Advanced Scripting   
Legacy Shells and PowerShell

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# Instructions

Save a copy of this document. Use Microsoft Word to edit and answer all questions directly in this document. You will save and upload this completed document as your homework submission.

# Overview

These exercises are intended as a review of other command shells you have used previously.

# Setup

Launch a Windows legacy Command Prompt. To find it: [Flag], then start typing cmd.exe.

Also, launch a Linux bash shell. If you installed WSL: [Flag], type bash, then under best matches, look for it under the heading “Command.” If you use macOS, Linux, or a Linux VM: launch its Terminal app.

Also, launch PowerShell Core. To find it in Windows: [Flag], then start typing pwsh.exe. In Linux or macOS: launch another Terminal app, then enter pwsh

# Task 1—Navigate the file system using legacy shells.

## Steps

1. Print Working Directory: show the current working directory (CWD) location as a “path” sequence of directories and subdirectories (folders and subfolders). *Metaphor: think of this as the shell’s “cursor” location within the filesystem.*
   1. In CMD.EXE: type pwd and press [Enter]. You should see output similar to: C:\Users/Alice. What output was produced in your Command Prompt console? Click or tap here to enter text.
   2. In bash: type pwd and press [Enter]. You should see output such as: /home/alice. What output do you see in your bash terminal? Click or tap here to enter text.
   3. In pwsh: Type Get-Location and press [Enter]. Your output: Click or tap here to enter text. The alias commands gl and pwd also work; try them.
2. Make Directory: create a new subdirectory (subfolder). *Metaphor: make a new “branch” in the filesystem’s directory tree structure.*
   1. CMD: Enter md stash1
   2. bash: Enter mkdir stash2 (this command also works in CMD and PowerShell)
   3. pwsh: Enter New-Item -Type Directory stash3
3. Change Directory: set a new CWD location. Metaphor: think of this as moving the shell’s cursor to a different folder path.
   1. CMD:
      1. Enter cd stash1. Then enter pwd. Record your output here: Click or tap here to enter text.
      2. cd .. then pwd. Your output: Click or tap here to enter text. (You should be out of the stash subdirectory and back in the parent directory.)
      3. cd \ then pwd. Your output: Click or tap here to enter text. (You should be at the top level directory, which is the “root” folder of the filesystem tree).
   2. bash:
      1. cd stash2, then enter pwd. Your output: Click or tap here to enter text.
      2. cd .. then pwd. Your output: Click or tap here to enter text.
      3. cd / then pwd. Your output: Click or tap here to enter text.
   3. pwsh:
      1. Set-Location stash3, then enter Get-Location. Your output: Click or tap here to enter text.
      2. Set-Location .. then Get-Location. Your output: Click or tap here to enter text.
      3. Set-Location / then Get-Location. Your output: Click or tap here to enter text.
      4. The aliases sl and cd also work in PowerShell.
4. List directory contents: show a list of the files and subdirectories contained in the CWD.
   1. CMD:
      1. dir . Your output: Click or tap here to enter text. (You should see the contents of the root-level folder of your Windows filesystem.)
      2. cd then dir. Your output: Click or tap here to enter text. (You should see the contents of your account’s home user folder.)
   2. bash:
      1. ls . Your output: Click or tap here to enter text. (You should see the contents of the root level folder of your Linux or macOS filesystem.)
      2. cd ~ then ls . Your output: Click or tap here to enter text.
   3. pwsh:
      1. Get-ChildItem . Your output: Click or tap here to enter text. (You should see the contents of the root level folder.)
      2. Set-Location ~ then Get-ChildItem . Your output: Click or tap here to enter text. (Set-Location by itself without the additional argument ~ also sets the CWD to your home folder.)
5. External command: use the external “tree” console program to show the tree structure of the entire filesystem.
   1. CMD: tree \ . (Note: this will probably tie up your shell with a lot of output, because the Windows tree structure has thousands of folders and subfolders in various paths. It’s not worth your time to wait for it to finish outputting everything! Instead, impatiently press [Ctrl]+C to interrupt the command and get back to the prompt.)
   2. bash: If you don’t already have the tree utility installed (likely), you’ll need to install it first:
      1. sudo apt install -y tree .(This command installs tree in Ubuntu or Debian; use your favorite search engine to research equivalent commands in macOS, Fedora, etc.)
      2. tree / (Again, [Ctrl]+C to interrupt.)
   3. pwsh: entering the name of any external command, such as tree, launches that program as if it were executed in a legacy shell. That is, PowerShell Core in Windows executes it as it would in CMD, PowerShell Core in Linux runs it like it would in bash.
6. There are many more commands for other filesystem tasks like moving files and folders, renaming them, deleting them, changing their attributes and permissions, etc. If you don’t remember, or haven’t yet learned, you can always consult a search engine or an LLM AI chatbot if you need to do those tasks in a legacy shell. Later, we’ll practice in depth more filesystem tasks in PowerShell, but for now, let’s move on to other tasks.

# Task 2—Operate input and output streams

## Steps

1. Use > to redirect output to a file instead of to the scrolling display.
   1. CMD: echo payment:100 > myinfo1.txt
   2. bash: echo payment:200 > myinfo2.txt
   3. pwsh: Write-Output payment:300 > myinfo3.txt (The echo and write aliases also work)
2. Use >> to append additional output to an existing file.
   1. CMD: echo expense:91 >> myinfo1.txt
   2. bash: echo expense:92 >> myinfo2.txt
   3. pwsh: Write-Output expense:93 >> myinfo3.txt
3. Get content from a file.
   1. CMD: type myinfo1.txt
   2. bash: cat myinfo2.txt
   3. pwsh: Get-Content myinfo3.txt
      1. Enter Get-Alias -Definition Get-Content. What are three shorter aliases for Get-Content? Click or tap here to enter text.
4. Use | to “pipe” the output of one command into the input of another command.
   1. CMD: type myinfo1.txt | find "pay" . Your output: Click or tap here to enter text.
      1. tree \ | more (Press space to see more output. Press Q to quit the more command, and press [Ctrl]+C to interrupt the tree command)
   2. bash:
      1. cat myinfo2.txt | grep pay . Your output: Click or tap here to enter text.
      2. tree / | more (Press space to see more output. Press Q to quit more.)
   3. pwsh: Get-Content myinfo3.txt | Select-String pay . Your output: Click or tap here to enter text.

# Task 3—Managing processes

## Steps

1. List all running processes.
   1. CMD: tasklist
   2. bash: ps ax
   3. pwsh: Get-Process
2. Use a process identifier (PID) to terminate a running process.
   1. CMD:
      1. Enter calc to launch a Calculator app window.
      2. tasklist | find "Calculator" What is the PID of your Calculator app’s process? Click or tap here to enter text.
      3. Enter taskkill /F /PID **<PID number>**. Example: my Calculator’s PID was 8124, so I entered taskkill /F /PID 8124
   2. bash:
      1. Launch another bash terminal console. In that second console, start the interactive password changer utility: passwd (You don’t need to actually change your password; just ignore the “current password” prompt and leave it idle.)
      2. Back in your original bash terminal: ps ax | grep passwd . What is the PID of your password-changer’s process? Click or tap here to enter text.
      3. Again in your original bash terminal: kill -KILL **<PID number>** . Example: my passwd PID was 84, so I entered kill -KILL 84
   3. pwsh:
      1. Launch one of the above programs (calc if you’re using PowerShell Core in Windows, passwd if you’re using PowerShell Core in Linux).
      2. Get-Process | more (Or, if you prefer, pipe into a suitable Select-String command.) Find the PID number of your process.
      3. Stop-Process -Id **<PID number>**.
      4. Get-Alias -Definition Stop-Process . What are shorter aliases for Stop-Process? Click or tap here to enter text.

# Task 4—Access built-in help documentation

## Steps

1. Show help for the command that lists directory contents.
   1. CMD: dir /?
      1. Notice that the command option **/B** changes the output to “bare” format.
      2. Try it: dir \ /B
      3. What command option adds file ownership information to the output? Click or tap here to enter text.
   2. bash: man ls (Press Q to quit reading the “manpage” and return to the shell prompt.)
      1. Notice that the command option **-1** (that’s the numeral “one”) changes the output to “single-column” format, like the “bare” format of CMD’s dir.
      2. Try it: ls -1 /
      3. What option produces a “long listing” format that adds file permission codes, ownership, size, and modification date information to the output? Click or tap here to enter text.
   3. pwsh: Get-Help -Online Get-ChildItem
      1. This opens a new browser tab to show the online help documentation.
      2. In every new installation of PowerShell Core, the built-in help system is kept sparse, so that it doesn’t use too much local disk storage space. In other words, by default, most of the help manuals are online rather than built-in.
      3. You can download the help manuals. Here’s how: launch a new PowerShell Core prompt with administrator privileges (In Windows, find it in the Start menu and tap “Run as Administrator.” In Linux or macOS, open a new Terminal and enter sudo pwsh. If necessary, authenticate to escalate to root privilege.) At that new administrator PowerShell Core prompt, enter Update-Help. This command will download the online documentation to PowerShell Core’s local built-in help system, and will take a while. Some help packages may not be available on every system, so don’t freak out if you see some red-colored warning or error messages. You might see hints in those errors that you can follow to get some of the content that Update-Help couldn’t get by itself.
      4. Okay, now that the built-in help system is updated, you can get help locally at the console prompt instead of in a browser: Get-Help Get-ChildItem
      5. Notice that the command-line switch option -Name changes the output to names-only “bare” format. Try it: Get-ChildItem -Name
      6. What command-line switch option causes Get-ChildItem to list not just the contents of a folder, but also the contents of all of its child locations (subfolders), and their child locations (sub-subfolders), and so forth? Click or tap here to enter text.
2. Explore built-in documentation for other commands, such as the process listers:
   1. CMD: tasklist /?
   2. bash: man ps.
   3. pwsh: Get-Help Get-Process.
3. That’s enough review for now. Use the exit command to close each of your command prompt, PowerShell, and bash terminal windows.

# Deliverable

Upload this document with completed answers to I-Learn Canvas.