

CSE 333

OPERATING SYSTEMS

Programming Assignment # 1

1)

```
root@localhost:~/CSE333
File Edit View Search Terminal Help
[root@localhost CSE333]# ./myprog1.sh apple 12345
brspj
[root@localhost CSE333]# ./myprog1.sh zoo 8
hww
[root@localhost CSE333]# ./myprog1.sh zoo 12345
Number length is wrong

[root@localhost CSE333]# ./myprog1.sh zooooo 12345
aqrst
[root@localhost CSE333]# ./myprog1.sh aaaaa 1
bbbbbb
[root@localhost CSE333]# ./myprog1.sh abcde 54321
fffff
[root@localhost CSE333]# █
```

Encryption routine is in this code block:

```
# Check if the string and number lengths are equal or the number is a just a digit number
if [ $slen == $nlen ] || [ $nlen == 1 ]; then
    # If number length is 1 make it slen digit number with the same value
    # for input: abcde 8 -> 88888
    if [ $nlen == 1 ]; then
        n=$num
        num=0

        for (( i=0; i<$slen; i++ ))
        do
            num=$((($num*10+$n))
        done
    fi

    # Encrypt string characters 1 by 1
    for (( i=$((slen-1)); i>=0; i-- )); do
        # Get the character at index i and convert ASCII to integer value
        val=$(( printf "%d" "${str:$i:1}" ))
        key=$((($num%10))
        num=$((($num/10))
        # Add key to the character (mod for cycling)
        val=$((($val+$key-97)%26+97))

        # Convert integer value to ASCII character
        printf -v val %b "\0$(printf %o "$val")"
        printf -v result "%c%s" $val $result
    done
else
    echo "Number length is wrong"
fi
```

2)

```
root@localhost:~/CSE333
File Edit View Search Terminal Help
[root@localhost CSE333]# ./myprog2.sh
Usage: ./myprog2.sh <filename>
[root@localhost CSE333]# ls -al
total 112
drwxr-xr-x. 2 root root 169 Nov 13 10:27 .
dr-xr-x---. 16 root root 4096 Nov 13 10:26 ..
-rw- - - - - 1 root root 496 Nov 13 10:26 gelisme.txt
-rw- - - - - 1 root root 268 Nov 13 10:26 giris.txt
-rwxr-xr-x. 1 root root 1464 Nov 13 10:26 myprog1.sh
-rwxr-xr-x. 1 root root 1675 Nov 13 10:26 myprog2.sh
-rwxr-xr-x. 1 root root 696 Nov 13 10:26 myprog3.sh
-rwxr-xr-x. 1 root root 799 Nov 13 10:26 myprog4.sh
-rwxr-xr-x. 1 root root 1641 Nov 13 10:26 myprog5.sh
-rw- - - - - 1 root root 74585 Nov 13 10:26 Project1.pdf
-rw- - - - - 1 root root 307 Nov 13 10:26 sonuc.txt
[root@localhost CSE333]# ./myprog2.sh hikaye.txt
[root@localhost CSE333]# cat hikaye.txt
Bazı kisilerle ilgili hikayeler ve tarihten alınmış olaylar deyimlerin ortaya çıkış nedenleri arasında on sırada yer alır.
Yardımsıver arkadaşım hemen imdadına kostu. Dikkatlice kozanın liflerini siyirdi, kozayı araladı ve kelebegin fazla cabalamadan kozadan çıkmasını sağladı.
Arkadaşım kelebegin isini kolaylastırmak isterken onun guclenmesine engel olmustu.

[root@localhost CSE333]# ./myprog2.sh hikaye.txt
hikaye.txt exists. Do you want it to be modified? (y/n): y
[root@localhost CSE333]# cat hikaye.txt
Yardımsıver arkadaşımla bir gun kırlarda gezerken kozasından cikmaya calisan bir kelebek gorduk.
Bu ulkede kral ve kralice halka hizmet eder, cok sevilirmis. Bu ulkede bir de Prens ve Nilufer Prenses varmis.
Arkadasım kelebegin isini kolaylastırmak isterken onun guclenmesine engel olmustu.

[root@localhost CSE333]# ./myprog2.sh hikaye.txt
hikaye.txt exists. Do you want it to be modified? (y/n): y
[root@localhost CSE333]# cat hikaye.txt
Bazı kisilerle ilgili hikayeler ve tarihten alınmış olaylar deyimlerin ortaya çıkış nedenleri arasında on sırada yer alır.
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Arkadasım kelebegin isini kolaylastırmak isterken onun guclenmesine engel olmustu.

[root@localhost CSE333]# ./myprog2.sh hikaye.txt
hikaye.txt exists. Do you want it to be modified? (y/n): y
[root@localhost CSE333]# cat hikaye.txt
Bazı kisilerle ilgili hikayeler ve tarihten alınmış olaylar deyimlerin ortaya çıkış nedenleri arasında on sırada yer alır.
Yardımsıver arkadaşım hemen imdadına kostu. Dikkatlice kozanın liflerini siyirdi, kozayı araladı ve kelebegin fazla cabalamadan kozadan çıkmasını sağladı.
Deyimlrimizin ortaya çıkış hikayelerini bilmek dilimizin kulture yansıyan yuzune renk katarak dusunce ve olayları karşilastırmamızda etkilidir.
```

Generating random numbers according to the line lengths and making a story is the following code part:

```
# Get the length of the arrays of lines
ilen=${#ilines[@]}
dlen=${#dlines[@]}
clen=${#clines[@]}

# Create a random number between 0 and array length - 1 for each array length
i=$(( $RANDOM % $ilen ))
d=$(( $RANDOM % $dlen ))
c=$(( $RANDOM % $clen ))

if [ -f "$filename" ]; then
    # If output file exists, ask user to modify it or not
    # if yes, write randomly choosen texts in the arrays (giris, gelisme, sonuc) to the output file
    while true; do
        echo -n "${filename} exists. ";
        read -p "Do you want it to be modified? (y/n): " yn
        case $yn in
            [Yy]* ) echo -e "${ilines[$i]}\n${dlines[$d]}\n${clines[$c]}\n" > $filename; break;;
            [Nn]* ) exit;;
            * ) echo "Please answer yes or no.";;
        esac
    done
else
    # File not exist, write randomly choosen texts in the arrays (giris, gelisme, sonuc) to the output file
    echo -e "${ilines[$i]}\n${dlines[$d]}\n${clines[$c]}\n" > $filename;
fi
```

3)

```
root@localhost:~/CSE333
File Edit View Search Terminal Help
[root@localhost CSE333]# ls -al
total 116
drwxr-xr-x. 2 root root 187 Nov 13 10:39 .
dr-xr-x---. 16 root root 4096 Nov 13 10:26 ..
-rw- - - - - 1 root root 496 Nov 13 10:26 gelisme.txt
-rw- - - - - 1 root root 268 Nov 13 10:26 giris.txt
-rw- - - - - 1 root root 424 Nov 13 10:35 hikaye.txt
-rwxr-xr-x. 1 root root 1464 Nov 13 10:26 myprog1.sh
-rwxr-xr-x. 1 root root 1675 Nov 13 10:26 myprog2.sh
-rwxr-xr-x. 1 root root 696 Nov 13 10:26 myprog3.sh
-rwxr-xr-x. 1 root root 799 Nov 13 10:26 myprog4.sh
-rwxr-xr-x. 1 root root 1641 Nov 13 10:26 myprog5.sh
-rw- - - - - 1 root root 74585 Nov 13 10:26 Project1.pdf
-rw- - - - - 1 root root 307 Nov 13 10:26 sonuc.txt
[root@localhost CSE333]# chmod 400 hikaye.txt
[root@localhost CSE333]# ls -al
total 116
drwxr-xr-x. 2 root root 187 Nov 13 10:39 .
dr-xr-x---. 16 root root 4096 Nov 13 10:26 ..
-rw- - - - - 1 root root 496 Nov 13 10:26 gelisme.txt
-rw- - - - - 1 root root 268 Nov 13 10:26 giris.txt
-r- - - - - 1 root root 424 Nov 13 10:35 hikaye.txt
-rwxr-xr-x. 1 root root 1464 Nov 13 10:26 myprog1.sh
-rwxr-xr-x. 1 root root 1675 Nov 13 10:26 myprog2.sh
-rwxr-xr-x. 1 root root 696 Nov 13 10:26 myprog3.sh
-rwxr-xr-x. 1 root root 799 Nov 13 10:26 myprog4.sh
-rwxr-xr-x. 1 root root 1641 Nov 13 10:26 myprog5.sh
-rw- - - - - 1 root root 74585 Nov 13 10:26 Project1.pdf
-rw- - - - - 1 root root 307 Nov 13 10:26 sonuc.txt
[root@localhost CSE333]# ./myprog3.sh
9 files moved to writable directory.
[root@localhost CSE333]# ls -al
total 8
drwxr-xr-x. 3 root root 40 Nov 13 10:40 .
dr-xr-x---. 16 root root 4096 Nov 13 10:26 ..
-r- - - - - 1 root root 424 Nov 13 10:35 hikaye.txt
drwxr-xr-x. 2 root root 169 Nov 13 10:40 writable
[root@localhost CSE333]# ls writable/
gelisme.txt giris.txt myprog1.sh myprog2.sh myprog3.sh myprog4.sh myprog5.sh Project1.pdf sonuc.txt
[root@localhost CSE333]#
```

Using stat command we search files with writable access rights for user.

```
# For each file in the current directory do
for file in "$current_dir"/*
do
    # Get the file permission of the file and check for user permission 6 (rw-) or 7 (rwx)
    # group and other permission we don't care
    perm=$(stat -c "%a" $file | grep "[67]..")

    # If it return a non-empty result and if the file is an ordinary file
    # Then move the file to writable directory
    if [ -n "$perm" ] && [ -f "$file" ]; then
        count=$((count+1))
        mv "${file}" "writable/"
    fi
done

# Print number of files which has been moved
echo "${count} files moved to writable directory."
```

4)

```
root@localhost:~/CSE333
File Edit View Search Terminal Help
[root@localhost CSE333]# ./myprog4.sh
Usage: ./myprog4.sh <number>
[root@localhost CSE333]# ./myprog4.sh 30
Hexadecimal of 2 is 2
Hexadecimal of 3 is 3
Hexadecimal of 5 is 5
Hexadecimal of 7 is 7
Hexadecimal of 11 is B
Hexadecimal of 13 is D
Hexadecimal of 17 is 11
Hexadecimal of 19 is 13
Hexadecimal of 23 is 17
Hexadecimal of 29 is 1D
[root@localhost CSE333]# ./myprog4.sh 60
Hexadecimal of 2 is 2
Hexadecimal of 3 is 3
Hexadecimal of 5 is 5
Hexadecimal of 7 is 7
Hexadecimal of 11 is B
Hexadecimal of 13 is D
Hexadecimal of 17 is 11
Hexadecimal of 19 is 13
Hexadecimal of 23 is 17
Hexadecimal of 29 is 1D
Hexadecimal of 31 is 1F
Hexadecimal of 37 is 25
Hexadecimal of 41 is 29
Hexadecimal of 43 is 2B
Hexadecimal of 47 is 2F
Hexadecimal of 53 is 35
Hexadecimal of 59 is 3B
[root@localhost CSE333]#
```

We define a function named `is_prime` which takes one parameter, which is a number and function returns 1 if the number is prime, 0 if the number is not prime

```
# is_prime function
# returns 1 if the number is prime
# returns 0 if the number is not prime
is_prime() {
    local n
    local i

    # Square root of the number
    n=$((bc <<< "scale=0; sqrt($1)"))
    n=$((n))

    # Check if the number is divisible until sqrt(number)
    for (( i=2; i<=n; i++ ))
    do
        r=$((($1%i))

        if [ $r -eq 0 ]; then
            return 0
        fi
    done

    return 1
}
```

5)

```
root@localhost:~/CSE333
File Edit View Search Terminal Help
[root@localhost CSE333]# ls -al
total 116
drwxr-xr-x. 3 root root 240 Nov 13 10:48 .
dr-xr-x---. 16 root root 4096 Nov 13 10:26 ..
-rw-r--r--. 1 root root 0 Nov 13 10:47 d1.txt
-rw-r--r--. 1 root root 0 Nov 13 10:47 d2.txt
-rw-r--r--. 1 root root 0 Nov 13 10:47 d33.txt
drwxr-xr-x. 2 root root 66 Nov 13 10:48 dr
-rw-----. 1 root root 496 Nov 13 10:26 gelisme.txt
-rw-----. 1 root root 268 Nov 13 10:26 giris.txt
-r-----. 1 root root 424 Nov 13 10:35 hikaye.txt
-rwxr-xr-x. 1 root root 1464 Nov 13 10:26 myprog1.sh
-rwxr-xr-x. 1 root root 1675 Nov 13 10:26 myprog2.sh
-rwxr-xr-x. 1 root root 696 Nov 13 10:26 myprog3.sh
-rwxr-xr-x. 1 root root 799 Nov 13 10:26 myprog4.sh
-rwxr-xr-x. 1 root root 1641 Nov 13 10:26 myprog5.sh
-rw-----. 1 root root 74585 Nov 13 10:26 Project1.pdf
-rw-----. 1 root root 307 Nov 13 10:26 sonuc.txt
[root@localhost CSE333]# ./myprog5.sh "d*"
Do you want to delete d1.txt? (y/n): y
Do you want to delete d2.txt? (y/n): y
Do you want to delete d33.txt? (y/n): y
3 files deleted
[root@localhost CSE333]# ls -al
total 116
drwxr-xr-x. 3 root root 197 Nov 13 10:49 .
dr-xr-x---. 16 root root 4096 Nov 13 10:26 ..
drwxr-xr-x. 2 root root 66 Nov 13 10:48 dr
-rw-----. 1 root root 496 Nov 13 10:26 gelisme.txt
-rw-----. 1 root root 268 Nov 13 10:26 giris.txt
-r-----. 1 root root 424 Nov 13 10:35 hikaye.txt
-rwxr-xr-x. 1 root root 1464 Nov 13 10:26 myprog1.sh
-rwxr-xr-x. 1 root root 1675 Nov 13 10:26 myprog2.sh
-rwxr-xr-x. 1 root root 696 Nov 13 10:26 myprog3.sh
-rwxr-xr-x. 1 root root 799 Nov 13 10:26 myprog4.sh
-rwxr-xr-x. 1 root root 1641 Nov 13 10:26 myprog5.sh
-rw-----. 1 root root 74585 Nov 13 10:26 Project1.pdf
-rw-----. 1 root root 307 Nov 13 10:26 sonuc.txt
[root@localhost CSE333]# █
```

```
root@localhost:~/CSE333
File Edit View Search Terminal Help
[root@localhost CSE333]# ls -al
total 116
drwxr-xr-x. 3 root root 242 Nov 13 10:51 .
dr-xr-x---. 16 root root 4096 Nov 13 10:26 ..
-rw-r--r--. 1 root root 0 Nov 13 10:51 d77.txt
-rw-r--r--. 1 root root 0 Nov 13 10:51 d88.txt
-rw-r--r--. 1 root root 0 Nov 13 10:51 d99.txt
drwxr-xr-x. 2 root root 66 Nov 13 10:48 dr
-rw-----. 1 root root 496 Nov 13 10:26 gelisme.txt
-rw-----. 1 root root 268 Nov 13 10:26 giris.txt
-r-----. 1 root root 424 Nov 13 10:35 hikaye.txt
-rwxr-xr-x. 1 root root 1464 Nov 13 10:26 myprog1.sh
-rwxr-xr-x. 1 root root 1675 Nov 13 10:26 myprog2.sh
-rwxr-xr-x. 1 root root 696 Nov 13 10:26 myprog3.sh
-rwxr-xr-x. 1 root root 799 Nov 13 10:26 myprog4.sh
-rwxr-xr-x. 1 root root 1641 Nov 13 10:26 myprog5.sh
-rw-----. 1 root root 74585 Nov 13 10:26 Project1.pdf
-rw-----. 1 root root 307 Nov 13 10:26 sonuc.txt
[root@localhost CSE333]# ls -al dr/
total 0
drwxr-xr-x. 2 root root 66 Nov 13 10:48 .
drwxr-xr-x. 3 root root 242 Nov 13 10:51 ..
-rw-r--r--. 1 root root 0 Nov 13 10:48 d44.txt
-rw-r--r--. 1 root root 0 Nov 13 10:48 d49.txt
-rw-r--r--. 1 root root 0 Nov 13 10:48 d61.txt
-rw-r--r--. 1 root root 0 Nov 13 10:48 e10.txt
[root@localhost CSE333]# ./myprog5.sh "d*"
Do you want to delete dr/d44.txt? (y/n): y
Do you want to delete dr/d49.txt? (y/n): y
Do you want to delete dr/d61.txt? (y/n): y
Do you want to delete d77.txt? (y/n): y
Do you want to delete d88.txt? (y/n): y
Do you want to delete d99.txt? (y/n): y
6 files deleted
[root@localhost CSE333]# ls -al dr/
total 0
drwxr-xr-x. 2 root root 21 Nov 13 10:51 .
drwxr-xr-x. 3 root root 197 Nov 13 10:51 ..
-rw-r--r--. 1 root root 0 Nov 13 10:48 e10.txt
[root@localhost CSE333]# ls
dr gelisme.txt giris.txt hikaye.txt myprog1.sh myprog2.sh myprog3.sh myprog4.sh myprog5.sh Project1.pdf sonuc.txt
[root@localhost CSE333]# █
```

To find files in a file path we used “find” command

```
if [ -n "$2" ]; then
    # If there is a second argument, it is the file path to be searched for wildcard
    files=()

    # Find all regular files matched for wildcard in the directory given
    # Put found files to the files array
    while IFS= read -r -d $'\0'; do
        files+=("$REPLY")
    done < <(find $2 -type f -name "$1" -print0)

    # For each files in the files array do
    for f in "${files[@]}; do
        # Remove current directory characters "./" if there is from the file string
        f="${f#./}"

        # Ask user to delete the file or not
        while true; do
            read -p "Do you want to delete ${f}? (y/n): " yn
            case $yn in
                [Yy]* ) rm -rf $f; count=$((count+1)); break;;
                [Nn]* ) exit;;
                * ) echo "Please answer yes or no.";;
            esac
        done
    done
done
```

In the current directory we used bash feature to loop all suitable files with wildcard

```
else
    -----
    # For each files which matches with wildcard in the current directory do
    for f in $wildcard; do
        # Check if it is a regular file
        if [ -f "$f" ]; then
            # Ask user to delete the file or not
            while true; do
                read -p "Do you want to delete ${f}? (y/n): " yn
                case $yn in
                    [Yy]* ) rm -rf $f; count=$((count+1)); break;;
                    [Nn]* ) exit;;
                    * ) echo "Please answer yes or no.";;
                esac
            done
        fi
    done
done
```