Assignment 4 – Filters

Exercise 1:

1. Launch the terminal. - A terminal window was opened.

2. Use the cat command to create a file containing the following data. Name it Ch6S1F1. Use tabs to separate the fields.

1425   Juan   14.25
4321   George   21.11
6781   Anna   16.77
1451   Ben   21.77
2277   Tuan   18.77
asec20@sel20-HP-Compaq-Pro-6305-SFF:~$ cat> Ch6S1F1
1425   Juan   14.25
4321   George21.11
6781   Anna   16.77
1451   Ben   21.77
2277   Tuan   18.77

3. Use the cat command to display the file and check for accuracy.
asec20@sel20-HP-Compaq-Pro-6305-SFF:~$ cat Ch6S1F1
1425   Juan   14.25
4321   George21.11
6781   Anna   16.77
1451   Ben   21.77
2277   Tuan   18.77

4. Use the sort command to sort the file Ch6SlFl according to the first field. Call the sorted file Ch6S1F1(same name).
asec20@sel20-HP-Compaq-Pro-6305-SFF:~$ sort +0n -1 Ch6S1F1 >new | mv new Ch6S1F1

5. Display the file Ch6S1F1.
asec20@sel20-HP-Compaq-Pro-6305-SFF:~$ cat Ch6S1F1
1425   Juan   14.25
1451   Ben   21.77
2277   Tuan   18.77
4321   George21.11
6781   Anna   16.77

6. Use the cut and paste commands to swap fields 2 and 3 of Ch6S1F1. Call it Ch6S1F1.
asec20@sel20-HP-Compaq-Pro-6305-SFF:~$ cut -f1,3 Ch6S1F1>cat; cut -f2 Ch6S1F1| paste cat
-> new
asec20@sel20-HP-Compaq-Pro-6305-SFF:~$ mv result Ch6S1F1

7. Display the file Ch6S1F1.
asec20@sel20-HP-Compaq-Pro-6305-SFF:~$ cat Ch6S1F1
1425   14.25   Juan
1451   21.77   Ben

2277   18.77   Tuan
4321   21.11   George
6781   16.77   Anna

8. Quit the terminal. - The terminal window is closed.

Exercise 2:

1. Launch the terminal. - A terminal window was opened.

2. Use the tail command to create and save the following file. Call it Ch6S2F1.
PASSES ALL DATA FROM INPUT TO OUTPUT
PASSES ONLY SPECIFIED COLUMNS
PASSES NUMBER OF SPECIFIED LINES AT BEGINNING
COMBINES COLUMNS
ARRANGES DATA IN SEQUENCE
PASSES NUMBER OF SPECIFIED LINES AT THE END OF DATA
TRANSLATES ONE OR MORE CHARACTERS
DELETES DUPLICATE LINES
COUNTS CHARACTERS} WORDS,OR'LINES
ABCDEFGHIJKLMNOPQRSTUVWXYZ
asec20@sel20-HP-Compaq-Pro-6305-SFF:~$ tail >Ch6S2F1<<EOF
> PASSES ALL DATA FROM INPUT TO OUTPUT
> PASSES ONLY SPECIFIED COLUMNS
> PASSES NUMBER OF SPECIFIED LINES AT BEGINNING
> COMBINES COLUMNS
> ARRANGES DATA IN SEQUENCE
> PASSES NUMBER OF SPECIFIED LINES AT THE END OF DATA
> TRANSLATES ONE OR MORE CHARACTERS
> DELETES DUPLICATE LINES
> COUNTS CHARACTERS} WORDS,OR'LINES
> ABCDEFGHIJKLMNOPQRSTUVWXYZ
> EOF

3. Use the cat command to view its contents.
asec20@sel20-HP-Compaq-Pro-6305-SFF:~$ cat Ch6S2F1
PASSES ALL DATA FROM INPUT TO OUTPUT
PASSES ONLY SPECIFIED COLUMNS
PASSES NUMBER OF SPECIFIED LINES AT BEGINNING
COMBINES COLUMNS
ARRANGES DATA IN SEQUENCE
PASSES NUMBER OF SPECIFIED LINES AT THE END OF DATA
TRANSLATES ONE OR MORE CHARACTERS
DELETES DUPLICATE LINES
COUNTS CHARACTERS} WORDS,OR'LINES
ABCDEFGHIJKLMNOPQRSTUVWXYZ

4&5. Encrypt this file using the following steps: Reverse the file line by line (the last line becomes the first, the line before the last line becomes the second, and so on).

asec20@sel20-HP-Compaq-Pro-6305-SFF:~$ tac Ch6S2F1 > Ch6S2F1Encr

6&7. Use the cat command to view its contents. Display the file.
asec20@sel20-HP-Compaq-Pro-6305-SFF:~$ cat Ch6S2F1Encr
ABCDEFGHIJKLMNOPQRSTUVWXYZ
COUNTS CHARACTERS} WORDS,OR'LINES
DELETES DUPLICATE LINES
TRANSLATES ONE OR MORE CHARACTERS
PASSES NUMBER OF SPECIFIED LINES AT THE END OF DATA
ARRANGES DATA IN SEQUENCE
COMBINES COLUMNS
PASSES NUMBER OF SPECIFIED LINES AT BEGINNING
PASSES ONLY SPECIFIED COLUMNS
PASSES ALL DATA FROM INPUT TO OUTPUT

8. Decrypt the file (reverse the encryption Steps). Display the file Ch6S1F1.
asec20@sel20-HP-Compaq-Pro-6305-SFF:~$ tac Ch6S2F1Encr > Ch6S2F1
asec20@sel20-HP-Compaq-Pro-6305-SFF:~$ cat Ch6S2F1
PASSES ALL DATA FROM INPUT TO OUTPUT
PASSES ONLY SPECIFIED COLUMNS
PASSES NUMBER OF SPECIFIED LINES AT BEGINNING
COMBINES COLUMNS
ARRANGES DATA IN SEQUENCE
PASSES NUMBER OF SPECIFIED LINES AT THE END OF DATA
TRANSLATES ONE OR MORE CHARACTERS
DELETES DUPLICATE LINES
COUNTS CHARACTERS} WORDS,OR'LINES
ABCDEFGHIJKLMNOPQRSTUVWXYZ

9. Quit the terminal. - The terminal window is closed.

Exercise 3:

1. Launch the terminal. - A terminal window was opened.

2. Use the cat command to create and save the following file. Call it Ch6S3F1.
ALPHABETICAL FACTS.
THE FIRST THREE LETTERS ARE ABC. THE
MEDIAN LETTERS ARE MN.
THE LAST THREE LETTERS ARE XYZ.
THE FIRST WORK IN MY DICTIONARY IS AAL. THE
LAST WORD IN MY DICTIONARY IS ZYTHUM.
THE QUICK BROWN FOX JUMPED OVER THE LAZYDOG.
THE LAST LETTER MAY BE PRONOUNCED ZEE OR ZED.
THE FIRST GREEK LETTER IS ALPHA. THE LAST
GREEK LETTER IS OMEGA.
asec20@sel20-HP-Compaq-Pro-6305-SFF:~$ cat> Ch6S3F1
ALPHABETICAL FACTS.
THE FIRST THREE LETTERS ARE ABC. THE

MEDIAN LETTERS ARE MN.
THE LAST THREE LETTERS ARE XYZ.
THE FIRST WORK IN MY DICTIONARY IS AAL. THE
LAST WORD IN MY DICTIONARY IS ZYTHUM.
THE QUICK BROWN FOX JUMPED OVER THE LAZYDOG.
THE LAST LETTER MAY BE PRONOUNCED ZEE OR ZED.
THE FIRST GREEK LETTER IS ALPHA. THE LAST
GREEK LETTER IS OMEGA.

3&4. Use the cat command to check the contents. Display the file.
asec20@sel20-HP-Compaq-Pro-6305-SFF:~$ cat Ch6S3F1
ALPHABETICAL FACTS.
THE FIRST THREE LETTERS ARE ABC. THE
MEDIAN LETTERS ARE MN.
THE LAST THREE LETTERS ARE XYZ.
THE FIRST WORK IN MY DICTIONARY IS AAL. THE
LAST WORD IN MY DICTIONARY IS ZYTHUM.
THE QUICK BROWN FOX JUMPED OVER THE LAZYDOG.
THE LAST LETTER MAY BE PRONOUNCED ZEE OR ZED.
THE FIRST GREEK LETTER IS ALPHA. THE LAST
GREEK LETTER IS OMEGA.

5. Using the tr command, encrypt this file by shifting each letter five characters to the end of the character set. For example, A becomes F, B becomes G, and so on. The end of the alphabet will wrap around. For example, Y becomes D and Z becomes E. Spaces and newlines would be preserved. This is called Caesarian encryption because it was invented by Julius Caesar. Call the encrypted file Ch6S3F1Encr.
asec20@sel20-HP-Compaq-Pro-6305-SFF:~$ cat Ch6S3F1| tr "A-Z" "F-ZA-E" > Ch6S3F1Encr
FQUMFGJYNHFQ KFHYX.
YMJ KNWXY YMWJJ QJYYJWX FWJ FGH. YMJ
RJINFS QJYYJWX FWJ RS.
YMJ QFXY YMWJJ QJYYJWX FWJ BCD.
YMJ KNWXY ATWP NS RC INHYNTSFWC NX FFQ. YMJ
QFXY ATWI NS RC INHYNTSFWC NX DCYMZR.
YMJ VZNHP GWTAS KTB OZRUJI T,JW YMJ QFDCITL.
YMJ QFXY QJYYJW RFC GJ UWTSTZSHJI DJJ TW DJI.
YMJ KNWXY LWJJP QJYYJW NX FQUMF. YMJ QFXY
LWJJP QJYYJW NX TRJLF.

6&7. Use the cat command to check the contents of the encrypted file. Display the file.
asec20@sel20-HP-Compaq-Pro-6305-SFF:~$ cat Ch6S3F1Encr

8. Now use decryption (reverse strategy) to decrypt the file. Call the new file Ch6S3F1 (original name).
asec20@sel20-HP-Compaq-Pro-6305-SFF:~$ cat Ch6S3F1Encr| tr "F-ZA-E" "A-Z" > Ch6S3F1

9. Use the cat command to look at the contents of the file. Is it the same as the original file?
asec20@sel20-HP-Compaq-Pro-6305-SFF:~$ cat Ch6S3F1
FQUMFGJYNHFQ KFHYX.

YMJ KNWXY YMWJJ QJYYJWX FWJ FGH. YMJ
RJINFS QJYYJWX FWJ RS.
YMJ QFXY YMWJJ QJYYJWX FWJ BCD.
YMJ KNWXY ATWP NS RC INHYNTSFWC NX FFQ. YMJ
QFXY ATWI NS RC INHYNTSFWC NX DCYMZR.
YMJ VZNHP GWTAS KTB OZRUJI T,JW YMJ QFDCITL.
YMJ QFXY QJYYJW RFC GJ UWTSTZSHJI DJJ TW DJI.
YMJ KNWXY LWJJP QJYYJW NX FQUMF. YMJ QFXY
LWJJP QJYYJW NX TRJLF.

10. Quit the terminal. - The terminal window is closed.

Exercise 4:

1. Launch the terminal. - A terminal window was opened.

2. Use the cat command to create and save the following file. Do not type the headings. Call it Ch6S4F1.
ID Hours Rate Hours Worked
1420   12.56   45
3456   14.56   22
2341   45.12   34
1122   23.55   28
1443   23.23   19
2351   67.90   56
8001   7.00   14
asec20@sel20-HP-Compaq-Pro-6305-SFF:~$ cat> Ch6S4F1
1420   12.56   45
3456   14.56   22
2341   45.12   34
1122   23.55   28
1443   23.23   19
2351   67.90   56
8001   7.00   14

3&4. Use the cat command to check the contents. Display the file.
asec20@sel20-HP-Compaq-Pro-6305-SFF:~$ cat Ch6S4F1
1420   12.56   45
3456   14.56   22
2341   45.12   34
1122   23.55   28
1443   23.23   19
2351   67.90   56
8001   7.00   14

5. Use a command to show the number of workers.
asec20@sel20-HP-Compaq-Pro-6305-SFF:~$ wc -l Ch6S4F1
7 Ch6S4F1

6. Use command to sort the file based on id.
asec20@sel20-HP-Compaq-Pro-6305-SFF:~$ sort -n +0 -1 Ch6S4F1
1122   23.55   28
1420   12.56   45
1443   23.23   19
2341   45.12   34
2351   67.90   56
3456   14.56   22
8001   7.00   14

7. Use one single command to show the worker who is paid the highest hourly rate.
asec20@sel20-HP-Compaq-Pro-6305-SFF:~$ sort +1n -2 Ch6S4F1 | tail -1
2351   67.90   56

8. Use one single command to show the worker who worked more than anybody else.
asec20@sel20-HP-Compaq-Pro-6305-SFF:~$ sort +2n -3 Ch6S4F1 | tail -1
2351   67.90   56

9. The command should show only the id of the worker.
asec20@sel20-HP-Compaq-Pro-6305-SFF:~$ sort +2n -3 Ch6S4F1 | tail -1 | cut -f 1
2351

10. Quit the terminal. - The terminal window is closed.

Exercise 5:

1. Launch the terminal. - A terminal window was opened.

2. Use the cat command to copy file Ch6S4F1and name it Ch6S5F1.
asec20@sel20-HP-Compaq-Pro-6305-SFF:~$ cat Ch6S4F1 >Ch6S5F1

3. Use the cat command to create and save the following file. Do not type the headings. Call it Ch6S5F2.

ID	Hourly Rate	Hours Worked
1122	**23.55**	**28**
1420	**12.56**	**45**
1443	**23.23**	**19**
2341	**45.12**	**34**
2351	**67.90**	**56**
3456	**14.56**	**22**
8001	**7.00**	**14**

asec20@sel20-HP-Compaq-Pro-6305-SFF:~$ cat> Ch6S5F2
1420   12.56   45
2456   14.56   22
2341   45.12   34
1322   23.56   28
1443   23.23   19
2351   67.90   56
3467   56.90   14

4&5. Use the cat command to check the contents of both files. Display both files.
asec20@sel20-HP-Compaq-Pro-6305-SFF:~$ cat Ch6S5F1
```
1122   23.55  28
1420   12.56  45
1443   23.23  19
2341   45.12  34
2351   67.90  56
3456   14.56  22
8001   7.00   14
```
asec20@sel20-HP-Compaq-Pro-6305-SFF:~$ cat Ch6S5F2
```
1420   12.56  45
2456   14.56  22
2341   45.12  34
1322   23.56  28
1443   23.23  19
2351   67.90  56
3467   56.90  14
```

6. Sort each file using the file id as the sort key.
asec20@sel20-HP-Compaq-Pro-6305-SFF:~$ sort +0n -1 Ch6S5F1
```
1122   23.55  28
1420   12.56  45
1443   23.23  19
2341   45.12  34
2351   67.90  56
3456   14.56  22
8001   7.00   14
```
asec20@sel20-HP-Compaq-Pro-6305-SFF:~$ sort +0n -1 Ch6S5F2
```
1322   23.56  28
1420   12.56  45
1443   23.23  19
2341   45.12  34
2351   67.90  56
2456   14.56  22
3467   56.90  14
```

7. Save the sorted files as separate files.
asec20@sel20-HP-Compaq-Pro-6305-SFF:~$ sort +0n -1 Ch6S5F1 >Ch6S5F1new
asec20@sel20-HP-Compaq-Pro-6305-SFF:~$ sort +0n -1 Ch6S5F2 >Ch6S5F2new

8. Use a command to merge two files created in step 7 on the id field. Call the new file Ch6S5F3.
asec20@sel20-HP-Compaq-Pro-6305-SFF:~$ sort -m new1 new2 > Ch6S5F3
asec20@sel20-HP-Compaq-Pro-6305-SFF:~$ cat Ch6S5F3
```
1122   23.55  28
1322   23.56  28
1420   12.56  45
1420   12.56  45
1443   23.23  19
```

```
1443    23.23    19
2341    45.12    34
2341    45.12    34
2351    67.90    56
2351    67.90    56
2456    14.56    22
3456    14.56    22
3467    56.90    14
8001    7.00     14
```

9. Use a command to remove the duplicate from the file and save it without renaming it.
**asec20@sel20-HP-Compaq-Pro-6305-SFF:~$** echo "$(uniq Ch6S5F3)" > Ch6S5F3

10. Display the file.
asec20@sel20-HP-Compaq-Pro-6305-SFF:~$ cat Ch6S5F3
```
1122    23.55    28
1322    23.56    28
1420    12.56    45
1443    23.23    19
2341    45.12    34
2351    67.90    56
2456    14.56    22
3456    14.56    22
3467    56.90    14
8001    7.00     14
```

11. Quit the terminal. - The terminal window is closed.

Exercise 6:

1. Launch the terminal. - A terminal window was opened.

2. Use the cat command to create and save the following file. Do not type the headings. Call it C6S6F1.

Department	Course		Session	Enrollment
CIS	15	1	45	
CIS	54	1	20	
BUS	34	2	20	
ENG	11	2	89	
CIS	45	1	38	
MTH	35	1	56	
MTH	35	2	41	
PE	17	2	25	
CIS	54	2	67	

asec20@sel20-HP-Compaq-Pro-6305-SFF:~$ cat> C6S6F1
```
CIS    15    1    45
CIS    54    1    20
BUS    34    2    20
ENG    11    2    89
```

CIS   45   1   38
MTH 35   1   56
MTH 35   2   41
PE   17   2   25
CIS   54   2   67

3. Use the cat command to check the contents of the file.
asec20@sel20-HP-Compaq-Pro-6305-SFF:~$ cat C6S6F1

CIS   15   1   45
CIS   54   1   20
BUS   34   2   20
ENG   11   2   89
CIS   45   1   38
MTH 35   1   56
MTH 35   2   41
PE   17   2   25
CIS   54   2   67

4. Use one command to sort the file on department course and session. The resulting file should be ordered first by department; within equal departments, it should be ordered on course; and within equal courses, it should be ordered by session. (Hint: use three field specifiers: department, course, and session.)
asec20@sel20-HP-Compaq-Pro-6305-SFF:~$ sort +0 -1 +1n -2 +2n -3 C6S6F1>newinfo.txt

5. Display the file.
asec20@sel20-HP-Compaq-Pro-6305-SFF:~$ cat newinfo.txt

BUS   34   2   20
CIS   15   1   45
CIS   45   1   38
CIS   54   1   20
CIS   54   2   67
ENG   11   2   89
MTH 35   1   56
MTH 35   2   41
PE   17   2   25

6. Quit the terminal. - The terminal window is closed.

Exercise 7:

1. Launch the terminal. - A terminal window was opened.

2. Make a copy of /etc /passwd file and save it in a file called Ch6S7F1.
kri@kri-ubuntu:~$ cp /etc/passwd Ch6S7F1

3. Use a command to count the number of users in this file. Make a note of it.
kri@kri-ubuntu:~$ wc -l Ch6S7F1 | cut -d " " -f1
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4. Cut the file so that each line has only two columns: login name (column 1) and user id (column 3). Call the new file Ch6S7F2.

kri@kri-ubuntu:~$ cut -d ":" -f1,3 Ch6S7F1>Ch6S7F2

kri@kri-ubuntu:~$ cat Ch6S7F2

root:0
daemon:1
bin:2
sys:3
sync:4
games:5
man:6
lp:7
mail:8
news:9
uucp:10
proxy:13
www-data:33
backup:34
list:38
irc:39
gnats:41
nobody:65534
systemd-network:100
systemd-resolve:101
systemd-timesync:102
messagebus:103
syslog:104
_apt:105
tss:106
uuidd:107
tcpdump:108
avahi-autoipd:109
usbmux:110
rtkit:111
dnsmasq:112
cups-pk-helper:113
speech-dispatcher:114
avahi:115
kernoops:116
saned:117
nm-openvpn:118
hplip:119
whoopsie:120
colord:121
geoclue:122
pulse:123
gnome-initial-setup:124
gdm:125
sssd:126

kri:1000
systemd-coredump:999

5. Sort the file (Ch6S7F2) on login name without renaming it. Save the file.
kri@kri-ubuntu:~$ sort +0 -1 -o Ch6S7F2 Ch6S7F2
kri@kri-ubuntu:~$ cat Ch6S7F2
_apt:105
avahi:115
avahi-autoipd:109
backup:34
bin:2
colord:121
cups-pk-helper:113
daemon:1
dnsmasq:112
games:5
gdm:125
geoclue:122
gnats:41
gnome-initial-setup:124
hplip:119
irc:39
kernoops:116
kri:1000
list:38
lp:7
mail:8
man:6
messagebus:103
news:9
nm-openvpn:118
nobody:65534
proxy:13
pulse:123
root:0
rtkit:111
saned:117
speech-dispatcher:114
sssd:126
sync:4
sys:3
syslog:104
systemd-coredump:999
systemd-network:100
systemd-resolve:101
systemd-timesync:102
tcpdump:108
tss:106
usbmux:110

uucp:10
uuidd:107
whoopsie:120
www-data:33

**6&7. Use the commands you have learned so far to reorganize the file Ch6S7F2 into six
columns using the following format: Name id Name id Name id**
**Note that you should divide the number of users by three to find out the number of lines in
this new format. You should create three files and then paste them together.**
kri@kri-ubuntu:~$ (head -16 Ch6S7F2)>f1.txt
kri@kri-ubuntu:~$ (tail +17 Ch6S7F2 | head -16)>f2.txt
kri@kri-ubuntu:~$ (tail -16 Ch6S7F2)>f3.txt
kri@kri-ubuntu:~$ paste -d " " f1.txt f2.txt f3.txt >Ch6S7F2
kri@kri-ubuntu:~$ cat Ch6S7F2
_apt:105 kernoops:116 speech-dispatcher:114
avahi:115 kri:1000 sssd:126
avahi-autoipd:109 list:38 sync:4
backup:34 lp:7 sys:3
bin:2 mail:8 syslog:104
colord:121 man:6 systemd-coredump:999
cups-pk-helper:113 messagebus:103 systemd-network:100
daemon:1 news:9 systemd-resolve:101
dnsmasq:112 nm-openvpn:118 systemd-timesync:102
games:5 nobody:65534 tcpdump:108
gdm:125 proxy:13 tss:106
geoclue:122 pulse:123 usbmux:110
gnats:41 root:0 uucp:10
gnome-initial-setup:124 rtkit:111 uuidd:107
hplip:119 saned:117 whoopsie:120
irc:39 speech-dispatcher:114 www-data:33

8. Quit the terminal. - The terminal window is closed.