CSCI 3232 Systems Software Assignment 5

Upload all your files to the correct dropbox folder in Folio before the deadline --- **11:30PM, Jul 4, Sunday, 2021.**

**Note: Make sure you have practiced all relevant sample codes in slides and Folio’s example codes before you start this assignment. Make sure your scripts have Unix style line endings. See page with title “Script File Line Ending Caveat” of 6\_shell\_basics.pptx for details. If Folio complains, you can add .txt extension to the files. For example, myfile.sh.txt, makefile.txt. You don’t need to add .txt extension if Folio/Gradescope allows you to submit without complaining.**

1. (15 pts) Write a bash script **A5p1.sh** to output the number of executable and non-executable files and subdirectories separately in the directory that is specified as the first command line argument to this script. **DO NOT** count recursively in subdirectories. **DO NOT** call any external Linux utilities such as “ls”. You may refer to the *testSearch.sh* example and page 7 of the “*Basic Bash Scripting Lab.docx”* documentation in Folio to find out how to test if an item in a directory is an executable or non-executable file or subdirectory. You can test your script using “./**A5p1.sh <dir>**” where <dir> can be any *absolute* (those starting with ‘/’) or *relative* directory (those not starting with ‘/’). A sample run can look like the following (You do NOT need to submit screen shots. Instead submit your source file.):

[kwang@computer][~/temp]$./A5p1.sh <dir>

Number of executable files in <dir>: 7

Number of non-executable files in <dir>: 6

Number of subdirectories in <dir>: 5

1. (15 pts) Write a bash script **A5p2.sh** that accepts one command line argument a which is assumed to be an integer no less than 2. Your script should output a list of integers starting from a and ending with 1 according to the iteration rule from assignment 4 problem 2 (f(x)=x/2 if x is even; f(x)=(3x+1)/2 if x is odd). After that, also report the number of integers in the list. Don’t call any external programs. Implement all algorithms in your script. You can test your script using “./**A5p2.sh <integer>**”. A sample run can look like the following (You do NOT need to submit screen shots. Instead submit your source file.):

[kwang@computer][~/temp]$./A5p2.sh 6

6,3,5,8,4,2,1

Length of the list: 7

1. (15 pts) Write a bash script **A5p3.sh** to print all 16 binary 2 by 2 matrices in lexicographic order. You must use loops to achieve the desired printing results. The total number of times that the keyword *for*, *while* and *until* appear cannot exceed 6. Do not call any external programs in this script. Part of a sample run can look like the following:

[kwang@computer][~/temp]$ ./A5p3.sh

0 0

0 0

0 0

0 1

0 0

1 0

…..(additional output here)

1. (15 pts) Write a bash script **A5p4.sh** to print in lexicographic order all possible 2 by 2 matrices in which each element can be one of three or more distinct (lower case) English characters. The candidate English characters for the matrix elements should be provided by the user as the command line arguments (assume that the user will type in these characters in alphabetical order). You must use loops to achieve the desired printing results. The total number of times that the keyword *for*, *while* and *until* appear cannot exceed 6. Do not call any external programs in this script. A sample run can look like the following.

[kwang@computer][~/temp]$bash A5p4.sh a x z

a a

a a

a a

a x

…(additional output here)

z z

z z

1. (30 pts) Write a bash script **A5p5a.sh** that accepts one command line argument which is supposed to be a positive integer *n*. The script should print all odd integers from 1 through *n* (each on a separate line). Write another bash script **A5p5b.sh** to read from stdin as many integers as there are available and then print the squares of all these integers (each on a separate line). You should test your code by **“./A5p5a.sh <n> | ./A5p5b.sh**”. Submit both source code files. See the following for a sample run. (You do NOT need to submit screen shots. Instead submit your source files.)

[kwang@computer][~/temp]$bash A5p5a.sh 10 | ./A5p5b.sh

1

9

25

49

81

1. (10 pts) Write a bash script **A5p6.sh** that accepts two command line arguments *m* and *n* (assumed to be positive integers with *m*<*n*). This script should call your bash script A5p2.sh with **all** integers from *m* through *n* inclusive. Make sure all output lists for these integers are clearly separated. You may refer to LaunchExternal.sh in Folio example codes. See the following for a sample run.

[kwang@computer][~/temp]$bash A5p6.sh 101 120

Here is the list beginning with 101:

101,152,76,38,19,29,44,22,11,17,26,13,20,10,5,8,4,2,1

Length of the list: 19

…(additional output here)

Here is the list beginning with 120:

120,60,30,15,23,35,53,80,40,20,10,5,8,4,2,1

Length of the list: 16

Checklist for seven files to be submitted: A5p1.sh, A5p2.sh, A5p3.sh, A5p4.sh, A5p5a.sh, A5p5b.sh, A5p6.sh.