## **BINF2111 - Introduction to Bioinformatics Computing**

**BASH 101 - Loops and conditionals** 



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RAW Lab

Lecture 9 - Tuesday Sep 20<sup>th</sup>, 2022

#### **Learning Objectives**

- Carnegie Rule
- Review quiz and bonus
- Review assignment 3
- Bash conditionals
- Bash for loops
- Quiz 9

#### Carnegie rule

Carnegie Rule is a rule of thumb suggesting how much outside-of-classroom study time is required to succeed in an average higher education course in the U.S. system.

Is for every hour spent in the classroom that two or more hours of outside work required.

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OUTDATED!

RAW rule of thumb for computational learning is spend quality time at the terminal, googling, and thinking problems at the terminal..

printf '#!/bin/bash\n \n# This is my first comment\n #Wookies rule' >script.sh

more script.sh

#!/bin/bash

# This is my first comment # Wookies rule

Is that my correct script output?

printf '#!/bin/bash\n \n# This is my first comment\n #Wookies rule' >script.sh

more script.sh

#!/bin/bash

# This is my first comment # Wookies rule

Is that my correct script output?

This file is an example of a BLANK type file?

```
@SEQ_ID
GATTTGGGGTTCAAAGCAGTATCGATCAAATAGTAAATCCATTT
GTTCAACTCACAGTTT
+
```

```
!"*((((***+))%%%++)(%%%%).1***
+*"))**55CCF>>>>>CCCCCC65
```

#### Assignment 3 lab (most missed)

(Q5) Provide two unique commands to convert a tsv to csv? They cannot start with the same command (For example, sed/tr, grep/tr etc)

- Command 1 here:

- Command 2 here:

- Another way:

#### Assignment 3 lab (most missed)

(Q10) Extract the sequence in example2.fasta that has more then one ATG?

more example2.fasta
>chr1\_geneA
ATGCTAAGGCTATCTTGACAACTGACTGCCTAG
>chr1\_geneB
ATGCTAAGGCTATGTTGGCAACTGACTCCCTAG
>chr1\_geneC
ATGCTAAGGCTACCTTGACAACTGACTGGGTAG
>chr1\_geneD

ATGAAAAGGCTATCTTGACAACTGACTCTTAC

ATGCTAAGGCTATCTTGATTTCTGACTTTTTAG >chr1 geneY

ATGGGGGGCTATCTTGACAACTGACTGCGTAG

>chr1\_geneZ

ATGCTAAGGCTATCNNGACAACTGACTAAATAG

What is a command to find multiple 'ATGs'?

- Command:

#### Bonus 7

- Write a bash script that states 150 kg at 178 cm is overweight?

```
Var1 = ?
Var2 = ?
```

#### Bonus 7

- Write a bash script that states 150 kg at 178 cm is overweight?

Var1 = weight Var2 = height

What are these variables?

#### Inside a bash script

```
3 # This script prints a message about your weight if you give it
  VOUL
5 # weight in kilos and height in centimeters.
9 idealweight=$[$height - 110]
10 if [ $weight -le $idealweight ] ; then
11 echo "You should eat a bit more food."
12 else
13 echo "You should eat a bit less food."
14 fi
```

#### Inside a bash script

Executable Script Var1 Var2 bash -x weight.sh 130 178

#### Inside a bash script

bash -x weight.sh 130 178

>output.txt

#### Lab Q4

Executable Script Var1 output

bash -x count\_fasta.sh example2.fasta >out.txt

```
1 #!/bin/bash
```

2

3 input=\$1

What is \$1 in this script?

#### BASH Variables (By content)

### Temporary stores of information

In this respect, variables come in 4 types:

- String variables:
- Integer variables:
- Constant variables:
- Array variables:

#### **BASH Reserved words**

```
! - Pipelines
   11 - Conditional Constructs
   } - Command Grouping
break - Looping Constructs
case - Conditional Constructs
continue - Looping Constructs
do - Looping Constructs
done - Looping Constructs
elif - Conditional Constructs
else - Conditional Constructs
esac - Conditional Constructs
fi - Conditional Constructs
for - Looping Constructs
function - Shell Functions
```

if - Conditional Constructs
 in - Conditional Constructs
 select - Conditional Constructs
 then - Conditional Constructs
 time - Pipelines
 until - Looping Constructs
 while - Looping Constructs

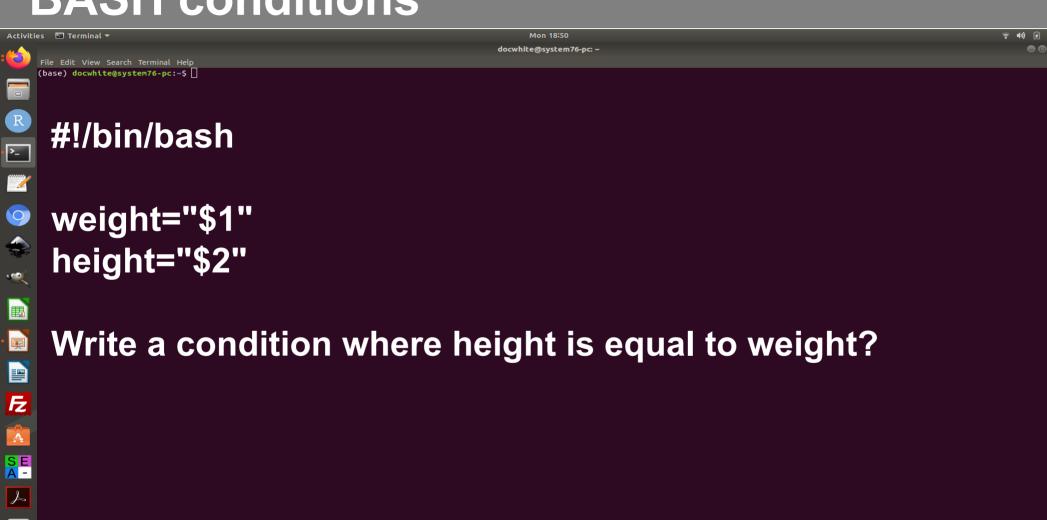
#### Similar from UNIX

https://www.gnu.org/software/bash/manual/html\_node/Reserved-Word-Index.html

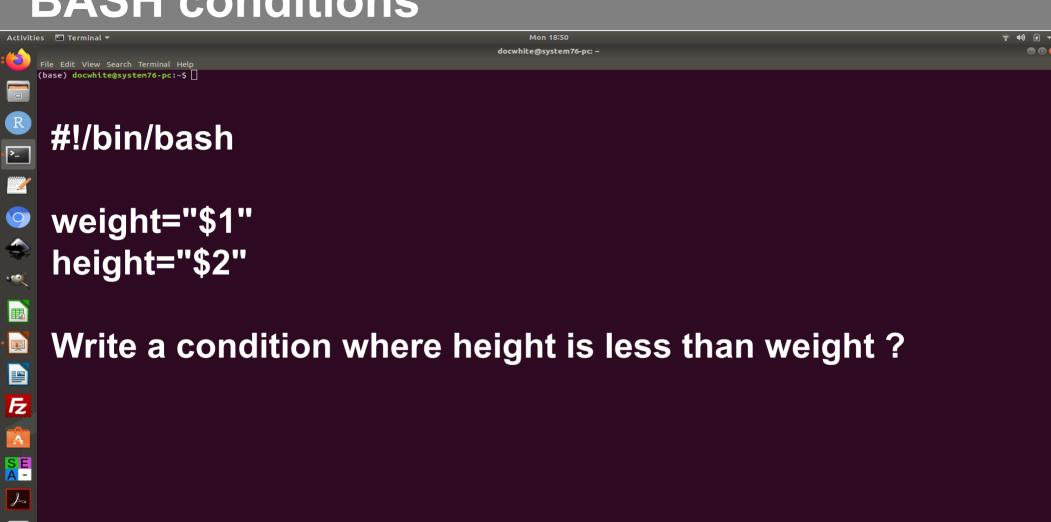
#### **BASH Conditionals (conditions)**

```
[[ -z STRING ]] Empty string
[[ -n STRING ]] Not empty string
[[ STRING == STRING ]] Equal
[[ STRING != STRING ]] Not Equal
[[ NUM -eq NUM ]] Equal
[[ NUM -ne NUM ]] Not equal
[[ NUM -It NUM ]] Less than
[[ NUM -le NUM ]] Less than or equal
[[ NUM -gt NUM ]] Greater than
[[ NUM -ge NUM ]] Greater than or equal
[[ STRING =~ STRING ]] Regexp
(( NUM < NUM )) Numeric conditions
[[ -o noclobber ]] If OPTIONNAME is enabled
[[ ! EXPR ]]
           Not
[[ X && Y ]] And
[[ X || Y ]] Or
```

#### **BASH** conditions



#### **BASH** conditions



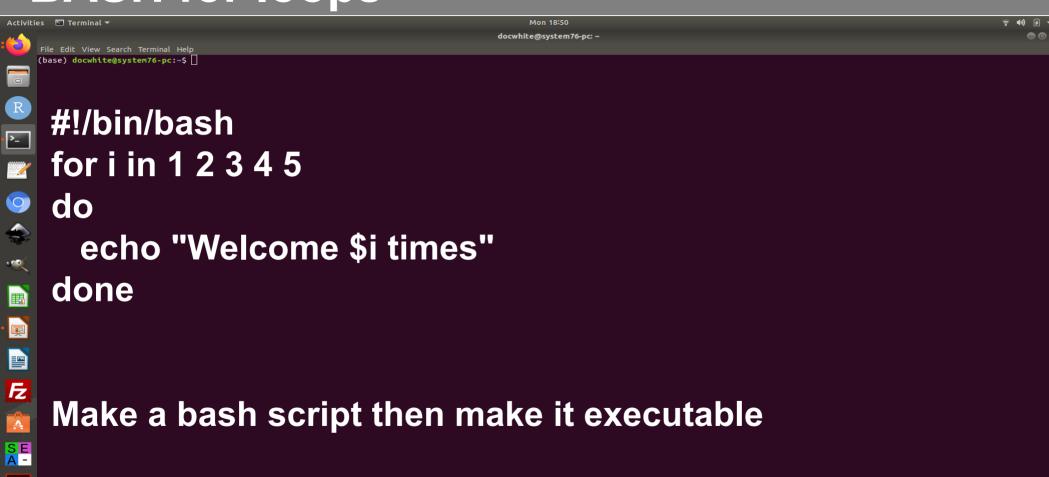
#### **BASH Conditionals (file conditions)**

```
[[ -e FILE ]]
                Exists
[[ -r FILE ]]
                Readable
[[ -h FILE ]]
                Symlink
[[ -d FILE ]]
                Directory
[[ -w FILE ]]
                Writable
[[ -s FILE ]]
                Size is > 0 bytes
[[ -f FILE ]]
                File
[[ -x FILE ]]
                Executable
[[ FILE1 -nt FILE2 ]] 1 is more recent than 2
[[ FILE1 -ot FILE2 ]] 2 is more recent than 1
[[ FILE1 -ef FILE2 ]] Same files
```

bash -x weight.sh 130 178

# for i in file.\*;do command \$i done

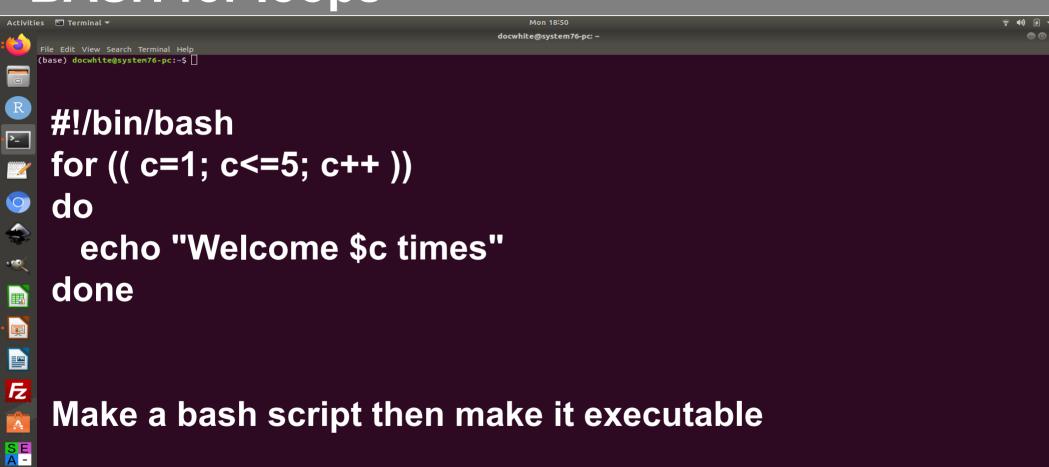
#### **BASH** for loops



#### BASH - for loop (C-style)

```
for ((i = 0; i < 100; i++)); do
  command $i
done</pre>
```

#### **BASH** for loops



- On canvas now