

## CSc 3320: Systems Programming

Spring 2021

Final/Project: Total points = 100

### THIS FINAL IS OPTIONAL

Assigned: 23th Apr 2021, Friday Noon

**Submission Deadline (if attempting): 2nd May 2021, Sunday, 11.59 PM**

**(No extensions. If your submission is not received by this time then it will NOT be accepted.)**

#### Submission instructions:

1. Create a Google doc for your 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 TWO POINTS WILL BE DEDUCTED.
4. Keep this page 1 intact. If this *submissions instructions* page is missing in your submission TWO POINTS WILL BE DEDUCTED.
5. Start your responses to each QUESTION on a new page.
6. If you are being asked to write code copy the code into a separate txt file and submit that as well. The code should be executable. E.g. if asked for a C script then provide myfile.c so that we can execute that script. In your answer to the specific question, provide the steps on how to execute your file (like a ReadMe).
7. If you are being asked to test code or run specific commands or scripts, provide the evidence of your outputs through a screenshot and/or screen video-recordings and copy the same into the document.
8. Upon completion, download a .PDF version of the google doc document and submit the same along with all the supplementary files (videos, pictures, scripts etc).

Full Name:

Campus ID:

Panther #:

**All programs have to be well commented. Non commented programs will receive 0 points. Comments have to be easily comprehensible and concise.**

1. [30pts] Copy the contents of this document into a text file. Make sure the spacings and indentations are included.

Write a C program that reads the text file and then outputs

- the number of characters (space is to be considered a character),
- number of words (a word is any sequence of non-white-space characters),
- number of lines.

Write a makefile as well.

2. Repeat question 1, but write a shell script instead of C. Makefile not necessary. [30pts]

3. [40pts] Describe (briefly in 1-2 sentences) the following unix utility functions and provide 1 example of it's usage. You can refer to Chapter 13 in the Unix textbook. You must NOT provide the same example from the textbook:

- a. perror()
- b. open()
- c. read()
- d. write()
- e. lseek()
- f. close()
- g. monitor()
- h. chown()
- i. fchown()
- j. chmod()
- k. fchmod()
- l. link()
- m. unlink()
- n. getpid()
- o. getppid()
- p. fork()

- q. `exit()`
- r. `wait()`
- s. `alarm()`
- t. `signal()`
- u. `kill()`
- v. `pipe()`
- w. `scp()` (also referred to as secure copy)