CSc 3320: Systems Programming

Spring 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.

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Campus ID: btharpe2

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Part 1

1. Unix and Linux are both operating systems, but only Unix is not open source and has to be licensed. Linux, on the other hand, is known for being open source. Whereas Unix was developed primarily for corporate use, Linux is accessible to many people and devices. Linux also uses the BASH shell as default, while Unix uses the Bourne shell. Operating systems like Solaris, SunOS, and ULTRIX are considered Unix, but *not* Linux.

2. The pipe mechanism in UNIX allows the user to port the output of one command as the input to another. In this way, it acts as a method of inter-process communication. A command like "cat fileName.txt | sort" would read out the contents of fileName.txt and pipe it into a sorting function to order the contents alphabetically.

3. Meaning of Sub-directories:
    a. /bin: contains binary executable files that are available for all users.
    b. /dev: contains device files that help the kernel recognize hardware.
    c. /boot: contains the files needed to boot up the computer.
    d. /usr: contains shareable, read-only data under the form of Unix System Resources.
    e. /etc: contains configuration files that are specific to each machine.
    f. /mnt: usually remains empty. Sometimes contains data related to temporary mounting points.
    g. /sbin: contains system binaries that help the operating system configure itself.
    h. /var: contains files that are variable in size, like log files.

4. "Multi-user" means that the system supports more than one user at a time, and "Multitask" means that the system can perform more than one task at a time.

5. "-rwxr-xr-x" means that the owner has read, write, and execute permission. People in the group and everyone else have only read and execute permission. The command with octal representation for this permissions setting is "chmod 755 <path_to_file>"

6. The basic concept of file permissions also applies to permissions for directories. The difference when it comes to directories is that the first character of the permissions string begins with a "d" and the permissions themselves apply to every file in the directory, unless otherwise specified.

Part 2

7. ‘a[ab]*a’
    a. The matched string should begin and end with a, with no or multiple occurrences of ‘a’ or ‘b’ in the middle.
    b. ‘aaba’, ‘aa’, ‘ababa’, ‘aabbaa’
8. ‘a(bc)?’
    a. The matched string will start with a and have no or one instance of ‘bc’.
    b. ‘a’, ‘abc’
9. ‘.[ind]*’
    a. The matched string can start with any character and end with no or multiple instances of ‘i’ or ‘n’ or ‘d’.
    b. ‘kind’, ‘find’, ‘id’
10. ‘[a-z]+[a-z]’
    a. The matched string starts with one or more repetitions of a lowercase alphabetical character and ends with a lowercase alphabetical character.
    b. ‘aaab’, ‘ffq’
11. ‘[a-z](\+[a-z])+’
    a. The matched string starts with a lowercase alphabetical character and ends with one or more occurrence of the subpattern that starts with a ‘+’ and ends with a lowercase alphabetical character.
    b. ‘a+f+z’, ‘x+y’, ‘x+y+z’
12. ‘a.[bc]+’
    a. The matched string starts with an a, then has any character, and ends with one or more occurrence of ‘b’ or ‘c’.
    b. ‘axcbcb’, ‘abb’
13. ‘a.[0-9]’
    a. The matched string starts with an a, then has any character, and ends with a number 0-9.
    b. ‘a%4’, ‘a38’
14. ‘[a-z]+[\.\?!]’

a. The matched string starts with one or more instances of a lowercase letter, and ends with any of the characters in the subpattern of a period, a question mark, and or any character.
b. ‘Ad.l’,’y?s’

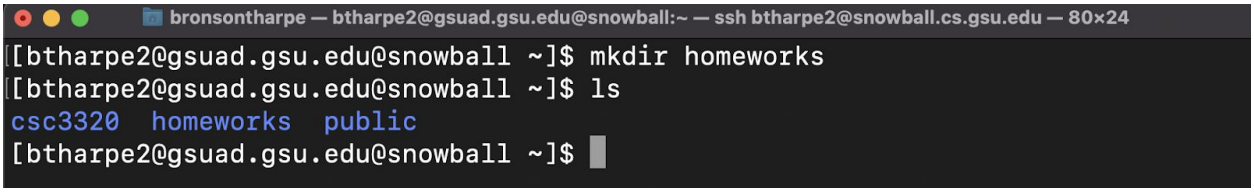
15. ‘[a-z]+[\.\?!]\s*[A-Z]’
    a. The matched string starts with one or more occurrences of a lowercase letter, then has any of the characters in the subgroup containing ‘.’, ‘?’, and any character, then has zero or more repetitions of a whitespace character, and ends with any of the characters in the uppercase alphabet.
    b. ‘you? S’, ‘hello. J’
16. ‘(very)+(cool)?(good|bad)weather’
    a. The matched string starts with one or more repetitions of ‘very ‘, then (optionally) ‘cool ‘, then ‘good’ or ‘bad’, then has a space, and ends with ‘weather’.
    b. ‘very bad weather’, ‘very cool good weather’
17. ‘-?[0-9]+’
    a. The matched string starts with an optional ‘-’ and ends with one or more occurence of a number 0-9.
    b. ‘-154’, ‘6789’
18. ‘-?[0-9]*\.?[0-9]*’
    a. The matched string starts with an optional ‘-’, then has zero or more occurrences of a number 0-9, then, optionally, has a ‘.’, and ends, with zero or more occurrences of a number 0-9.

Part II-b

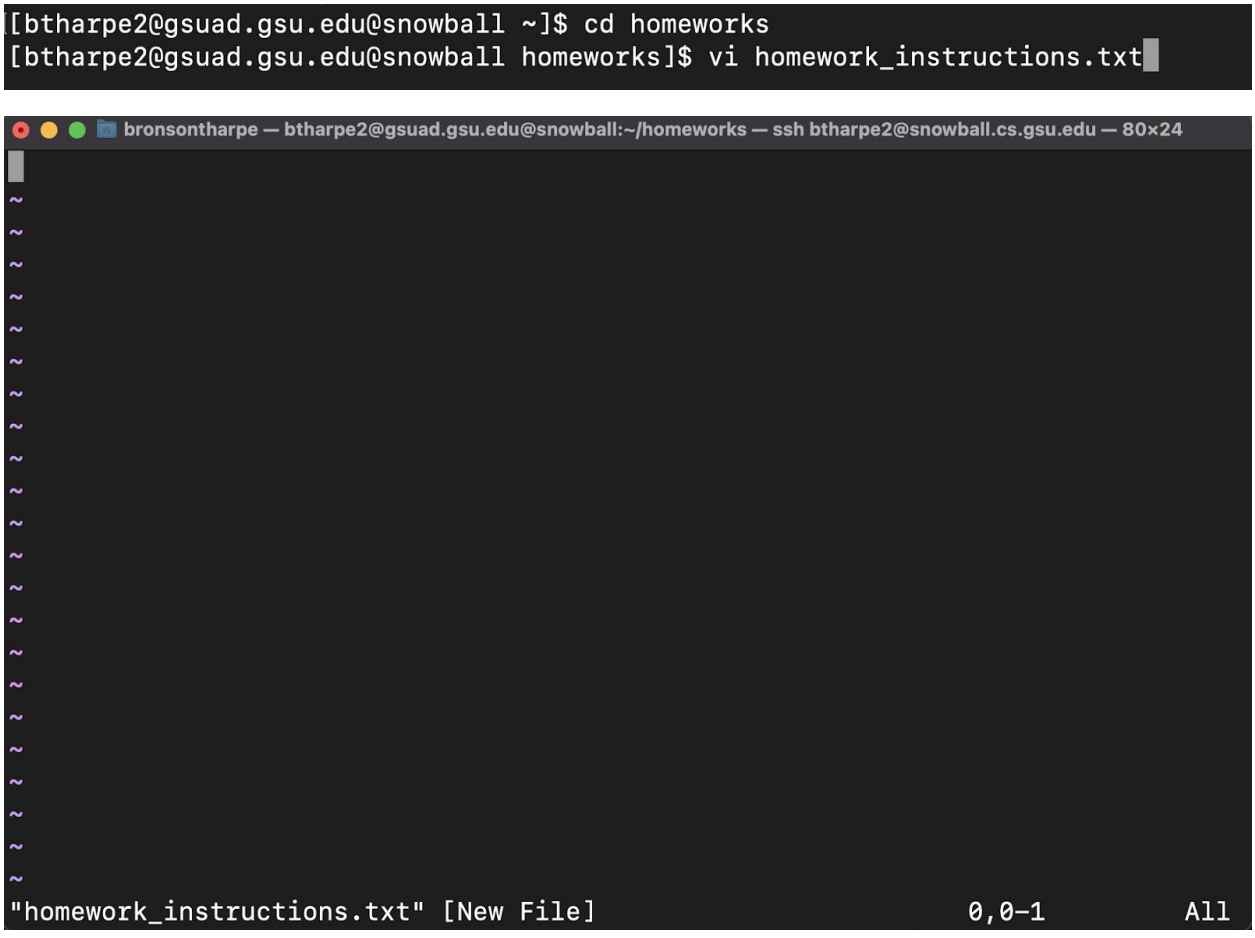
19. (https:\/\/)[a-z]*\.[a-z]*(.edu)
20. [\+]?[0-9]+
21. [^\0]+
22. ([_]*[a-zA-Z]*[0-9a-zA-Z]*){1,10}
23. \(?[0-9]{3}\)?[-]?[0-9]{3}[-]?[0-9]{4}

Part III

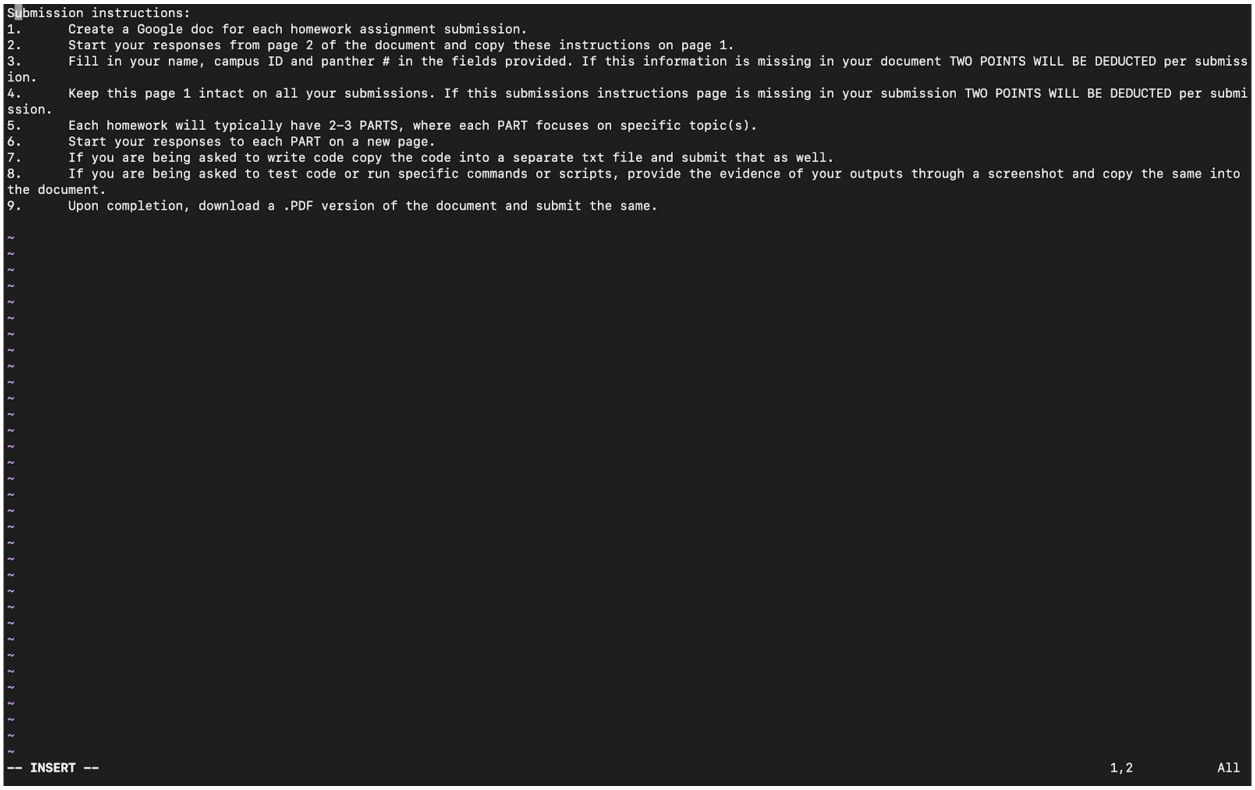
1. Create the *homeworks* directory:



2. Create the homework_instructions.txt file with VI.



3. Type submission instructions into VI.



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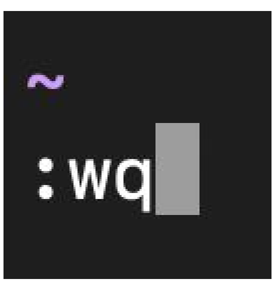
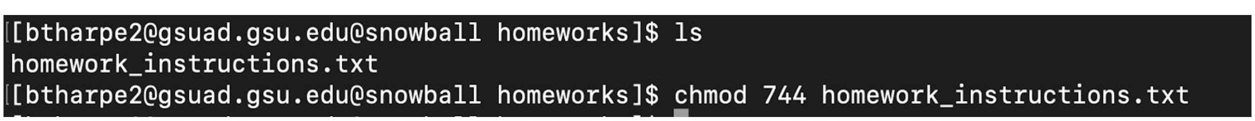
-- INSERT --                                                                                                                    1,2           All
```

4. Save the file in VI.



```
~
:wq
```

5. Change permissions so that the owner can read, write, execute, and everyone else can only read.



```
[btharpe2@gsuad.gsu.edu@snowball homeworks]$ ls
homework_instructions.txt
[btharpe2@gsuad.gsu.edu@snowball homeworks]$ chmod 744 homework_instructions.txt
```

6. Find and list all lines that contain “POINTS” using grep.