

# CSc 3320: Systems Programming

Fall 2021

Midterm 1: Total points = 100

## 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 program 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).
9. Scripts/Code without proper comments, indentation and titles (must have the name of the program, and name & email of the programmer on top the script).

Full Name:

Campus ID:

Panther #:

**Questions 1-5 are 20pts each**

1. (20 pts) Pick any of your 10 favourite unix commands. For each command run the *man* command and copy the text that is printed into a *mandatabase.txt*. Write a shell script *helpme.sh* that will ask the user to type in a command and then print the manual's text associated with that corresponding command. If the command the user types is not in the database then the script must print *sorry, I cannot help you*
2. (10pts each) On your computer open your favourite Wikipedia page. Copy the text from that page into a text file **myexamfile.txt** and then copy that file to a directory named **midterm** (use *mkdir* to create the directory if it doesn't exist) in your snowball server home directory (use any FTP tool such as Putty or Filezilla to copy the file from your computer to the remote snowball server machine: see Lab 6).
  - a. Write a shell script that will find the number of statements in the text. A statement is defined as the collection of text between two periods (full-stops).
  - b. Update the script to present a tabular list that shows the number of words and number of letters in each statement.
3. (20pts) Design a calculator using a shell script using regular expressions. The calculator, at the minimum, must be able to process addition, subtraction, multiplication, division and modulo operations. It must also have cancel and clear features.
4. (20pts) Build a phone-book utility that allows you to access and modify an alphabetical list of names, addresses and telephone

numbers. Use utilities such as `awk` and `sed`, to maintain and edit the file of phone-book information. The user (in this case, you) must be able to read, edit, and delete the phone book contents. The permissions for the phone book database must be such that it is inaccessible to anybody other than you (the user).

5. (4 pts each) Give brief answers with examples, wherever relevant
- A. What is the use of a shell?
  - B. Is there any difference between the shell that you see on your PC versus that you see on the snowball server upon login. If yes, what are they? Provide screenshots for examples.
  - C. What are the elements in a computer (software and hardware) that enable the understanding and interpretation of a C program?
  - D. The “`printf()`” C command is used for printing anything on the screen. In bash we use the command “`echo`”. What is the difference (if any) in terms of how the computer interprets and executes these commands?
  - E. What do these shell commands do? “`ssh`”, “`scp`” and “`wget`”. Describe briefly using an example that you have executed using the snowball server.