

Shell Scripting 3

Q1.

```
#!/bin/bash

echo "Enter a number:"
read n

for ((i=1;i<=n;i++))
do
    for ((j=1;j<=i;j++))
    do
        echo -n "$j "
    done
    echo ""
done
```

```
root@DESKTOP-M3TSUJI:/home# cd infobell
root@DESKTOP-M3TSUJI:/home/infobell# vi q1.sh
root@DESKTOP-M3TSUJI:/home/infobell# chmod +x q1.sh
root@DESKTOP-M3TSUJI:/home/infobell# ./q1.sh
Enter a number:
5
1
1 2
1 2 3
1 2 3 4
1 2 3 4 5
root@DESKTOP-M3TSUJI:/home/infobell# |
```

Q2.

```
#!/bin/bash

echo "Enter a number:"
read n

count=1

for ((i=1;i<=n;i++))
do
    for ((j=1;j<=i;j++))
    do
        echo -n "$count "
        count=$((count+1))
    done
    echo ""
done
```

```
root@DESKTOP-H3TSUJI:/home/infobell# vi q2.sh
root@DESKTOP-H3TSUJI:/home/infobell# chmod +x q2.sh
Enter a number:
10
1
2 3
4 5 6
7 8 9 10
11 12 13 14 15
16 17 18 19 20 21
22 23 24 25 26 27 28
29 30 31 32 33 34 35 36
37 38 39 40 41 42 43 44 45
46 47 48 49 50 51 52 53 54 55
root@DESKTOP-H3TSUJI:/home/infobell# ./q2.sh
Enter a number:
5
1
2 3
4 5 6
7 8 9 10
11 12 13 14 15
root@DESKTOP-H3TSUJI:/home/infobell# |
```

Q3.

```
#!/bin/bash

echo "Enter the first number:"
read num1

echo "Enter the second number:"
read num2

sum=$((echo "$num1 + $num2" | bc -l))

echo "The sum of $num1 and $num2 is $sum"
```

```
root@DESKTOP-M3TSUJI: /home/infobell# vi q3.sh
root@DESKTOP-M3TSUJI: /home/infobell# chmod +x q3.sh
root@DESKTOP-M3TSUJI: /home/infobell# ./q3.sh
Enter the first number:
4.28
Enter the second number:
1.21
The sum of 4.28 and 1.21 is 5.49
root@DESKTOP-M3TSUJI: /home/infobell#
```

Q4.

```
#!/bin/bash

if [ $# -ne 3 ]
then
    echo "Usage: $0 <num1> <operator> <num2>"
    exit 1
fi

num1=$1
operator=$2
num2=$3

case $operator in
    "+")
        result=$(echo "$num1 + $num2" | bc -l)
        ;;
    "-")
        result=$(echo "$num1 - $num2" | bc -l)
        ;;
    "*")
        result=$(echo "$num1 * $num2" | bc -l)
        ;;
    "/")
        result=$(echo "scale=2; $num1 / $num2" | bc -l)
        ;;
    *)
        echo "Invalid operator. Valid operators are +, -, *, /."
        exit 1
        ;;
esac

echo "$num1 $operator $num2 = $result"

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:wq
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```
root@DESKTOP-M3TSUJI:/home/infobell# vi q4.sh
root@DESKTOP-M3TSUJI:/home/infobell# chmod +x q4.sh
root@DESKTOP-M3TSUJI:/home/infobell# ./q4.sh
Usage: ./q4.sh <num1> <operator> <num2>
root@DESKTOP-M3TSUJI:/home/infobell# vi q4.sh
root@DESKTOP-M3TSUJI:/home/infobell# chmod +x q4.sh
root@DESKTOP-M3TSUJI:/home/infobell# ./q4.sh 1.2 + 2.6
1.2 + 2.6 = 3.8
root@DESKTOP-M3TSUJI:/home/infobell#
```

Q5.

```
#!/bin/bash

if [ $# -eq 0 ]
then
    echo "Usage: $0 <num1> <num2> ... <numN>"
    exit 1
fi

max=$1

for num in "$@"
do
    if [ $num -gt $max ]
    then
        max=$num
    fi
done

echo "The largest number is: $max"

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:wq
```

```
root@DESKTOP-M3TSUJI:/home/infobell# vi q5.sh
root@DESKTOP-M3TSUJI:/home/infobell# chmod +x q5.sh
root@DESKTOP-M3TSUJI:/home/infobell# ./q5.sh
Usage: ./q5.sh <num1> <num2> ... <numN>
root@DESKTOP-M3TSUJI:/home/infobell# ./q5.sh 1 3 8 6 5 7 9 2
The largest number is: 9
root@DESKTOP-M3TSUJI:/home/infobell#
```

Q6.

```
#!/bin/bash

if [ $# -ne 1 ]
then
    echo "Usage: $0 <number>"
    exit 1
fi

number=$1
reversed=""

while [ $number -gt 0 ]
do
    digit=$(( $number % 10 ))
    reversed="$digit$reversed"
    number=$(( $number / 10 ))
done

echo "$1 in reverse order is $reversed"
```

```
root@DESKTOP-M3TSUJI:/home/infobell# vi q6.sh
root@DESKTOP-M3TSUJI:/home/infobell# chmod +x q6.sh
root@DESKTOP-M3TSUJI:/home/infobell# ./q6.sh 639872
639872 in reverse order is 278936
root@DESKTOP-M3TSUJI:/home/infobell#
```

Q7.

```
#!/bin/bash

if [ $# -ne 1 ]
then
    echo "Usage: $0 <filename>"
    exit 1
fi

if [ ! -f $1 ]
then
    echo "$1 does not exist or is not a file"
    exit 1
fi

sed -i '/^$/d' $1

echo "Empty lines removed from $1"

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```

```
root@DESKTOP-M3TSUJI:/home/infobell# vi q7.sh
root@DESKTOP-M3TSUJI:/home/infobell# chmod +x q7.sh
root@DESKTOP-M3TSUJI:/home/infobell# ls
f1 f2.txt.gz f3.txt q1.sh q2.sh q3.sh q4.sh q5.sh q6.sh q7.sh t1
root@DESKTOP-M3TSUJI:/home/infobell# f3.txt
f3.txt: command not found
root@DESKTOP-M3TSUJI:/home/infobell# unzip f2.txt

Command 'unzip' not found, but can be installed with:

apt install unzip

root@DESKTOP-M3TSUJI:/home/infobell# gzip -d f2.txt
root@DESKTOP-M3TSUJI:/home/infobell# ls
f1 f2.txt f3.txt q1.sh q2.sh q3.sh q4.sh q5.sh q6.sh q7.sh t1
root@DESKTOP-M3TSUJI:/home/infobell# cat f2.txt
Hello Infobell
root@DESKTOP-M3TSUJI:/home/infobell# ./q7.sh f2.txt
Empty lines removed from f2.txt
```

Q9

```
#!/bin/bash\nread -p "Enter the value of n: " n\n\na=0\nb=1\n\n# first Fibonacci number\necho $a\n\n# next Fibonacci numbers less than or equal to n\nwhile [ $b -le $n ]\ndo\n    echo $b\n    c=$((a+b))\n    a=$b\n    b=$c\ndone
```

```
root@DESKTOP-M3TSUJI:/home/infobell# vi q9.sh
root@DESKTOP-M3TSUJI:/home/infobell# chmod +x q9.sh
root@DESKTOP-M3TSUJI:/home/infobell# ./q9.sh
Enter the value of n: 9
0
1
1
2
3
5
8
root@DESKTOP-M3TSUJI:/home/infobell#
```

Q10.

[illegible]

```
root@DESKTOP-M3TSUJI:/home/infobell# vi q10.sh
root@DESKTOP-M3TSUJI:/home/infobell# chmod +x q10.sh
root@DESKTOP-M3TSUJI:/home/infobell# ./q10.sh
5
5
3
3
3
root@DESKTOP-M3TSUJI:/home/infobell#
```

Q11.

```
#!/bin/bash

# set the board size
board_size=8

# loop through each row of the board
for (( row=1; row<=board_size; row++ ))
do
    # loop through each column of the board
    for (( col=1; col<=board_size; col++ ))
    do
        # determine the value of the current square
        if (( ($row + $col) % 2 == 0 ))
        then
            val=0
        else
            val=1
        fi

        # print the value of the current square
        echo -n "$val "

    done

    # move to the next row
    echo ""
done

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:wq
```

```
root@DESKTOP-M3TSUJI:/home/infobell# vi q11.sh
root@DESKTOP-M3TSUJI:/home/infobell# chmod +x q11.sh
root@DESKTOP-M3TSUJI:/home/infobell# ./q11.sh
0 1 0 1 0 1 0 1
1 0 1 0 1 0 1 0
0 1 0 1 0 1 0 1
1 0 1 0 1 0 1 0
0 1 0 1 0 1 0 1
1 0 1 0 1 0 1 0
0 1 0 1 0 1 0 1
1 0 1 0 1 0 1 0
root@DESKTOP-M3TSUJI:/home/infobell#
```

Q12.

```
#!/bin/bash

read -p "Enter a list of numbers separated by spaces: " numbers
read -p "Enter sort order (asc/desc): " sort_order

if [ "$sort_order" == "asc" ]
then
    sorted_numbers=$(echo "$numbers" | tr ' ' '\n' | sort -n)
elif [ "$sort_order" == "desc" ]
then
    sorted_numbers=$(echo "$numbers" | tr ' ' '\n' | sort -nr)
else
    echo "Invalid sort order"
    exit 1
fi

echo "Sorted numbers: $sorted_numbers"

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```

```
root@DESKTOP-M3TSUJI:/home/infobell# vi q12.sh
root@DESKTOP-M3TSUJI:/home/infobell# chmod +x q12.sh
root@DESKTOP-M3TSUJI:/home/infobell# ./q12.sh
Enter a list of numbers separated by spaces: 96 12 85 36 25 1 9 14 14 11
Enter sort order (asc/desc): asc
Sorted numbers: 1
9
11
12
14
14
25
36
85
96
```


Q14.

```
#!/bin/bash

if [[ $# -eq 0 ]]; then
    echo "Please provide a filename as an argument."
    exit 1
fi

filename=$1

if [[ ! -e "$filename" ]]; then
    echo "Filename does not exist."
    exit 1
fi

if [[ -d "$filename" ]]; then
    type="directory"
elif [[ -f "$filename" ]]; then
    type="file"
else
    echo "Filename is not a valid file or directory."
    exit 1
fi

newname=$(echo "$filename" | tr '[:upper:][:lower:]' '[:lower:][:upper:]')

if [[ "$newname" != "$filename" ]]; then
    if [[ "$type" == "directory" ]]; then
        mv "$filename" "$newname"
    else
        mv "$filename" "$newname"
    fi
    echo "Renamed $filename to $newname."
else
    echo "Filename is already in the desired case."
fi

exit 0
```

```
root@DESKTOP-M3TSUJI:/home/infobell# vi q14.sh
root@DESKTOP-M3TSUJI:/home/infobell# chmod +x q14.sh
root@DESKTOP-M3TSUJI:/home/infobell# ./q14.sh
Please provide a filename as an argument.
root@DESKTOP-M3TSUJI:/home/infobell# ./q14.sh f3.txt
Renamed f3.txt to F3.TXT.
root@DESKTOP-M3TSUJI:/home/infobell#
```

Q15.

```
#!/bin/bash

current_dir=$(basename "$PWD")
new_name=$1
mv "$current_dir"
mv "$pwd" "$new_name"
```

```
root@DESKTOP-H3TSUJI:/home/infobell# vi q15.sh
root@DESKTOP-H3TSUJI:/home/infobell# chmod +x q15.sh
root@DESKTOP-H3TSUJI:/home/infobell# ./q15.sh
```


Q16.

```

ol/bin/bash
echo "Enter the old prefix: "
read old_prefix

echo "Enter the new prefix: "
read new_prefix

for file in *.jpg; do
    if [ -f "$file" ] && [ "${file#$old_prefix}" != "$file" ]; then
        mv -- "$file" "${file/$old_prefix/$new_prefix}"
    fi
done

```

14,0-1 All

```
root@DESKTOP-M3TSUJI:/home/infobell# vi q16.sh
root@DESKTOP-M3TSUJI:/home/infobell# chmod +x q16.sh
root@DESKTOP-M3TSUJI:/home/infobell# ./q16.sh
Enter the old prefix:
xyz
Enter the new prefix:
nkp
```

Q17.

```
#!/bin/bash

# read input from the user
read -p "Enter the file path: " filepath
read -p "Enter the starting line number: " startline
read -p "Enter the number of lines to print: " numlines

# print the requested lines using sed
sed -n "$startline,$((startline+numlines-1))p" "$filepath"
```

10,0-1 All

```
root@DESKTOP-M3TSUJI:/home/infobell# vi q17.sh
root@DESKTOP-M3TSUJI:/home/infobell# chmod +x q17.sh
root@DESKTOP-M3TSUJI:/home/infobell# ./q17.sh
Enter the file path: /home/education
Enter the starting line number: 1
Enter the number of lines to print: 6
sed: read error on /home/education: Is a directory
root@DESKTOP-M3TSUJI:/home/infobell#
```

Q18.

```
#!/bin/bash

# get the longest and shortest user-names using awk
longest=$(awk -F: 'length($1) > length(longest) {longest = $1} END {print longest}' /etc/passwd)
shortest=$(awk -F: 'length($1) < length(shortest) || !shortest {shortest = $1} END {print shortest}' /etc/passwd)

# display the results
echo "Longest username: $longest"
echo "Shortest username: $shortest"
```

"q18.sh" 11L, 371C

```
root@DESKTOP-M3TSUJI:/home/infobell# vi q18.h
root@DESKTOP-M3TSUJI:/home/infobell# vi q18.sh
root@DESKTOP-M3TSUJI:/home/infobell# chmod +x q18.sh
root@DESKTOP-M3TSUJI:/home/infobell# ./q18.sh
Longest username: systemd-timesync
Shortest username: lp
root@DESKTOP-M3TSUJI:/home/infobell#
```

Q19.

[illegible]

```
root@DESKTOP-M3TSUJI:/home/infobell# vi q19.sh
root@DESKTOP-M3TSUJI:/home/infobell# chmod +x q19.sh
root@DESKTOP-M3TSUJI:/home/infobell# ./q19.sh
root@DESKTOP-M3TSUJI:/home/infobell#
```

Q20.

[illegible]

```
root@DESKTOP-M3TSUJI:/home/infobell# vi q20.sh
root@DESKTOP-M3TSUJI:/home/infobell# chmod +x q20.sh
root@DESKTOP-M3TSUJI:/home/infobell# ./q20.sh
Your new password is: GY3zCyA2
root@DESKTOP-M3TSUJI:/home/infobell#
```

Q21.

```
#!/bin/bash

hour=$(date +%H)
date=$(date +%A,%d-%B-%Y)

if [ $hour -lt 12 ]; then
    echo "Good morning! Today is $date."
elif [ $hour -lt 18 ]; then
    echo "Good afternoon! Today is $date."
else
    echo "Good evening! Today is $date."
fi

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```
root@DESKTOP-M3TSUJI:/home/infobell# vi q21.sh
root@DESKTOP-M3TSUJI:/home/infobell# chmod +x q21.sh
root@DESKTOP-M3TSUJI:/home/infobell# ./q21.sh
Good morning! Today is Wednesday,26-April-2023.
root@DESKTOP-M3TSUJI:/home/infobell#
```

Q22.

```
#!/bin/bash

tr '[:upper:] [:lower:]' '[:lower:] [:upper:]' < "$1" > "$1.tmp"
mv "$1.tmp" "$1"
```

```
root@DESKTOP-M3TSUJI:/home/infobell# vi q22.sh
root@DESKTOP-M3TSUJI:/home/infobell# chmod +x q22.sh
root@DESKTOP-M3TSUJI:/home/infobell# ./q22.sh
```

Q23.

```
#!/bin/bash

tr '[:lower:][:upper:]' '[:upper:][:lower:]' < "$1" > "$1.tmp"
mv "$1.tmp" "$1"

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```
root@DESKTOP-M3TSUJI:/home/infobell# vi q23.sh
root@DESKTOP-M3TSUJI:/home/infobell# chmod +x q23.sh
root@DESKTOP-M3TSUJI:/home/infobell# ./q23.sh F3.TXT
root@DESKTOP-M3TSUJI:/home/infobell#
```

Q24.

```
#!/bin/bash

while true; do
    echo "Hello Siddhaling" | cat -> /dev/null
done
```

[illegible]

Q25.

```
#!/bin/bash

function print_args {
    if [ $# -gt 0 ]; then
        echo "$1"
        shift
        print_args "$@"
    fi
}

print_args "$@"

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root@DESKTOP-M3TSUJI:/home/infobell# vi q25.sh
root@DESKTOP-M3TSUJI:/home/infobell# chmod +x q25.sh
root@DESKTOP-M3TSUJI:/home/infobell# ./q25.sh 1 2 5 9 4 s jk 1 7 5
1
2
5
9
4
s
jk
1
7
5
```

```
#!/bin/bash

if [ $# -eq 0 ]; then
    echo "Usage: $0 mount_point"
    exit 1
fi

if grep -qs "^$(readlink -f "$1") " /proc/mounts; then
    echo "$1 is mounted"
else
    echo "$1 is not mounted"
fi

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:wq|

Q27.

```
root@DESKTOP-M3TSUJI:/home/infobell# vi q27.sh
root@DESKTOP-M3TSUJI:/home/infobell# chmod +x q27.sh
root@DESKTOP-M3TSUJI:/home/infobell# ./q27.sh
Usage: ./q27.sh dir1 dir2 dir3 ...
```

Q28.

```
#!/bin/bash

directory="/home/education"

# setting the permissions to be locked
permissions="go-rwx"

# setting the permissions recursively for all files and directories
chmod -R $permissions $directory

echo "Permissions locked for directory $directory"

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```
root@DESKTOP-M3TSUJI:/home/infobell# vi q28.sh
root@DESKTOP-M3TSUJI:/home/infobell# ./q28.sh
Permissions locked for directory /home/education
root@DESKTOP-M3TSUJI:/home/infobell#
```

Q29.

```
#!/bin/bash
threshold=10

df -H | awk '{print $1,$5}' | while read line; do

    filesystem=$(echo $line | awk '{print $1}')
    freespace=$(echo $line | awk '{print $2}')

    |
    freespace=$((freespace%\%))

    if [ "$freespace" -lt "$threshold" ]; then
        echo "File-system $filesystem has less than 10% free space"
    fi
done

"q29.sh" 19L, 351C
```

```
root@DESKTOP-H3TSUJL:~# home/infofobll# w /q29.sh
root@DESKTOP-H3TSUJL:~# home/infofobll# chmod x /q29.sh
root@DESKTOP-H3TSUJL:~# home/infofobll# ./q29.sh
./q29.sh: line 15: [: Use: integer expression expected
File-system /dev/sdb has less than 10% free space
File-system none has less than 10% free space
File-system none has less than 10% free space
File-system none has less than 10% free space
File-system none has less than 10% free space
File-system none has less than 10% free space
File-system none has less than 10% free space
File-system tmpfs has less than 100% free space
File-system drvfs has less than 10% free space
File-system drvfs has less than 10% free space
File-system drvfs has less than 10% free space
```

Q30.

```
#!/bin/bash  
#| awk to filter and count the number of users with user IDs between 500 and 10000  
count=$(awk -F: '$3 >= 500 && $3 <= 10000 {print}' /etc/passwd | wc -l)  
  
echo "Number of users with user IDs between 500 and 10000: $count"  
  
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```

"q30.sh" 7L, 236C

3, 2 All

```
root@DESKTOP-M3TSUJI:/home/infobell# vi q30.sh
root@DESKTOP-M3TSUJI:/home/infobell# chmod +x q30.sh
root@DESKTOP-M3TSUJI:/home/infobell# ./q30.sh
Number of users with user IDs between 500 and 10000: 2
root@DESKTOP-M3TSUJI:/home/infobell#
```

Q31.

```
#!/bin/bash

# Split the $PATH variable into an array of directories
IFS=: read -ra dirs <<< "$PATH"

for dir in "${dirs[@]}; do
    count=$(find "$dir" -type f -executable | wc -l)
    echo "Directory: $dir"
    echo "Number of executable files: $count"
    echo
done
```



```
root@DESKTOP-M3T5UJ1:/home/infobell# vi q31.sh
root@DESKTOP-M3T5UJ1:/home/infobell# chmod +x q31.sh
root@DESKTOP-M3T5UJ1:/home/infobell# ./q31.sh
Directory: /usr/local/sbin
Number of executable files: 0

Directory: /usr/local/bin
Number of executable files: 0

Directory: /usr/sbin
Number of executable files: 253

Directory: /usr/bin
Number of executable files: 823

Directory: /sbin
Number of executable files: 0

Directory: /bin
Number of executable files: 0

Directory: /usr/games
Number of executable files: 0

Directory: /usr/local/games
Number of executable files: 0

Directory: /snap/bin
Number of executable files: 0
```

Q32.

```
#!/bin/bash

# Get the search query from the user
read -p "Enter the username or ID to search: " query

# Search for the user using getent
result=$(getent passwd "$query")

# Check if the result is empty (user not found)
if [[ -z "$result" ]]; then
    echo "User '$query' not found."
else
    echo "$result"
fi
```

```
root@DESKTOP-M3TSUJJ: /home/infobell# vi q32.sh
root@DESKTOP-M3TSUJJ: /home/infobell# chmod +x q32.sh
root@DESKTOP-M3TSUJJ: /home/infobell# ./q32.sh
Enter the username or ID to search: cdac
User 'cdac' not found.
root@DESKTOP-M3TSUJJ: /home/infobell# ./q32.sh
Enter the username or ID to search: games
games::x:5:60:games::usr/games::usr/sbin/nologin
root@DESKTOP-M3TSUJJ: /home/infobell#
```

Q33.

```
#!/bin/bash

read -p "Enter the name of the C file to modify: " filename

# Get the total number of lines in the file
total_lines=$(wc -l < "$filename")

# Calculate the number of lines to replace (20% of the total)
lines_to_replace=$((total_lines / 5))

# Use awk to randomly select lines and replace them with the pattern
awk -v lines="$lines_to_replace" 'BEGIN {srand()} {if (rand() <= lines/NR) print "<---DEL--->"; else print}' "$filename" | shuf > temp.c

# Overwrite the original file with the modified version
mv temp.c "$filename"

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:wq|

root@DESKTOP-M3TSUJI:/home/infobell# vi q33.sh
root@DESKTOP-M3TSUJI:/home/infobell# chmod +x q33.sh
root@DESKTOP-M3TSUJI:/home/infobell# ./q33.sh
Enter the name of the C file to modify: f2.txt
```

Q34.

```
#!/bin/bash

read -p "Enter weight in kilograms: " weight
read -p "Enter height in meters: " height

# Calculate the BMI
bmi=$(echo "scale=2; $weight/($height*$height)" | bc)

echo "Your BMI is $bmi"

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:wq|

root@DESKTOP-M3TSUJI:/home/infobell# vi q34.sh
root@DESKTOP-M3TSUJI:/home/infobell# chmod +x q34.sh
root@DESKTOP-M3TSUJI:/home/infobell# ./q34.sh
Enter weight in kilograms: 58
Enter height in meters: 0.1347
Your BMI is 3204.41
```