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OPERATING SYSTEMS

1. Create a file demo with the following contents

```
Student Alice Essentials 20 PSAT 22 Maths 34 Cultural 25 English 70
Student Bob Essentials 23 PSAT 21 Maths 32 Cultural 18 English 94
Student Boby Essentials 43 PSAT 31 Maths 22 Cultural 8 English 93
Student Clara Essentials 18 PSAT 16 Maths 27 Cultural 12 English 45
Student Dirck Essentials 25 PSAT 23 Maths 48 Cultural 25 English 98
Student Eve Essentials 8 PSAT 6 Maths 12 Cultural 13 English 5
```

```
root@Giriirig:~# nano demo
root@Giriirig:~# cat demo
Student Alice Essentials 20 PSAT 22 Maths 34 Cultural 25 English 70
Student Bob Essentials 23 PSAT 21 Maths 32 Cultural 18 English 94
Student Boby Essentials 43 PSAT 31 Maths 22 Cultural 8 English 93
Student Clara Essentials 18 PSAT 16 Maths 27 Cultural 12 English 45
Student Dirck Essentials 25 PSAT 23 Maths 48 Cultural 25 English 98
Student Eve Essentials 8 PSAT 6 Maths 12 Cultural 13 English 5
root@Giriirig:~#
```

2. Find the marks obtained by Clara in all the subjects

```
root@Giriirig:~# grep -i clara demo
Student Clara Essentials 18 PSAT 16 Maths 27 Cultural 12 English 45
root@Giriirig:~#
```

3. Print the marks for essentials in the increasing order

```
root@Giriirig:~# cut -d " " -f 4 demo | sort -n
8
18
20
23
25
43
root@Giriirig:~#
```

4. Find the maximum marks scored in PSAT

```
root@Giriirig:~# cut -d " " -f 6 demo | sort -n | tail -n 1
31
root@Giriirig:~#
```

5. **Find the minimum marks obtained in Cultural**

```
root@Giriirig:~# cut -d " " -f 10 demo | sort -n | head -n 1
8
root@Giriirig:~#
```

6. **Save the marks obtained by all the students in maths into a file and display it in the terminal using a single command**

```
root@Giriirig:~# cut -d " " -f 8 demo > math_marks && cat math_marks
34
32
22
27
48
12
root@Giriirig:~#
```

7. **Print the first 3 letters of all student names.**

```
root@Giriirig:~# cut -c 9-11 demo
Ali
Bob
Bob
Cla
Dir
Eve
root@Giriirig:~#
```

8. **Print the contents of file demo in terminal with all alphabets in capital letters.**

```
root@Giriirig:~# tr a-z A-Z < demo
STUDENT ALICE ESSENTIALS 20 PSAT 22 MATHS 34 CULTURAL 25 ENGLISH 70
STUDENT BOB ESSENTIALS 23 PSAT 21 MATHS 32 CULTURAL 18 ENGLISH 94
STUDENT BOBY ESSENTIALS 43 PSAT 31 MATHS 22 CULTURAL 8 ENGLISH 93
STUDENT CLARA ESSENTIALS 18 PSAT 16 MATHS 27 CULTURAL 12 ENGLISH 45
STUDENT DIRCK ESSENTIALS 25 PSAT 23 MATHS 48 CULTURAL 25 ENGLISH 98
STUDENT EVE ESSENTIALS 8 PSAT 6 MATHS 12 CULTURAL 13 ENGLISH 5
root@Giriirig:~#
```

9. **Print all student names after deleting the letter ‘a’**

```
root@Giriirig:~# cut -d " " -f 2 demo | tr -d 'aA'
lice
Bob
Boby
Clr
Dirck
Eve
root@Giriirig:~#
```

10. Count the number of lines, words and characters in demo file after removing the letter ‘S’

```
root@Giriirig:~# tr -d 'sS' < demo | wc
      6      72     357
root@Giriirig:~#
```

11. Find the number of students with their names containing the letter a, e or i

```
root@Giriirig:~# cut -d " " -f 2 demo | grep -iEc 'a|i|e'
4
root@Giriirig:~#
```

12. Find the marks of students whose names starts with ‘b’ (case insensitive)

```
root@Giriirig:~# grep -E "$(cut -d " " -f 2 demo | grep -i '^b')" demo | cut -d " " -f 2,4,6,8,10,12
Bob 23 21 32 18 94
Boby 43 31 22 8 93
root@Giriirig:~#
```

13. Find the names of students whose names starts with ‘b’ and ends with ‘y’ (case insensitive)

```
root@Giriirig:~# cut -d " " -f 2 demo | grep -i -w '^b.*y$'
Boby
root@Giriirig:~#
```

Shell Programming

1. Write a shell program to perform the following actions in the given order.

```
  GNU nano 6.2                                                    s
#!/bin/bash

cd
mkdir -p Test1/Test2/Test3
echo -e "\n\nQuestion 1.a"
(cd Test1/Test2/Test3 && pwd)


ls -l | cat >Test1/Test2/Test3/file1
echo -e "\n\nQuestion 1.b"
ls Test1/Test2/Test3
cat Test1/Test2/Test3/file1

cd Test1/Test2/Test3
echo -e "\n\nQuestion 1.c"
pwd

echo -e "\n\nQuestion 1.d"
tail +2 file1 | rev | cut -d " " -f 1 | rev

echo -e "\n\nQuestion 1.e"
tail +2 file1 | rev | cut -d " " -f 1 | rev | grep -iE '^d'

echo -e "\n\nQuestion 1.f"
tr -s '[:space:]' '\n' < file1
```

a. Create a directory hierarchy in your home folder

```
Question 1.a
/root/Test1/Test2/Test3
```

b. Create a file file1 in directory Test3 with the contents same as output of the command ls -l

```
Question 1.b
file1
total 48
drwxr-xr-x 3 root root 4096 Dec  2 23:30 Test1
-rw-r--r-- 1 root root  132 Nov 27 10:41 count
-rw-r--r-- 1 root root  132 Nov 27 10:17 count2
-rw-r--r-- 1 root root   59 Nov 27 10:18 count3
-rw-r--r-- 1 root root  191 Nov 27 10:18 countfinal
-rw-r--r-- 1 root root  399 Nov 27 16:42 demo
drwxr-xr-x 3 root root 4096 Nov 21 11:01 main
-rw-r--r-- 1 root root   86 Nov 27 17:08 math.txt
-rw-r--r-- 1 root root   18 Dec  2 22:38 math_marks
-rwxr--r-- 1 root root  522 Dec  3 00:06 shl1.sh
drwx------ 3 root root 4096 Nov 20 16:30 snap
-rwxr--r-- 1 root root   31 Nov 27 16:06 test.sh
```

c. Go to directory Test3

```
Question 1.c
/root/Test1/Test2/Test3
```

d. Find the names of all files and folders in file1

```
Question 1.d
Test1
count
count2
count3
countfinal
demo
main
math.txt
math_marks
shl1.sh
snap
test.sh
```

e. Find the names of all files and folders starting with d(case insensitive)

```
Question 1.e
demo
```

f. Print all words of file1 on a separate line.

```
Question 1.f
total
48
drwxr-xr-x
3
root
root
4096
Dec
2
23:30
Test1
-rw-r--r--
1
root
```

g. Go back to your home directory.

```
Question 1.g
/root
root@Giriirig:~#
```

2. Write a shell program to perform the following actions in the given order.

a. Create a file numericdata with the following contents

Karunagappally 34567 7864 6785
Kollam 56754 6754 7654
Vallikkavu 54328 7548 45675
Trivandrum 16423 6654 6754
Ernakulam 28796 8549 9875
Kayamkulam 35589 75892 3451
kottayam 45557 6773 6547
tirukulum 45675 56476 7896

(Hint : First field is referred as Place second as code1 third as code2 and fourth as code3)

```
Question 2.a
Karunagappally 34567 7864 6785
Kollam 56754 6754 7654
Vallikkavu 54328 7548 45675
Trivandrum 16423 6654 6754
Ernakulam 28796 8549 9875
Kayamkulam 35589 75892 3451
kottayam 45557 6773 6547
tirukulum 45675 56476 7896
```

b. **Display the details of Places that starts with 'T'(case sensitive)**

```
Question 2.b
Trivandrum 16423 6654 6754
```

c. **Display code3 in sorted order(ascending) of the places that start with 'K'(case insensitive)**

```
Question 2.c
3451
6785
7654
```

d. **Filter code2 that starts with 6 and ends with 4**

```
Question 2.d
6754
6654
```

e. **Filter code2 having one or more occurrence of the digit 6.**

```
Question 2.e
7864
6754
6654
6773
56476
```

f. **Filter all code1 having one or more occurrence of the digit 5**

```
Question 2.f
34567
56754
54328
35589
45557
45675
root@Giriirig:~#
```

```
 GNU nano 6.2
#!/bin/bash

cat > numericdata <<EOF
Karunagappally 34567 7864 6785
Kollam 56754 6754 7654
Vallikkavu 54328 7548 45675
Trivandrum 16423 6654 6754
Ernakulam 28796 8549 9875
Kayamkulam 35589 75892 3451
kottayam 45557 6773 6547
tirukulum 45675 56476 7896
EOF

echo -e "\n\nQuestion 2.a"
cat numericdata

echo -e "\n\nQuestion 2.b"
grep '^T' numericdata

echo -e "\n\nQuestion 2.c"
grep '^K' numericdata | cut -d " " -f 4 | sort -n

echo -e "\n\nQuestion 2.d"
cut -d " " -f 3 numericdata | grep -E '^6.*4$'

echo -e "\n\nQuestion 2.e"
cut -d " " -f 3 numericdata | grep -E '6+'

echo -e "\n\nQuestion 2.f"
cut -d " " -f 2 numericdata | grep -E '5+'
```