

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: Shiv Brahmhatt

Campus ID: sbrahmhatt3

Panther #: 002483892

Questions 1-5 are 20pts each

1.

```
Last login: Sat Oct 9 11:59:11 on tty000
The default interactive shell is now zsh.
To update your account to use zsh, please run 'chsh -s /bin/zsh'.
For more details, please visit https://support.apple.com/kb/HT208850.
Shive-MacBook-Pro:~ shivobrahmbhatt$ ssh brahmbhatt3@snowball.cs.gsu.edu
(brahmbhatt3@snowball.cs.gsu.edu)'s password:
Permission denied, please try again.
brahmbhatt3@snowball.cs.gsu.edu's password:
Last failed login: Sat Oct 9 12:15:55 EDT 2021 from c-73-184-81-195.hsd1.ga.comcast.net on ssh:notty
There was 1 failed login attempt since the last successful login.
Last login: Sat Oct 9 12:02:46 2021 from c-73-184-81-195.hsd1.ga.comcast.net
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*
| OSU Computer Science
| Instructional Server
| SNOWBALL.cs.gsu.edu
[brahmbhatt3@suad.gsu.edu@snowball ~]$ cd MidtermExam
[brahmbhatt3@suad.gsu.edu@snowball MidtermExam]$ man sudo|head -10 |cat > mandatabase.txt
[brahmbhatt3@suad.gsu.edu@snowball MidtermExam]$ man cat|head -10 |cat >> mandatabase.txt
[brahmbhatt3@suad.gsu.edu@snowball MidtermExam]$ man awk|head -10 |cat >> mandatabase.txt
[brahmbhatt3@suad.gsu.edu@snowball MidtermExam]$ man ls|head -10 |cat >> mandatabase.txt
[brahmbhatt3@suad.gsu.edu@snowball MidtermExam]$ man sed|head -10 |cat >> mandatabase.txt
[brahmbhatt3@suad.gsu.edu@snowball MidtermExam]$ man grep|head -10 |cat >> mandatabase.txt
[brahmbhatt3@suad.gsu.edu@snowball MidtermExam]$ man chmod|head -10 |cat >> mandatabase.txt
[brahmbhatt3@suad.gsu.edu@snowball MidtermExam]$ man cut|head -10 |cat >> mandatabase.txt
[brahmbhatt3@suad.gsu.edu@snowball MidtermExam]$ man wc|head -10 |cat >> mandatabase.txt
[brahmbhatt3@suad.gsu.edu@snowball MidtermExam]$ man echo|head -10 |cat >> mandatabase.txt
[brahmbhatt3@suad.gsu.edu@snowball MidtermExam]$ cat -n mandatabase.txt
 1 SUDO(8)                      BSD System Manager's Manual                SUDO(8)
 2
 3 NAME
 4     sudo, sudoedit - execute a command as another user
 5
 6 SYNOPSIS
 7     sudo -h [-K] [-k] [-V]
 8     sudo -y [-AknS] [-a type] [-g group] [-h host] [-p prompt] [-u user]
 9     sudo -l [-AknS] [-a type] [-g group] [-h host] [-p prompt] [-u user] [-u user] [command]
10     sudo [-AbEnPS] [-a type] [-C num] [-C class] [-g group] [-h host] [-p prompt] [-r role]
11 CAT(1)
12
13 NAME
14     cat - concatenate files and print on the standard output
15
16 SYNOPSIS
17     cat [OPTION]... [FILE]...
18
19 GAWK(1)
20
21 NAME
22     gawk - pattern scanning and processing language
23
24 SYNOPSIS
25     gawk [ POSIX or GNU style options ] -f program-file [ -- ] file ...
26     gawk [ POSIX or GNU style options ] [ -- ] program-text file ...
27
28 LS(1)
29
30 NAME
31     User Commands
32
33
34
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31 LS(1)
32
33 NAME
34     ls - list directory contents
35
36 SYNOPSIS
37     ls [OPTION]... [FILE]...
38
39 SED(1)
40
41 NAME
42     User Commands
43
44 SED(1)
45
46 NAME
47     sed - stream editor for filtering and transforming text
48
49 SYNOPSIS
50     sed [OPTION]... {script-only-if-no-other-script} [input-file]...
51
52 GREP(1)
53
54 NAME
55     grep, egrep, fgrep - print lines matching a pattern
56
57 SYNOPSIS
58     grep [OPTIONS] PATTERN [FILE...]
59     grep [OPTIONS] [-e PATTERN | -f FILE] [FILE...]
60
61 CHMOD(1)
62
63 NAME
64     User Commands
65
66 CHMOD(1)
67
68 NAME
69     chmod - change file mode bits
70
71 SYNOPSIS
72     chmod [OPTION]... MODE[,MODE]... FILE...
73     chmod [OPTION]... OCTAL-MODE FILE...
74
75 CUT(1)
76
77 NAME
78     User Commands
79
80 CUT(1)
81
82 NAME
83     wc - print newline, word, and byte counts for each file
84
85 SYNOPSIS
86     wc [OPTION]... [FILE]...
87     wc [OPTION]... --files0-from=F
88
89 ECHO(1)
90
91 NAME
92     User Commands
93
94 ECHO(1)
```

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59      grep [OPTIONS] PATTERN [FILE...]
60      grep [OPTIONS] [-e PATTERN | -f FILE] [FILE...]
61 CHMOD(1)                                User Commands                                CHMOD(1)
62
63
64
65 NAME
66      chmod - change file mode bits
67
68 SYNOPSIS
69      chmod [OPTION]... MODE[,MODE]... FILE...
70      chmod [OPTION]... OCTAL-MODE FILE...
71 CUT(1)                                User Commands                                CUT(1)
72
73
74
75 NAME
76      cut - remove sections from each line of files
77
78 SYNOPSIS
79      cut OPTION... [FILE]...
80
81 WC(1)                                User Commands                                WC(1)
82
83
84
85 NAME
86      wc - print newline, word, and byte counts for each file
87
88 SYNOPSIS
89      wc [OPTION]... [FILE]...
90      wc [OPTION]... --files0-from=F
91 ECHO(1)                                User Commands                                ECHO(1)
92
93
94
95 NAME
96      echo - display a line of text
97
98 SYNOPSIS
99      echo [SHORT-OPTION]... [STRING]...
100     echo LONG-OPTION
[abrahmbhatt3@gsuad.gsu.edu@snowball MidtermExam]$ vim helpe.sh
[abrahmbhatt3@gsuad.gsu.edu@snowball MidtermExam]$ sh helpe.txt
sh: helpe.txt: No such file or directory
[abrahmbhatt3@gsuad.gsu.edu@snowball MidtermExam]$ sh helpe.sh
Type a command
cat
helpe.sh: line 11: syntax error: unexpected end of file
[abrahmbhatt3@gsuad.gsu.edu@snowball MidtermExam]$ vim helpe.sh
[abrahmbhatt3@gsuad.gsu.edu@snowball MidtermExam]$ sh helpe.txt
sh: helpe.txt: No such file or directory
[abrahmbhatt3@gsuad.gsu.edu@snowball MidtermExam]$ vim helpe.sh
[abrahmbhatt3@gsuad.gsu.edu@snowball MidtermExam]$ sh helpe.sh
Type a command
mtt
No such command found
[abrahmbhatt3@gsuad.gsu.edu@snowball MidtermExam]$ sh helpe.sh
Type a command
cat
cat - concatenate files and print on the standard output
cat [OPTION]... [FILE]...
[abrahmbhatt3@gsuad.gsu.edu@snowball MidtermExam]$

```

2.

```

The default interactive shell is now zsh.
To update your account to use zsh, please run 'chsh -s /bin/zsh'.
For more details, please visit https://support.apple.com/kb/HT200056.
Shiva-MacBook-Pro:~ shivabrahmbhatt$ ssh abrahmbhatt3@snowball.cs.gsu.edu
abrahmbhatt3@snowball.cs.gsu.edu's password:
Last login: Fri Nov 19 13:27:54 2021 from c-73-184-81-195.hsd1.ga.comcast.net
+
+   GSU Computer Science
+   | Instructional Server
+   | SNOWBALL.cs.gsu.edu
+
[abrahmbhatt3@gsuad.gsu.edu@snowball ~]$ cat > myexamfile.txt
Linux (/bin/ls) (About this sound) LÉEN-uks or /linuks/ LIN-uks(9) is a family of open-source Unix-like operating systems based on the Linux kernel,[10] an operating system kernel first released on September 17, 1991, by Linus Torvalds.[11][12][13] Linux is typically packaged in a Linux distribution.
Distributions include the Linux kernel and supporting system software and libraries, many of which are provided by the GNU Project. Many Linux distributions use the word "Linux" in their name, but the Free Software Foundation uses the name "GNU/Linux" to emphasize the importance of GNU software, causing some controversy.[14][15]
Popular Linux distributions[16][17][18] include Debian, Fedora, and Ubuntu. Commercial distributions include Red Hat Enterprise Linux and SUSE Linux Enterprise Server. Desktop Linux distributions include a windowing system such as X11 or Wayland, and a desktop environment such as GNOME or KDE Plasma. Distributions intended for servers may omit graphics altogether, or include a solution stack such as LAMP. Because Linux is freely redistributable, anyone may create a distribution for any purpose.[19]
Linux was originally developed for personal computers based on the Intel x86 architecture, but has since been ported to more platforms than any other operating system.[20] Because of the dominance of the Linux-based Android on smartphones, Linux also has the largest installed base of all general-purpose operating systems.[21][22][23][24] Although it is used by only around 2.3 percent of desktop computers,[25][26] the Chromebook, which runs the Linux kernel-based Chrome OS, dominates the US K-12 education market and represents nearly 20 percent of sub-$300 notebook sales in the US.[27] Linux is the leading operating system on servers (over 96.4% of the top 1 million web servers' operating systems are Linux),[28] leads other big iron systems such as mainframe computers, and is the only OS used on TOP500 supercomputers (since November 2017, having gradually eliminated all competitors).[29][30][31]
Linux also runs on embedded systems, i.e. devices whose operating system is typically built into the firmware and is highly tailored to the system. This includes routers, automation controls, smart home technology, televisions (Samsung and LG Smart TVs use Tizen and WebOS, respectively),[32][33][34] automobiles (for example, Tesla, Audi, Mercedes-Benz, Hyundai, and Toyota all rely on Linux),[35] digital video recorders, video game consoles, and smartwatches.[36] The Falcon 9's and the Dragon 2's avionics use a customized version of Linux.[37]
Linux is one of the most prominent examples of free and open-source software collaboration. The source code may be used, modified and distributed commercially or non-commercially by anyone under the terms of its respective licenses, such as the GNU General Public License.[19]C
[abrahmbhatt3@gsuad.gsu.edu@snowball ~]$ cd MidtermExam
[abrahmbhatt3@gsuad.gsu.edu@snowball MidtermExam]$ touch wordsearch.sh
[abrahmbhatt3@gsuad.gsu.edu@snowball MidtermExam]$ vi wordsearch.sh
[abrahmbhatt3@gsuad.gsu.edu@snowball MidtermExam]$ cp myexamfile.txt MidtermExam
[abrahmbhatt3@gsuad.gsu.edu@snowball MidtermExam]$ chmod +x wordsearch.sh
[abrahmbhatt3@gsuad.gsu.edu@snowball MidtermExam]$ ./wordsearch.sh
Enter a word:
6
[abrahmbhatt3@gsuad.gsu.edu@snowball MidtermExam]$ ./wordsearch.sh
Enter a word:
0
[abrahmbhatt3@gsuad.gsu.edu@snowball MidtermExam]$ ./wordsearch.sh
Enter a word: linux
0
[abrahmbhatt3@gsuad.gsu.edu@snowball MidtermExam]$ ./wordsearch.sh
Enter a word: linux
0
[abrahmbhatt3@gsuad.gsu.edu@snowball MidtermExam]$ ./wordsearch.sh
Enter a word: Linux
0
[abrahmbhatt3@gsuad.gsu.edu@snowball MidtermExam]$ ./wordsearch.sh
Enter a word: software
0
[abrahmbhatt3@gsuad.gsu.edu@snowball MidtermExam]$ ./wordsearch.sh
Enter a word: software
0
[abrahmbhatt3@gsuad.gsu.edu@snowball MidtermExam]$ ./wordsearch.sh
Enter a word: 1
6

```

3.

```

[sbrahmbhatt3@gsuad.gsu.edu@snowball MidtermExam]$ sh calculator.sh
Enter Two numbers :
3
5
Enter Choice :
1. Addition
2. Subtraction
3. Multiplication
4. Division
3
Result : 15
[sbrahmbhatt3@gsuad.gsu.edu@snowball MidtermExam]$ sh calculator.sh
Enter Two numbers :
3
8
Enter Choice :
1. Addition
2. Subtraction
3. Multiplication
4. Division
1
Result : 8
[sbrahmbhatt3@gsuad.gsu.edu@snowball MidtermExam]$ sh calculator.sh
Enter Two numbers :
3
5
Enter Choice :
1. Addition
2. Subtraction
3. Multiplication
4. Division
2
Result : -2
[sbrahmbhatt3@gsuad.gsu.edu@snowball MidtermExam]$ sh calculator.sh
Enter Two numbers :
3
5
Enter Choice :
1. Addition
2. Subtraction
3. Multiplication
4. Division
4
Result : .68
[sbrahmbhatt3@gsuad.gsu.edu@snowball MidtermExam]$ █

```

4.

```

Last login: Sun Oct 10 14:55:46 on ttys000

The default interactive shell is now zsh.
To update your account to use zsh, please run 'chsh -s /bin/zsh'.
For more details, please visit https://support.apple.com/kb/HT208858.
Shivs-MacBook-Pro:~ shivbrahmbhatt$ ssh sbrahmbhatt3@snowball.cs.gsu.edu
sbrahmbhatt3@snowball.cs.gsu.edu's password:
Last login: Sun Oct 10 14:56:15 2021 from c-73-184-81-195.hsd1.ga.comcast.net

+
|   GSU Computer Science
|   Instructional Server
|   SNOWBALL.cs.gsu.edu
+
[sbrahmbhatt3@gsuad.gsu.edu@snowball ~]$ cd MidtermExam
[sbrahmbhatt3@gsuad.gsu.edu@snowball MidtermExam]$ sh PhoneBook.sh
Enter the name of the person: Justin
Provide the address of respective person: 7625646946
Provide the phone number of respective person: ^C
[sbrahmbhatt3@gsuad.gsu.edu@snowball MidtermExam]$ sh PhoneBook.sh
Enter the name of the person: Justin
Provide the address of respective person: Atlanta
Provide the phone number of respective person: 7629834857
Please provide the name of the person to find the information: Justin
Name ; Address ; Phone number
Justin ; Atlanta ; 7629834857
Provide the name of the person whose record you want to delete: █

```

5. A) The shell is used to controlling the computer using the commands instead of the Graphical User interface (GUI). It takes the command from programs. Shell helps to interact with the system. It is a term of UNIX.

B) Yes, Snowball Server stops all the commands running in the system between the data source whereas shell in PC's won't stop. And to secure the Snowball Secure Shell is used (SSH) that is used for connections.

C) As C is a compiled language, not an interpreted language. So that it is interpreted by a compiler of the C language and machine code generates and executes the output. Therefore, interpreted language is completely different from the compiled language.

D) These two are Built-in commands. In which echo always ends with the status zero, whereas printf gives an exit of non-zero. The printf is slower compared to echo. Example: echo has a default newline character, but in print added manually.

E) **SSH**- It is a connection between two systems used to copy, manage, or move files. The acronym of SSH is Secure Shell.

SCP- It is used to copy a file on a remote server to the computer. SCP is a tool used by the SSH network protocol.

WGET- It is used to download files by using the pasted URL from the server. WGET is a network downloader that is non-interactive.