

Surname, Name:

Section:

Student No:

Closed Book, closed note exam. You are required to write down commands with necessary arguments and options; and make sure that they work. Your script and output should match. Give the best result that you can give!

Each question worths 4 points unless otherwise stated.

Over 100 points is bonus.

Unless otherwise stated for question k, your answers as command must be in k.sh and output should in k.txt both should be in Answers directory. You can combine k.sh's in a single file such as cevaplar.sh

SIGNATURE	Time of Submission:
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Prelude: Before solving questions you should:

- let NAME be your FirstLast name as ascii (MAkgul, ASOzgur, LMessi, LionelMessi)
- create NAME and NAME/Answers directories `mkdir -p ~/NAME/Answers`
- script NAME/NAME.Log
- history -c
- download the questions file and unzip it in NAME Directory, (maintaining directory structure), unzip file-path
`cd /NAME`
use wget <http://lab4t.ctis.bilkent.edu.tr/download/LabM.zip>
- Your working directory could be LabM, files that you operate on will be in LabM. Your answers will be written under NAME; shell scripts and solution files under NAME/Answers; you need to redirect selected output to NAME/Answers directory. You can write your commands within k.sh for question k OR cevaplar.sh/answers.sh by identifying your questions. This will save you time. For most of the questions you should run the necessary command(s), make sure it produces correct output, save the output if necessary in k.txt if k is question number, and save the command in answers.sh using another window/terminal, just copy and paste it.

When you finish, you will save History and zip NAME directory with commands

```
cd; history > NAME/History.txt
```

```
cd ; zip -ry NAME NAME
```

- upload NAME.zip

1. <GroupA> apply `mkdir -p ~/NAME/Answers/Dir{1,2,3,4,5,6,7,8,9,10}` . **For the rest of this question you are located in LabM (2.5 pts each)**

- copy everything under LabM including directory name into Answers/LabM using **cp**. **You might have hidden files/directories. Give command within LabM and use relative addressing**

```
cp -Rp ../LabM ../Answers/
```

- copy everything in LabM into Dir1 with **rsync** . Keep owner and date info

```
rsync -av . ../Answers/Dir1
```

- do it with **tar** using any auxiliary (tar) file into Dir3. Keep the file under NAME

```
tar cf ../LabM.tar . ; tar xf ../LabM.tar -C ../Answer/Dir3
```

- do it with **cpio** without using any auxiliary file into Dir4

```
find . | cpio -pd ../Answers/Dir4
```

</GroupA>

2. consider all files with name *.txt in LabM hierarchy determine number of lines containing **string Net** case sensitive in all *.txt files

```
find . -type f -name "*.txt" | xargs cat | grep -c Net > ../Answers/2.txt
```

3. find all files with name *.txt under LabM which are newer than file time.stamp and copy them into Dir6 while retaining directory structure

```
find . -type f -name "*.txt" -newer time.stamp | cpio -pd ../answers/Dir6
```

4. Given a.txt, we want to determine the lines containing strings Met or Net and put them in files 4-1.txt, 4-2.txt and 4-3.txt . How would you do it using:(each **1**)

grep: `egrep "Net|Met" a.txt > ../Answers/4-1.txt` **or** `grep "[MN]et" a.txt`

sed: `sed -n '/[N|M]net/p' a.txt > ../Answers/4-2.txt` **or** `sed -n '/[MN]et/p' a.txt`

awk: `awk '/[N|M]et/' a.txt > ../Answers/4-3.txt` **or** `awk '/[MN]et/' a.txt`

5. given a.txt, we want to determine non-empty lines and obtain files 5-1.txt, 5-2.txt, and 5-3.txt. How would you do it using: (each **1**)

grep: `grep -v "^$" a.txt > ../Answers/5-1.txt`

sed: `sed '/^$/d' a.txt > ../answers/5-2.txt`

awk: `awk '!/^$/' { print $0 } ' > ../Answers/5-3.txt`

6. given a.txt, we want to determine the lines containing only one of Net or Fox, as word, and put them in files 6-1.txt, 6-2.txt and 6-3.txt How would you do it using:(each **2**)

grep: `grep -w Net a.txt | grep -vw Fox > ../Answers/6-1.txt`
and `grep -w Fox a.txt | grep -vw Net >> ../Answers/6-1.txt`

sed: `sed -n '/Net/p' a.txt | sed '/Fox/d' > ../Answers/6-2.txt`
and `sed -n '/Fox/p' a.txt | sed '/Net/d' >> ../Answers/6-2.txt`

awk: `awk '/Net/' a.txt | awk '!/Fox/' > ../Answers/6-3.txt`
and `awk '!/Net/' | awk '/Fox/' >> ../Answers/6-3.txt`

7. Given a.txt: – determine lines containing string Fox followed by Net, not necessary immediately. 4

```
grep "Fox.*Net" a.txt > ../Answers/7.txt
```

8. Given the following file (data.txt) for a certain course

```
lab   mid1 mid2 final  Name (aciklama)
30    45   70   50    Ali
40    60   40   80    Ayse
80    80   60   80    Filiz
50    40   90   20    Fatma
60    70   50   70    Elif
```

aciklama is for information. It is not part of data.txt

For each student we want compute weighted sum $0.15 \cdot \text{lab} + 0.20 \cdot \text{mid1} + 0.25 \cdot \text{mid2} + 0.4 \cdot \text{final}$. We want to assign grades as A if $\text{sum} \geq 80$, B if $60 \leq \text{sum} < 80$, and D if $\text{sum} < 60$ (for simplicity). write an Awk script to compute weighted sum, grade and print **name grade** into file 8.txt, and compute and print number of A, B, D's

8 pts

```
#!/bin/awk
{sum=0.15*$1+0.20*$2+0.25*$3+0.40*$4}
sum >= 80 { NA+=1; print $5 " got A " }
sum < 60 { ND+=1; print $5 " got D " }
( sum < 80 ) && ( sum >= 60) { NB+=1; print $5 " got B " }
END{print "====\n As a Result:\n"; print "=====\n";
print "number of A's = ", NA;
print "number of B's = ", NB;
print "numbe rof D's = ", ND}
```

9. Write basic part of rsyncd.conf for public archive **books** which will be stored at /usr/local/book with permissions of user ftp. Public archive means anybody can read and download, but can not upload anything.

```
#rsynd.conf
[books]
path=/usr/local/book
read only = yes
list = yes
comment= Public Books
user = ftp
group = ftp
```

10. How would see list of public rsync archives/modules at rsync server ftp.linux.com? How would you download directory pardus/2012/iso/ at rsync archive of ftp.linux.com into iso directory in your home ? Assume your at your home directory. complete the command: rsync rsync://ftp.linux.com/

```
rsync -av ftp.linux.com::
rsync -av ftp.linux.com::pardus/2012/iso/ .
rsync -av rsync://ftp.linux.com/pardus/2012/iso/ .
```

11. In biletly.com, a message addressed to bilgi@biletly.net, will be distributed as: i) to users: webteam, boss, arge-group, satis-group and reklam-group. Ar-ge group contains alara, ayse, elif, burak; satis-group contains ali, ahmet, sinem, and elif, reklam-group contains deniz, filiz, murat, and webteam contains ali, veli, nese.

```
bilgi : webteam, boss, arge-group, satis-group, reklam-group, bilgi-log
arge-group : alara, ayse, elif, burak
satis-group : ali, ahmet, sinem, elif, /home/Logs/satis/Satis.Log
reklam-group : deniz, filiz, murat, "|/usr/bin/hypermail -f /etc/reklam.fg"
webteam : ali, veli, nese, /home/Logs/web/Web.Log
bilgi-log : /usr/Logs/bilgi/Bilgi.Log, "|/usr/sbin/bin/auto-respond"
```

ii) A copy of all mail for satis-group is stored in /home/Logs/satis/Satis.Log, copy of webteam will be stored at /home/Logs/web/Web.Log and all mail for reklam-group stored through program "/usr/bin/hypermail-f/etc/reklam.cfg"

iii) a copy of the message is appended to /usr/Logs/bilgi/Bilgi.Log

iii) message is passed to program /usr/sbin/bin/auto-respond to send an acknowledgment to sender

Write corresponding entry for /etc/aliases file. **8 pts**

12. On machine ayse.xyz.com you want all mail for user@xyz.com will be stored at mailbox of user. This machine will also host domain bil.com, gokyuzu.net. All mail to gokyuzu.net will be delivered to gokyuzu@gmail.com and to gokyuzu user in the local machine. For domain bil.com, only mail for webmaster@bil.com will be accepted and will be delivered to bilibil user. Write necessary configurations in suitable files: identify files and corresponding lines. **6 pts**

```
For user@xyz.com nothing is needed, it is default
in file /etc/postfix/main.cf
  mydestination = xyz.com, ayse.xyz.com, localhost.xyz.com, localhost
  virtual_alia_domains = bil.com gokyuzu.net
  virtual_alias_maps = hash:/etc/postfix/virtual
in file /etc/postfix/virtual
  webmaster@bil.com      bilibil

  @gokyuzu.net           gokyuzu-net

in file /etc/postfix/aliases

  gokyuzu-net : gokyuzu, gokyuzu@gmail.com
```

13. Given mail.txt containing e-mail, grade and Full Name of students:

```
ali@ctis.bilkent.edu.tr A Ali Veli Net
ayse@gmail.com B Ayse Kirmizi
fatma@yahoo.com C Fatma Maviy Net
burak@hotmail.com D Burak Kara Batmaz
filiz@yandex.com A Filiz Ali Yazar
ahmet@ug.bilkent.edu.tr C Ali Ahmet Kitap Okur
```

Write a bash script, say mail.sh, which will read mail.txt and send mail to students with "Subject: your grade", and in the body it will say

Dear Ali Veli Net,
Your grade for CTIS123 will be A.
Best Regards

The Management

For the first students. You can use binaries /bin/mail, /bin/mailx, or /usr/sbin/sendmail **6**

solution:

```
#!/bin/bash
while read adres note adsoyad
do
mailx $adres -s "your grade" <<END
Dear $adsoyad,
Your grade for CTIS123 will be $note
Best Regards
The management
END
%\item
%\item Given a a text file, say abc.txt, which contains in each line an e-mail address
#a bash script which will send an e-mail for each person in abc.txt which will say:\
%\begin{verbatim}
%Dear "Full Name"
%Your grade for course XYZ will be "grade"
%Thank you for your cooperation
%The XYZ Course Management.
%
```

14. Write conditions for being a free software (özgür yazılım), Be precise as much as possible.

0. To run without any restriction
1. to study and make changes for your own needs
2. to distribute with or without money to any body
3. To distribute your changes to any body

15. Write a Bash script which will take a a set of arguments. For each one it will do the following:

first print it is name and check whether it exists, if not will give a message and continue.

If it exists, and if it is directory, it will print output of **du -s DIR**

If it is file it will print its size.

If it is a block device it will "It is a block device"

Else it will print "it is not a file or directory" and continue **6**.

Solution:

```
#!/bin/bash
for x
do
echo $x
if ! [ -e $x ]; then
echo "$x" does not exist
```

```

continue
fi

if [ -d "$x" ] ; then
echo disk usage of $x is $(du -s $x )
continue
fi
if [ -f $x ]; then
set -- $(ls -l $x)
echo size of $x is $7
continue
fi
if [ -b $x ]; then
echo $x is a block device
continue
fi
echo $x is not a file or directory or disk/block device
done

```

16. **Temizle.sh** We want to write a script for backup and periodic maintenance. Recall that `date +%F` will yield date as in 2015-11-02. The Script will act on some file formats which are newer than **time.stamp**. Script will do several things:

i) It will look for all mpg3 and mvi files in LabM; will move them into sub directory in Name/Answers/ directory with name year-month-day .

ii) It will look odt and doc files under LabM, and put them in a tar file in Name/Answers/year-month-day/All-odt-doc.tar

iii) It will look for all txt files under LabM, and put them in a cpio file in Name/Answers/year-month-day/All-txt.cpio

When all is done, time.stamp is updated to current time. This script will run every Sunday, and Thursday at 0.15 am in September to December; and 1st day of each month from January to August at 1.35 am. Write script Temizle.sh. and specify corresponding cron/at entry. **6 pts**

```

#!/bin/bash
gun=$(date +%F)
#work in LabM
mkdir ../Answers/$gun
find . -type f -newer time.stamp \( -iname "*mpg3" -o -iname "*mvi" \)
    -exec mv '{}' ../Answers/$gun/ \;
find . -type f -newer time.stamp \( -iname "*odt" -o -iname "*doc" \)
    | xargs tar cf ../Answers/$gun/All-odt-doc.tar
find . -type f -newer time.stamp -iname "*.txt" | cpio -o >
    ../Answers/$gun/All-txt.cpio
touch time.stamp

#cron entry
15 0 * 9-12 0,4 Temizle.sh
35 1 1 1-8 * Temizle.sh.sh

```

17. Given elma.txt, compute for each fruit-city pair amount sold as kg, and for each city total fruit sold as TL. Use **associative arrays** **6**

```
#!/bin/awk -f
{meyvaTL[ $1 "-" $2 ] += $4}
{meyvaKG[ $1 "-" $2 ] += $3}
END{ print " as TL"
for ( i in meyvaTL ) {
    print i, meyvaTL[ i ] }
print "as KG"
for ( i in meyvaKG ) {
    print i, meyvaKG[ i ] }
}
```

18. suppose you own bilkent.net domain. You have machines ayse.bilkent.net (60.80.90.100), deniz.bilkent.net (80.90.100.120), and filiz.bilkent.net(60.70.70.60). You have contact with ank.bilxyz.com (139.179.139.139), and van.xyz.net.tr (95.95.95.95). You want ayse, deniz, filiz to serve as http://bilkent.net and http://www.bilket.net. Moreover, you want ayse to serve as http://video.bilkent.net and filiz as http://satis.bilkent.net/, and deniz http://anket.bilkent.net/. You want your master DNS/NS server deniz machine and slave machines filiz and van. ayse and deniz be main MX machines and backup will be van and ank machines.

More over, you want halk sub-domain with NS servers filiz (master) and van (slave).

Write down complete zone file for bilkent.net **13 pts**

```
$TTL 86400
@ IN SOA deniz.bilkent.net. hostmaster.bilkent.net. (
2015110200 86400 7200 864000 3600 )
    IN A 60.80.90.100
    IN A 80.90.100.120
    IN A 60.70.70.60
    IN NS deniz
    IN NS filiz
    IN NS van.xyz.net.tr.
    IN MX 10 deniz
    IN MX 10 ayse
    IN MX 20 van.xyz.net.tr.
    IN MX 20 ank.bilxyz.com.
ayse IN A 60.80.90.100
deniz IN A 80.90.100.120
filiz IN A 60.70.70.60
www IN A 60.80.90.100
    IN A 80.90.100.120
    IN A 60.70.70.60
video IN CNAME ayse
satis IN CNAME filiz
anket IN CNAME deniz
sub IN NS filiz
    IN NS van.xyz.net.tr.
```

19. write part of named.conf for filiz machine file (using the above info) **4 pts**

```

zone "bilkent.net" {
    type slave;
    file "SEC.bilkent-net";
    masters { 80.90.100.120;};
};

zone "halk.bilkent.net" {
    type master;
    file "db.halk-bilkent-net";
};

```

20. Write down apache configuration (minimal and complete: directory, index, VirtualHost, Log and webmaster directives) for filiz machine. bilkent.net Web will be on /var/www/web, satis on /usr/local/apache/satis, on all servers

6

```

#NameVirtualHost *
<Directory /var/www>
Options Indexes FollowSymLinks
AllowOverride None
Require all granted
#     order allow,deny
#     allow from all     # for version 2.2
</Directory>

<Directory /usr/local/apache>
Options Indexes FollowSymLinks
AllowOverride None
Require all granted
#     order allow,deny
#     allow from all     # for version 2.2
</Directory>
<VirtualHost *:80>
DocumentRoot /var/www/web
ServerName  bilkent.net
ServerAlias www.bilkent.net
Webmaster  user@domain
CustomLog  Bilkent-net-access.Log combined
ErrorLog   Bilkent-net-error.Log
DirectoyIndex  index.php index.html index.htm
</VirtualHost>
<VirtualHost *:80>
DocumentRoot /usr/local/apach/stais
ServerName  satis.bilkent.net
Webmaster  user@domain
CustomLog  Bilkent-Satis-access.Log combined
ErrorLog   Bilkent-Satis-error.Log
DirectoyIndex  index.php index.html index.htm
</VirtualHost>

```