CSc 3320: Systems Programming

Fall 2021

Homework

1: Total points 100

Submission instructions:

1. Create a Google doc for each homework assignment submission.
2. Start your responses from page 2 of the document and copy these instructions on page 1.
3. Fill in your name, campus ID and panther # in the fields provided. If this information is missing in your document TWO POINTS WILL BE DEDUCTED per submission.
4. Keep this page 1 intact on all your submissions. If this *submissions instructions* page is missing in your submission TWO POINTS WILL BE DEDUCTED per submission.
5. Each homework will typically have 2-3 PARTS, where each PART focuses on specific topic(s).
6. Start your responses to each PART on a new page.
7. If you are being asked to write code copy the code into a separate txt file and submit that as well.
8. If you are being asked to test code or run specific commands or scripts, provide the evidence of your outputs through a screenshot and copy the same into the document.
9. Upon completion, download a .PDF version of the document and submit the same.

Full Name: Alex Siegel

Campus ID: asiegel11

Panther #: 002-41-1802

PART 1

Answer the following questions briefly. Provide clear and succinct reasoning.

Points per question = 5

1. Tell the differences between Unix and Linux. Then please list some operating systems (at least three) which belong to Unix but not Linux.

- Unix is a multitasking operating system. Linux is a variation of Unix.
- Some operating systems that belong to Unix are System V, Berkeley Standard Distribution, and Apple OS/X.

2. What is the pipe mechanism in UNIX? And show one command using pipe and explain how the pipe works in it?

- Using the pipe mechanism in UNIX, one output can be used as another process' input. One example is the command $ grep 'Union County' mountainList.txt | wc -l. This command filters out all the lines that don't contain "Union County" and then lists how many lines do have it.

3. In a Linux system, you can issue the command **ls /** to check the sub directories under root. Please describe the meanings of directory /bin, /dev, /boot, /usr, /etc, /mnt, /sbin, /var separately. For example, you can say that /bin contains binary executable files.

- /dev – Location of device files
- /boot – Contains boot configuration files
- /usr – User programs and data is stored here
- /etc – Contains system configuration files
- /mnt – Temporary mount points for storage devices such as USB and floppy disks.
- /sbin – Contains executable files that require administrator permission
- /var – Contains files which the system writes data during operation

4. What is the meaning of Multitask and Multi-user in a Unix system?

- Multitasking is when multiple programs can run at once
- Multi-user allows more than one user to work at any given time, with the processing time being distributed.

5. What does -rwxr-xr-x mean in terms of permissions for a file? What is the exact unix command (with the octal representation) for changing the permissions to this setting?

- This permission means that the user can read, write, and execute the file, while groups and the public user can only read and execute the file. The command would be $ chmod 655 (file)

6. In class, you have learned the meaning of read, write and execute permission for regular files. However, these permissions are also applied to directories. So please describe the meaning of read, write, and execute permission for directory.

- Reading a directory means listing all the files in that directory
- Writing a directory means creating/deleting a file in that directory
- Executing a directory allows you to access the directory.

Part II-a

Regular Expression
Find outcomes for each given basic/extended regular expression (maybe multiple correct answers)

Points per question: 2.5

Example:
'ab+a' (*extended regex*)

***Answer**: aba , abba ; Pattern : The matched string should begin and end with 'a' and 'b' occurs at least once between leading and ending 'a')*

Note: 7) to 10) are basic regexes; Note: 11) to 18) are extended regexes.

7) 'a[ab]*a': aaaaaaa ; Pattern: The matched string should begin and end with 'a' and each letter in between should be either 'a' or 'b'

8) 'a(bc)?': abc ; Pattern: The matched string must contain 'a' at least once and can only 'bc' zero or one time.

9) '.[ind]*': ihop ; Pattern: The matched string should contain the letter 'i', 'n', or 'd'.

10) '[a-z]+[a-z]': potato ; Pattern: The matched string must contain 2 lowercase letters next to each other.

11) '[a-z] (\+[a-z])+': a+c ; Pattern: The matched string must contain a lowercase letter followed by a '+' and another lowercase letter.

12) 'a.[bc]+': abc ; Pattern: The matched string must contain 'a' and 'bc' must occur at least once after 'a'

13) 'a.[0-9]': ak9 ; Pattern: The matched string must contain 'a' and any number between 0-9 must occur after 'a'

14) '[a-z]+[\.\?!]': f1 ; Pattern: The matched string must contain a lowercase letter followed by either '.', '?', or '!'.

15) '[a-z]+[\.\?!]\s*[A-Z]': s! A ; Pattern: The matched string must contain a lowercase letter followed by either '.', '?', or '!', followed by any amount of whitespaces, followed by a capital letter

16) '(very)+(cool)?(good|bad) weather': very bad weather ; Pattern: The matched string must start with 'very', can be followed by 'cool', but only once, followed by 'good' or 'bad', followed by 'weather'

17) '-?[0-9]+': -9 ; Pattern: The matched string must be a number from -9 to 9

18) '-?[0-9]*\.?[0-9]*': -999.100 ; Pattern: The matched string can be any positive or negative decimal.

Part II-b

Regular Expression
Write down the extended regular expression for following questions. E.g. Social security number in the format of 999-99-9999. Answer: [0-9]{3}-[0-9]{2}-[0-9]{4}

Points per question: 5

19) Valid URL beginning with "http://" and ending with ".edu" (e.g. http://cs.gsu.edu, http://gsu.edu): (http:\/\/)+.+(.edu)

20) Non-negative integers. (e.g. 0, +1, 3320): [0-9]*

21) A valid absolute pathname in Unix (e.g. /home/ylong4, /test/try.c): ^(\/)+[a-z]+(\/)+[a-z]+

22) Identifiers which can be between 1 and 10 characters long, must start with a letter or an underscore. The following characters can be letters or underscores or digits. (e.g. number, _name1, isOK): ([a-z]|_){1,10}

23) Phone number in any of the following format: 9999999999,999-999- 9999, (999)-999-9999. (Note: all of these formats should be matched by a single regular expression): (\([0-9]{3}\)\-[0-9]{3}\-[0-9]{4})|([0-9]{3}\-[0-9]{3}\-[0-9]{4})|([0-9]{10})

Part III

Programming

Points per question: 15

24. Create a file named homework_instructions.txt using VI editor and type in it all the submission instructions from page1 of this document. Save the file in a directory named *homeworks* that you would have created. Set the permissions for this file such that only you can edit the file while anybody can only read. Find and list (on the command prompt) all the statements that contain the word POINTS. Submit your answer as a description of what you did in a sequential manner (e.g. Step1 … Step 2… and so on..). Add a screenshot to your answer as a proof of evidence.

- Step 1 – Create a new folder called Homework1 (mkdir Homeworks) and move into that directory (cd Homeworks)
- Step 2 – Type “vi homework_instructions.txt” to create a new file and press I to enter insert mode (if not already in insert mode)
- Step 3 – Enter the instructions into the file. Once finished, press esc and then type “:wq” to write and quit.
- Step 4 – To change the permissions of the file, type “chmod 644 homework_instructions.txt”
- Step 5 – Type “grep ‘POINTS’ homework_instructions.txt” to list all the lines with the word POINTS.

```
[asiegel11@gsuad.gsu.edu@snowball Homeworks]$ vi homework_instructions.txt
[asiegel11@gsuad.gsu.edu@snowball Homeworks]$ chmod 644 homework_instructions
chmod: cannot access ‘homework_instructions’: No such file or directory
[asiegel11@gsuad.gsu.edu@snowball Homeworks]$ chmod 644 homework_instructions.txt
[asiegel11@gsuad.gsu.edu@snowball Homeworks]$ grep 'POINTS' homework_instructions.txt
3.      Fill in your name, campus ID and panther # in the fields provided. If this information is missing in your document TWO POINTS WILL BE DEDUCTE
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[asiegel11@gsuad.gsu.edu@snowball Homeworks]$
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