R·I·T School of Information

# ISTE-444 Web Server Development and Administration
# Lab 1: Linux Commands

## INSTRUCTIONS

Complete the tasks in Activity 1 and provide screenshots of the terminal that includes your commands and relevant output to prove that you were able to perform each task. The lab should be completed and submitted on an individual basis, but feel free to work with other classmates and ask for help from your instructor as needed. When complete, submit the lab to the Lab 1 dropbox. The exact due date will be posted on myCourses.

## PREPARATION

- Read through this document
- Have your Linux notes handy

## ACTIVITY SUMMARY

**Activity 0** – Modify your shell prompt
**Activity 1** – Linux commands

## ACTIVITIES

### Activity 0 – Modify your shell prompt

Before you begin working on the lab, you need to modify the prompt in your shell (terminal) to reflect your username, rather than the generic prompt of "student@localhost". To modify your shell prompt, open a Terminal and type "nano .bashrc". We're now going to edit a file that executes every time you start up a terminal in your current session.

```
  GNU nano 2.3.1               File: .bashrc                          Modified

# .bashrc

# Source global definitions
if [ -f /etc/bashrc ]; then
        . /etc/bashrc
fi

# Uncomment the following line if you don't like systemctl's auto-paging featur$
# export SYSTEMD_PAGER=

# User specific aliases and functions
PS1='[username \w]\$ '
```

Now add a line to the end of the file similar to the one above, except that you should use your RIT username in place of the word "username". Save the file and exit nano. Then type exit to leave the Terminal. Open another Terminal and your prompt should now look like the following:

```
[username ~]$
```

We will be looking for the correct username in your screen shots when the lab is graded, so make sure you follow these steps before working on any lab.

## Bonus:

**For a 10% bonus to your grade for this lab, change the color of the prompt (to be included in all of the screenshots that follow).**

## Activity 1 – Linux Commands

Perform the following tasks. For each task, include a screenshot that clearly indicates the command(s) that you used to accomplish the specified task as well as the output that proves that the task was accomplished correctly. Make sure that *your* username is in the screenshot prompt. If you're unable to perform the task as specified, you may receive partial credit by providing the commands and output you were able to get and explain where you had difficulty. Any text you write should be written in red font.

**Task 1 (10 points): Write a single command that outputs a list of all programs in /usr/bin that begin with "ip", begin with "net", or end with "grep". Hint: when using a $ in a regex, the $ comes *after* the string you want to match at the end of line.**

```
File  Edit  View  Search  Terminal  Help
[ap4534@localhost ~]$ ls /usr/bin/ | grep -E "^(ip|net).*|*.grep$"
bzgrep
egrep
fgrep
ipa
ipa-getcert
ipcalc
ipcmk
ipcrm
ipcs
iptables-xml
iptc
msggrep
netaddr
netstat
nettle-hash
nettle-lfib-stream
pgrep
xzegrep
xzfgrep
xzgrep
zegrep
zfgrep
zgrep
zipgrep
```

**Task 2 (20 points): Output a list of all subdirectories of /etc that you *cannot* open. The list should only include the full path of the subdirectories without any extraneous visible characters, such as ":". See the output below for the first few subdirectories and expected formatting. This task must be accomplished in two commands or fewer. Hint: save the list of subdirectories to a file and then use filters.**

```
/etc/audisp
/etc/audit
/etc/cups/ssl
/etc/dhcp
/etc/firewalld
/etc/grub.d
/etc/ipsec.d
/etc/libvirt
/etc/lvm/archive
/etc/lvm/backup
/etc/lvm/cache
```

```
[ap4534@localhost etc]$ find /etc/ -type d -not -readable -printf "%f\n" 2>/dev/null | sed "s/^/\/etc\//g"
/etc/grub.d
/etc/private
/etc/rsyslog
/etc/sssd
/etc/active
/etc/final
/etc/dhcp
/etc/archive
/etc/backup
/etc/cache
/etc/rules.d
/etc/localauthority
/etc/sudoers.d
/etc/firewalld
/etc/trusted
/etc/audisp
/etc/audit
/etc/ipsec.d
/etc/libvirt
/etc/crypto
/etc/ssl
```

**Task 3 (50 points): Ted Williams was a baseball player that played Major League Baseball for 19 seasons between the years 1939 and 1960 and is considered The Greatest Hitter That Ever Lived™. Some of his statistics are stored in TeddyBallgame.csv on myCourses. You will be performing several tasks using this file. See the top line of the file for the definition of each field in the file. Note that since this is a .csv file, all fields are separated by commas.**

**Task 3a (5 points): Write a single line that removes the top line of the file, replaces commas with spaces, and saves the output to a file called TeddyBallgame.txt. Also show the contents of TeddyBallgame.txt in your screenshot (you should use a separate command to display the output to the console).**

```
[ap4534@localhost Downloads]$ sed "1d" TeddyBallgame.csv | tr , " " > TeddyBallgame.txt
[ap4534@localhost Downloads]$ cat TeddyBallgame.txt
1939 20 149 31 145 .327
1940 21 144 23 113 .344
1941 22 143 37 120 .406
1942 23 150 36 137 .356
1946 27 150 38 123 .342
1947 28 156 32 114 .343
1948 29 137 25 127 .369
1949 30 155 43 159 .343
1950 31 89 28 97 .317
1951 32 148 30 126 .318
1952 33 6 1 3 .400
1953 34 37 13 34 .407
1954 35 117 29 89 .345
1955 36 98 28 83 .356
1956 37 136 24 82 .345
1957 38 132 38 87 .388
1958 39 129 26 85 .328
1959 40 103 10 43 .254
1960 41 113 29 72 .316
```

**Task 3b (15 points): Use TeddyBallgame.txt from Task 3a as a starting point for this task. Write a single command to output the list of all seasons where Ted Williams had 100 or more Runs Batted In. Your output should only include the year and the number of Runs Batted In during that year.**

```
[ap4534@localhost Downloads]$ awk '$5 >= 100 {print $1, $5}' TeddyBallgame.txt
1939 145
1940 113
1941 120
1942 137
1946 123
1947 114
1948 127
1949 159
1951 126
```

**Task 3c (15 points): Use TeddyBallgame.txt from Task 3a as a starting point for this task. Write a single line to output the list of all seasons where Ted Williams hit 30 or more Home Runs. The list should be sorted from most Home Runs to least and the final output should include the fields Year, Home Runs, Runs Batted In, and Batting Average for those seasons. See expected output below.**

```
1949 43 159 .343
1957 38 87 .388
1946 38 123 .342
1941 37 120 .406
1942 36 137 .356
1947 32 114 .343
1939 31 145 .327
1951 30 126 .318
```

```
[ap4534@localhost Downloads]$ awk '$4 >= 30 {print $1, $4, $5, $6}' TeddyBallgame.txt | sort -nrk2
1949 43 159 .343
1957 38 87 .388
1946 38 123 .342
1941 37 120 .406
1942 36 137 .356
1947 32 114 .343
1939 31 145 .327
1951 30 126 .318
```

**Task 3d (15 points): Use the output of Task 3c as a starting point for this task either as a redirected output file or add more pipes to the command from Task 3c. Write a single line to sort the seasons from Task 3c by Runs Batted In from low to high. See expected output below.**

```
1957 38 87 .388
1947 32 114 .343
1941 37 120 .406
1946 38 123 .342
1951 30 126 .318
1942 36 137 .356
1939 31 145 .327
1949 43 159 .343
```

```
[ap4534@localhost Downloads]$ awk '$4 >= 30 {print $1, $4, $5, $6}' TeddyBallgame.txt | sort -nrk2 | sort -nk3
1957 38 87 .388
1947 32 114 .343
1941 37 120 .406
1946 38 123 .342
1951 30 126 .318
1942 36 137 .356
1939 31 145 .327
1949 43 159 .343
```

**Task 4 (20 points): Write a single command that stores (in a file called out.txt) the names of all .conf files located in /etc that contain an IP address beginning with "192.168". Show the contents of out.txt in your screenshot using a separate command. See expected contents of out.txt below. It's ok if your command generates error messages when it's executed. To suppress error messages, you can redirect the error stream to /dev/null.**

/etc/chrony.conf
/etc/dnsmasq.conf
/etc/ipsec.conf
/etc/ntp.conf
/etc/rsyslog.conf

```
[ap4534@localhost Downloads]$ grep -rl "192\.168\." /etc/*.conf 2>/dev/null > out.txt
[ap4534@localhost Downloads]$ cat out.txt
/etc/chrony.conf
/etc/dnsmasq.conf
/etc/ipsec.conf
/etc/ntp.conf
/etc/resolv.conf
/etc/rsyslog.conf
```

The /etc/resolv.conf file contains two DNS records. One of them is 192.168.44.200. Therefore, it is included in the list even if the expected out.txt does not contain it.