-NetIPAddress -AddressFamily IPv4 | Sort-Object -Property InterfaceIndex | Format-Table

**Note**: Within PowerShell ISE, you can press F1 or select **Help** > **Windows PowerShell ISE Help** to get more information.

* + - 1. To see the functions of each command, click **Add-ons**, verify that **Command** is checked. In the Command tab, enter the name of the command in the **Name** field. Select the desired command and click the ? for more information regarding the desired command.
      2. Enter **.\info.ps1** at the PS prompt. **Note**: Make sure you are using the correct slash.

PS C:\Users\*YourUsername*> **.\info.ps1**

#### Question:

What is the output of the script?

Type your answer here.

Answers will vary.

PS C:\> **.\info.ps1**

Computer name is:

KDV-PC

Windows version is:

Microsoft Windows 10 Education

CPU is:

Name: Intel(R) Core(TM) i5-5200U CPU @ 2.20GHz

Total Memory is:

16

The Disks that are installed and their freespace:

DeviceID : C:

DriveType : 3

ProviderName :

FreeSpace : 212635987968

Size : 997923037184

VolumeName : Windows

IPv4 addresses

ifIndex IPAddress PrefixLength PrefixOrigin SuffixOrigin AddressState PolicyStore

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1 127.0.0.1 8 WellKnown WellKnown Preferred ActiveStore

3 169.254.220.156 16 WellKnown Link Tentative ActiveStore

5 192.168.159.1 24 Manual Manual Preferred ActiveStore

7 169.254.160.146 16 WellKnown Link Tentative ActiveStore

11 192.168.56.1 24 Manual Manual Preferred ActiveStore

15 169.254.45.2 16 WellKnown Link Preferred ActiveStore

17 192.168.1.40 24 Dhcp Dhcp Preferred ActiveStore

24 169.254.2.220 16 WellKnown Link Tentative ActiveStore

25 169.254.126.36 16 WellKnown Link Tentative ActiveStore

29 169.254.18.19 16 WellKnown Link Tentative ActiveStore

39 192.168.181.1 24 Manual Manual Preferred ActiveStore

73 169.254.126.64 16 WellKnown Link Preferred ActiveStore

* + - 1. Compare the two scripts. Match the batch command to the PowerShell commands below:

|  |  |
| --- | --- |
| Windows Batch Command | PowerShell Command |
| echo Computer Name is: %computername% | Write-Output "Computer name is:"  get-content env:computername |
| echo Windows version is:  ver | Write-Output "Windows version is:"  (Get-WmiObject -class Win32\_OperatingSystem).Caption |
| echo CPU is: %PROCESSOR\_IDENTIFIER% | Write-Output "CPU is:"  Get-WmiObject Win32\_Processor | findstr "Name" |
| echo Total memory is: | Write-Output "Total Memory is:" |
| wmic ComputerSystem get TotalPhysicalMemory | [Math]::Round((Get-WmiObject -Class win32\_computersystem -ComputerName localhost).TotalPhysicalMemory/1Gb) |
| echo The disks that are installed and their freespace: | Write-Output "The Disks that are installed and their freespace:" |
| wmic logicaldisk get size,freespace,caption | Get-WmiObject -Class Win32\_logicaldisk -Filter "DriveType = '3'" |
| echo All the %computername% IP addresses | Write-Output "IPv4 addresses" |
| netsh interface ip show address | findstr "IP Address" | Get-NetIPAddress -AddressFamily IPv4 | Sort-Object -Property InterfaceIndex | Format-Table |

## Create a BASH script.

A text editor is used to create an executable script. One of the text editor tools, vi, or the improved vi version, vim, is based on letter and number-based commands to modify text. For example, **dd** will delete the whole line on which the cursor is placed. **5dd** would delete 5 lines. When vi is in command mode, input is interpreted as a command.

To enter insert mode at the current cursor position type **i**. To append text at the end of the current line, type **a**. To insert text on a new line below the current line, type **o**. Use the Esc key to exit out of insert mode to command mode.

To save a file in the vi editor use **:w** from command mode. To save and quit, type **:wq**. To quit without saving type **:q!**.

Depending on your version of Unix-like OS, you may find other text editor tool, such as nano, pico, and gedit. The text editing tools, such as vi, nano, and pico, are accessible through the command line; while the GUI-based text editors, like gedit, may be located via the application menu or the command line.

* + - 1. Start up a Linux computer or VM.
      2. Use a text editor tool and create a file named **info.sh** in your home directory with the following text:

#!/bin/bash

echo "Computer name is: " $HOSTNAME

echo "Operating System is:"

cat /etc/os-release | grep PRETTY\_NAME

echo "CPU is"

lscpu | grep "Model name:" | sed -r 's/Model name:\s{1,}//g'

echo "Total Memory is"

cat /proc/meminfo | grep "MemTotal"

echo "The disks that are installed and their freespace"

df -h

echo "All the" $HOSTNAME "IP addresses"

hostname -I

* + - 1. Open a terminal and navigate to your home directory. To make the script executable, enter **chmod 755 info.sh** at prompt.
      2. At the prompt, enter **./info.sh** to execute the script.

#### Questions:

What is the output of the script?

Type your answer here.

Answers will vary.

Computer name is: KDV-PC

Operating System is:

PRETTY\_NAME="Ubuntu 16.04.5 LTS"

CPU is

Intel(R) Core(TM) i5-5200U CPU @ 2.20GHz

Total Memory is

MemTotal: 16690512 kB

The disks that are installed and their freespace

Filesystem Size Used Avail Use% Mounted on

rootfs 930G 732G 198G 79% /

root 930G 732G 198G 79% /root

home 930G 732G 198G 79% /home

data 930G 732G 198G 79% /data

cache 930G 732G 198G 79% /cache

mnt 930G 732G 198G 79% /mnt

none 930G 732G 198G 79% /dev

none 930G 732G 198G 79% /run

none 930G 732G 198G 79% /run/lock

none 930G 732G 198G 79% /run/shm

none 930G 732G 198G 79% /run/user

C: 930G 732G 198G 79% /mnt/c

All the KDV-PC IP addresses

192.168.56.1 192.168.159.1 192.168.181.1 169.254.45.2 169.254.126.64 192.168.1.40

What does the “#!/bin/bash” mean at the beginning of the script?

Type your answer here.

It tells the script which interpreter to use for the code.

What command would you use to learn more about the **df** and **lscpu** commands?

Type your answer here.

Use the man command to learn more. At the prompt, enter man df and man lscpu.

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