Basic Shell Script and Regular Expression

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Pre-reading

- https://www.linkedin.com/learning/learning-linux-command-line-26594217/search-for-text-in-files-and-streams-with-grep
- https://www.linkedin.com/learning/learning-linux-command-line-26594217/manipulate-text-with-awk-sed-and-sort
- Chapters 2 and 3: https://www.linkedin.com/learning/learning-bash-scripting-26210777

Linux Bash Scripting

Let's say I want to output all the jpg images from the Capilano University website, I could use the following one-liner with a combination of curl and grep, as follows:

curl -s https://www.capilanou.ca | grep -o -E '/media.*jpg' | sort -u

NOTE: the above one-liner downloads the homepage HTML (-s for silent), extract all .jpg image paths with grep, and sort them uniquely

Below is the sample output from the shell:

```
$ curl -s https://www.capilanou.ca | grep -o -E '/media.*jpg' | sort -u
/media/capilanouca/about-capu/get-to-know-us/capsule-stories/images/CapU-Student-First-Week-feature-image-1-800x495.jpg
/media/capilanouca/about-capu/get-to-know-us/capsule-stories/images/CapU-Student-First-Week-feature-image-500x309.jpg
/media/capilanouca/about-capu/get-to-know-us/capsule-stories/images/North-Shore-feature-image-1-800x495.jpg
/media/capilanouca/about-capu/get-to-know-us/capsule-stories/images/North-Shore-feature-image-500x309.jpg
/media/capilanouca/about-capu/get-to-know-us/capsule-stories/images/Sarah-Buchanan-feature-image-1-800x495.jpg
/media/capilanouca/about-capu/get-to-know-us/capsule-stories/images/Sarah-Buchanan-feature-image-500x309.jpg
/media/capilanouca/about-capu/get-to-know-us/capsule-stories/images/The-Mace-feature-image-1-800x495.jpg
/media/capilanouca/about-capu/get-to-know-us/capsule-stories/images/The-Mace-feature-image-500x309.jpg
/media/capilanouca/about-capu/get-to-know-us/capsule-stories/images/capu-in-focus-feature-photo-1-800x495.jpg
```

```
/media/capilanouca/about-capu/get-to-know-us/capsule-stories/images/capu-in-focus-feature-photo-500x309.jpg
/media/capilanouca/about-capu/get-to-know-us/events/university-events/2024.10.15_Learning-Support_13.jpg
/media/capilanouca/about-capu/get-to-know-us/events/university-events/2025.3.6_MDX-Student-Lifestyle_121_Event_page_Main_image_800x495.jpg
/media/capilanouca/about-capu/get-to-know-us/events/university-events/Consent-Coffee-Chat-image.jpg
/media/capilanouca/images/explore-degrees/Business-and-Professional-Studies-feature.jpg
/media/capilanouca/images/explore-degrees/Education-Health-and-Human-Development-feature.jpg
/media/capilanouca/images/explore-degrees/Global-and-Community-Studies-feature.jpg
/media/capilanouca/images/homepage-hero/homepage-hero-September-2024.jpg
/media/capilanouca/programs-amp-courses/search-amp-select/program-profiles/idea-instructor-painting.jpg
```

Now let's download every single image from the above, we can use the wget command, as follows:

```
wget https://www.capilanou.ca/media/capilanouca/about-capu/get-to-know-us/capsule-stories/images/CapU-Student-First-Week-feature-image-1-800x495.jpg
wget /media/capilanouca/about-capu/get-to-know-us/capsule-stories/images/CapU-Student-First-Week-feature-image-500x309.jpg
# ... do the above for each of the url above
```

I don't know about you, but I would get tired typing after 2 downloads, lol.
There is a better way, logically, we want to store the output of the first command into an list, then run **wget** on each of the item on the list, appending https://www.capilanou.ca/ to the beginning.

We do it via a shell script, a program that uses shell commands. Here is the code:

```
# Stores the output into the array call FILES
# NOTE: we use command substitution $( ) to capture the
# output of a command into a variable
FILES=$(curl -s https://www.capilanou.ca | grep -o -E '/media.*jpg')

# Loop over the FILES array.  In bash, assigning we need
# to prefix a variable with the $ sign to access its content
for F in $FILES
do
    # we are inside the loop, and we can now run wget on
    # the $F variable.  Noticed the use of variable expansion ${}
    wget https://www.capilanou.ca${F}
done
```

Save this in a file called download.sh and we can run it using the command

bash download.sh

To make the file easier to run, we can make the file executable. To do this, we need to first add a line in the beginning of the file to indicate to Linux that this file requires the bash program. This is generally called the **shebang** line:

```
#!/bin/bash

# Stores the output into the array call FILES
# NOTE: we use command substitution $( ) to capture the
# output of a command into a variable
FILES=$(curl -s https://www.capilanou.ca | grep -o -E '/media.*jpg')

# Loop over the FILES array.  In bash, assigning we need
# to prefix a variable with the $ sign to access its content
for F in $FILES
do
    # we are inside the loop, and we can now run wget on
    # the $F variable.  Noticed the use of variable expansion ${}
    wget https://www.capilanou.ca${F}
done
```

We then change the permission of the file so it is executable by Linux, finally we can run it on the command line:

$ chmod +x download.sh

Then you can run the script with the following directly in the shell as follows:

$ ./download.sh

Notice that we have to provide the path to the current directory when calling the script file.

Notes

1. Use the -P option of grep if you want to use the standard regex (you will learn this soon). i.e.

```
ubuntu@ip-172-31-2-248:~$ curl -s https://learn.operatoroverload.com/~jmadar/dogs/ | grep -E 'dog\-\d\d'
ubuntu@ip-172-31-2-248:~$ curl -s https://learn.operatoroverload.com/~jmadar/dogs/ | grep -P 'dog\-\d\d'
<tr><td valign="top"><img src="/icons/folder.gif" alt="[DIR]"></td><td><a href="dog-10/">dog-10/</a></td><td al
ign="right">2023-09-25 19:19  </td><td align="right">  - </td><td> </td></tr>
<tr><td valign="top"><img src="/icons/folder.gif" alt="[DIR]"></td><td><a href="dog-11/">dog-11/</a></td><td al
ign="right">2023-09-25 19:19  </td><td align="right">  - </td><td> </td></tr>
<tr><td valign="top"><img src="/icons/folder.gif" alt="[DIR]"></td><td><a href="dog-12/">dog-12/</a></td><td al
ign="right">2023-09-25 19:19  </td><td align="right">  - </td><td> </td></tr>
<tr><td valign="top"><img src="/icons/folder.gif" alt="[DIR]"></td><td><a href="dog-13/">dog-13/</a></td><td al
ign="right">2023-09-25 19:19  </td><td align="right">  - </td><td> </td></tr>
<tr><td valign="top"><img src="/icons/folder.gif" alt="[DIR]"></td><td><a href="dog-14/">dog-14/</a></td><td al
ign="right">2023-09-25 19:19  </td><td align="right">  - </td><td> </td></tr>
<tr><td valign="top"><img src="/icons/folder.gif" alt="[DIR]"></td><td><a href="dog-15/">dog-15/</a></td><td al
ign="right">2023-09-25 19:19  </td><td align="right">  - </td><td> </td></tr>
<tr><td valign="top"><img src="/icons/folder.gif" alt="[DIR]"></td><td><a href="dog-16/">dog-16/</a></td><td al
```

2. A reminder that to make your script file executable, you need to do the following:
   - Add the **#!/bin/bash line** as the first line of your script
   - Run **chmod +x ${script_filename}** to give the file executable permission
   - Execute the file by calling it directly (with path), i.e.
     ./${script_filename}

Question 1

Follow the instructions above to create **download.sh**.

Question 2

In data gathering, sometimes we need to extract information from web pages, directory listings, etc.

Visit https://learn.operatoroverload.com/~jmadar/dogs/

Some of the items have names like XXX-dog while others are dog-XXX (where XXX is a number).

Some directories have actual dog images in them, but most don't. In the animated gif below, I tried to click on each of the directories to find a directory containing the file dog.jpg. Turns out one of the directory is 61-dog/:

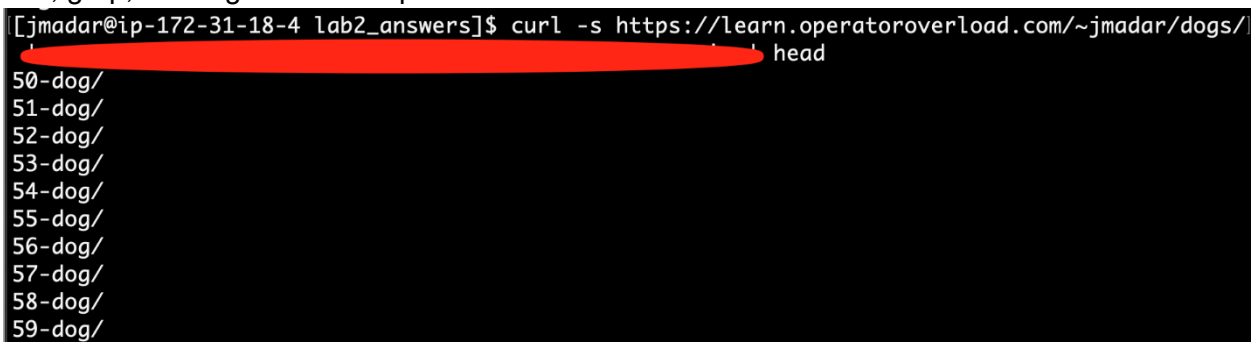
Index of /~jmadar/dogs

Name	Last modified	Size	Description
Parent Directory		-	
50-dog/	2020-05-07 19:00	-	
51-dog/	2020-05-07 19:00	-	
52-dog/	2020-05-07 19:00	-	
53-dog/	2020-05-07 19:00	-	
54-dog/	2020-05-07 19:00	-	
55-dog/	2020-05-07 19:00	-	
56-dog/	2020-05-07 19:00	-	
57-dog/	2020-05-07 19:00	-	
58-dog/	2020-05-07 19:00	-	
59-dog/	2020-05-07 19:00	-	
60-dog/	2020-05-07 19:00	-	

Your goal is to write a script to output the URL to all the dog.jpg locations under https://learn.operatoroverload.com/~jmadar/dogs/

Steps

1. Write a bash one-liner to extract all the directory names Hint: you will need to combine curl, grep, and regex to accomplish this.



NOTE: In the above screenshot, I have blurred out the important part of the one-liner, and added a head command so the output would fit the screenshot. Your one-liner will NOT include the head command.

a. Once you think the one liner is correct, incorporate this one liner into a script call "**dog_image.sh**" that outputs to stdout the urls all directories with images, as follows:

```
ubuntu@ip-172-31-27-251:~/a06$ ./dog_image.sh
http://learn.operatoroverload.com/~jmadar/dogs/61-dog/dog.jpg
http://learn.operatoroverload.com/~jmadar/dogs/133-dog/dog.jpg
http://learn.operatoroverload.com/~jmadar/dogs/dog-4/dog.jpg
http://learn.operatoroverload.com/~jmadar/dogs/dog-20/dog.jpg
ubuntu@ip-172-31-27-251:~/a06$
```

Hand-in

At the end of the lab, you will two files:

- **download.sh**
- **dog_image.sh**

zip the two files into one single file called <lastname>_lab02.zip. Upload it to D2L.

Note: If you do the work in AWS, please refer to this thread to learn how to download the files from the instance. https://stackoverflow.com/questions/9441008/how-can-i-download-a-file-from-ec2