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Cool Shell Scripts

Introduction

About me

- Sander van Vugt
- Living in the Netherlands
- Author and presenter of many titles on this platform – Linux, Kubernetes and Ansible
- Founder of the Living Open Source Foundation
 - The mission of the Living Open Source Foundation is to stimulate the growth of local economies by enabling people to develop themselves as experts in the area of Open Source
 - Current focus is on education in Africa
 - See livingopensource.net for more information

About this Course

- This course is developed to allow you to get more experience in shell scripting
- To do so, we'll work through some scenarios, and next discuss possible solutions
- To follow along, you'll need access to a Bash shell
- This course is NOT an introduction to Bash shell scripting – take my "Bash scripting in 4 Hours" if you need an introduction level course
- Sample scripts used in this course are on <https://github.com/sandervanvugt/cool-bash>

Course Labs

- This course has a few labs
- Please send your lab solutions using pastebin (see <https://pastebin.com>)
- If your network access restrictions don't allow pastebin access, feel free to copy your solution in group chat or Q&A

Poll Question 1

How would you rate your own Bash scripting experience?

- None
- Poor
- Average
- Strong

Poll Question 2

Have you attended my Shell scripting in 4 hours class?

- yes
- no

Poll Question 3

On which OS platform are you planning to use Bash shell scripts

- Linux
- MacOS
- Windows Subsystem for Linux
- UNIX
- Other

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1. Monitoring Process Activity

Lab 1: Monitor Process Activity

- Script 1_cpu-hog has a few problems. Can you identify which?

Script 1_cpu-hog summary

- A **while** loop can be used to continue running script code forever
- If you do so, it may make sense to include a sleep statement as well
- Command substitution can be used to use the result of a command in the script
 - **MYVAR=\$(mycmd)**
 - **MYVAR=`mycmd`**

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2. A flexible vi

Lab 2: a Flexible vi

- I often confuse **vi** and **cd**, with the result that I'm opening a directory with **vi**, and try to use **cd** to edit a file. This is easy to fix with a script. Write a script that works with one argument and meets the following requirements:
 - If no argument is provided, it should exit with an error message
 - If the argument is a directory, the script should **cd** to it
 - If the argument is a file, the script should open it in **vi** for editing
- Write this script as compact as possible: shorter is better!

Script 2_cv summary

- **test** can be used to evaluate variables
 - Write as **test** or [...]
 - The permissions tests **-r -w** are not looking at the actual permission mode, but try to open or write the file
- **condition1 && condition2** will only run condition2 if condition1 is true (and offers an alternative for **if ... then ... else**)
- **condition1 || condition2** will only run condition2 if condition1 is false
- **exec** is used to replace the current shell with the command used as argument, and doesn't start a subshell

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3. Writing a Menu

Script 3_choose_dir summary

- **select** is used to write a simple menu
- Use **break** if you want to stop after making a selection
- The structure is:
 select var in item1 item2 item3
 do
 echo \$var
 done

Lab 3: Writing a Menu

- Write a menu that creates a user. The menu should have you select between 3 user names. Pick any name you like

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4. Rebooting and Continuing

Script 4_reboot-test.sh summary

- You cannot reboot and pick up from a shell script
- You can however have the shell script add lines to a file that is executed after the reboot anyway, and clean up that file after running the code you previously added
- To write files from a script, a **here document** can be used
cat << WHATEVER >> destfile
line1
line2
WHATEVER

Lab 4: Reboot and Continue

- Sometimes, you want a script to reboot and continue after rebooting. Write a script that will do so, and contains at least the following elements:
 - The script should ask the user if it's OK to reboot
 - After rebooting, the script should create a file with the name `/tmp/after-reboot`
 - If this file already exists before reboot, the script should show an error
 - If this file exists after reboot, the script should congratulate the user for his successful work

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5. Advanced Pattern Matching

Script 5_today.sh and 5_subst summary

- Pattern matching is used to clean up text patterns
- As it is a Bash internal command structure, it is more efficient than using external commands like **awk** or **cut**
 - *##*/ removes the longest match of */*
 - **/ removes the shortest match of */*
 - *%/* removes the shortest match of /**
 - *%%/* removes the longest match of /**
 - */one/two replaces the first "one" with "two"*
 - *//one/two replaces all occurrence of "one" with "two"*

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6. Create a Stresstest

Lab 6: Create a stresstest

- Write a script that performs a stress test. It should push your system to its ultimate limits

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7. Using trap

Scripts 7: Using trap

- Use trap to run commands on specific behavior caused by signals
- Use **trap -l** for a list of signals
- **trap "command" signal**
- 7a_trap shows how to run **rm -f** on the EXIT signal
- 7b_trap uses a function to increase a counter when SIGINT (Ctrl-c) is used
- A function allows you to call specific commands by name

Lab 7: Using traps

- Write a script that sleeps for an hour, and which cannot be interrupted using Ctrl-C (SIGINT, SIGTERM)
- When Ctrl-C is used, the script should print "NOT PERMITTED"

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8. Working with Options

Script 8_makeuser summary

- An option is an argument that changes the behavior of a command
- Use **while getopts "abc" opt; do ... done** with an embedded **case** statement to process the options
- After a script deals with the options, using **shift \$((\$OPTIND - 1))** must be used to continue with the next (non-option) command line argument

Lab 8: Using Options

- Write a script that allows using 3 options:
 - -u should show a list of currently logged in users (**who**)
 - -l should show a list of files in the / directory (**ls**)
 - -p should print a list of all currently running processes (**ps aux**)

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9. (Optional) Monitoring Critical Processes

Lab 9: Monitoring Critical Processes

- Write a script that monitors a critical process. If the process goes down, the script should try to start it again, and at the same time it should send an email message alerting bob@example.com that the process has gone down

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10. (Optional) Multiplier Tables

10. Multiplier Tables

- Write a script that allows children to practice their multiplier tables. The script should run until manually interrupted with the Ctrl-C key sequence and allow kids to practice multiplier tables up to 10. If a question was not answered correctly, the same question should be repeated until answered correctly. While running the script, it should write a log file, indicating for each answer if it was answered correctly or not.