EXAM UNIX

- This is an examination. It is to be your work and your work alone.
- No exchange of information with another human entity in any form is acceptable.
- Reading google documents is ok.
- However, no exchanges via the internet are acceptable.
- Code generation on the internet is not acceptable.
- It is ok to use your notes, your programs, your lab notes, and any other notes you have written for class.

After you download **Exam1-Spring2023.zip** from **Canvas**, unzip the file if necessary, and a directory called **Exam1-Spring2023** will be created.

Change into Exam1-Spring2023 and start your work in that directory.

```
Follow these instructions in each file you submit
●  Include the class header

●  Format of Q&A pairs
Example:

#mprocop2:02/23/2022:filename

#Q1
cat file

#Q2
ls -lt file

Your answer must be only Unix code.

Shell error messages:
We will give partial credit in the case of syntax errors.
It is still preferred to comment out your code by using the # sign if
 you don't know how to fix the error.
```

Policy for cheating: sharing code on the exam is absolutely unacceptable and will earn you a 0 and take you straight to the ethics board. Do use any shared study documents either!

General Grading:
* Following instructions (class header and Q&A pair)
* Full points for correct answer
* Partial points are available

Change into Exam1-Spring2023 and start your work in that directory.
If you open two terminals, make sure you change into Exam1-Spring2023 in both.

```
For WSL and Ubuntu users: in each script that you submit, include:
# Class header
# WSL or Ubuntu user
```

1. (46 = 45+1) The directory structure depicted below is within the Exam1-Spring2023 directory.

```
                 /fishery-production.csv
                 /script1.bash
                 /file1
Exam1-Spring2023/dirB/fileB
                 /dirA/dirA1
                 /dirA/multiple files
```

In a script called **ex1-s23.bash** do the following:

Q1. (6) You working directory is Exam1-Spring2023.
Use the find command to find the location of the directory B and append the std output of the find command to the fileB. Start the search from current directory. Use a relative pathname to specify the location of fileB. To specify current directory, you can use either relative or absolute pathname. Be careful, there is also a file called B, but you should find a directory called B. Use one line of code.

Q2. (6) You working directory is Exam1-Spring2023.
Use tr directly on file1 to translate this characters set `@31` with this characters set `aei` (i.e @ with a, 3 with e and 1 with i) and further process the std output to obtain:

```
ah hello hi
```

Use only one tr, and do not use the cat command. You code should contain input redirection and one pipe. Use one line of code.

Q3. (8) Make these variables

```
a=Ihave
b=10
```

Use them with the echo command and process the std output of echo with another bash command to obtain:

```
I have $10 in my pocket.
```

Do not use printf but use echo. Use one line of code.

Q4. (10) You working directory is Exam1-Spring2023.
Run the script1.bash, redirect the std error to a file called **error**, translate the std output to uppercase and redirect the translated std output to a file called **output.txt**.
output.txt should be within Exam1-Spring2023. Do not change directory. Use one line of code. Do not use absolute pathnames.

Q5. (3) You working directory is Exam1-Spring2023.
Go to dirA1 by using a relative path.

Q6. (9) **You working directory is dirA1.**
Vertically concatenate all the files that are within **dirA** whose names have both 4 characters total and their first character is either g or p.
The output of the concatenation should be stored in a file called all.txt. all.txt should be within Exam1-Spring2023. Use relative pathnames and meta characters.

Notice: dirA is one directory back, and Exam1-Spring2023 is two directories back with respect to dirA1. Use one line of code.

Q7. (3) You working directory is dirA1.
Go to Exam1-Spring2023 by using an absolute pathname. Use the metacharacter for your home directory in your pathname.

2. (33=32+1) The file *fishery-production.csv* contains data about wild caught fish by different countries.

The 1st field reports the country.
2nd field is the country code.
3rd is the year.
4th is the fishery production in metric tons.

In a script called **ex2-fishery.bash** do the following:

Q1. (4) Extract all the lines with keyword 1960 and store them in a file called f1960. You can use grep or awk.
Use another line of code to extract all the lines with keyword 1982 and store them in another file called f1982. You can use grep or awk.

Q2. (6) Horizontally concatenate the two files generated in part Q1 with comma as the separator and save it in a file called f1960-1982.
The first lines of the file f1960-1982 should be:

```
Afghanistan,AFG,1960,200,Afghanistan,AFG,1982,700
Albania,ALB,1960,2600,Albania,ALB,1982,8812
Algeria,DZA,1960,25500,Algeria,DZA,1982,64500
….
….
```

If you do not know how to do this, for the next question use the provided file f1960-1982.bak.

Q3. (7) For *American Samoa*, print to screen the name of the country and the difference between fishery production in 1982 and in 1960. Use the file f1960-1982. The output should be:

```
American Samoa 112
```

No need to format the output. Use awk.

Q4. (15) Use a pipeline of commands to find the largest value of the fishery production, the corresponding country code and year and print to screen the following formatted statement. To format, use awk in the pipeline. Use the file fishery-production.csv.

```
Largest fishery production was 1389550 metric tons in 1997 in ARG
```

3. (24= 20+3+1) In a script called **ex3-loop-s23.bash** do the following:

Q1. (7) Use the file *fishery-production.csv*.
Use a pipeline of commands to generate a list of unique countries codes and use command substitution to store the list in a variable called x.
You would need to exclude the first line of the file, which is a header line, and use an option of the sort command to obtain the unique countries. Use one line of code.

If you do not know how to do this, for next question you can hardcode as below.

```
x="ABW AFG AGO ALB AND ARG ASM ATG AUS AUT DZA"
```

Q2. (13) Make a for loop over all country codes by using variable x, and within the for loop use a simple if statement. If the country code is equal to ARG, print the name of the country. Print the country name only once.
If you do not know how to do this, for partial credit print the country code instead.

Q3. **EC (3)** This is an extra credit problem and is graded all or nothing. Print a list of countries sorted in the order of maximum fisheries production, in decreasing order. Do not generate any intermediate files. You can use variable x. Your code should only print:

```
Argentina
Angola
Australia
Algeria
Albania
American Samoa
Antigua and Barbuda
Austria
Afghanistan
Aruba
Andorra
```

Deadline and late penalty

The deadline is **8:30pm with 3 min grace period** for you to check all the scripts and submit them to the Gradescope assignment called Exam1.

Late penalty:

After 8:33pm, the penalty is 2 points for each late minute.

Gradescope Exam1 will close at 8:40pm

IF YOU HAVE TECHNICAL ISSUES DURING THE EXAM LET THE PROFESSOR KNOW

Upload the following files to Gradescope Exam1

ex1-s23.bash
ex2-fishery.bash
ex3-loop-s23.bash
DO NOT SUBMIT ANY ADDITIONAL FILES