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SE202L – Development Operations Lab

Lab 03 – Report (Shell Scripting)

BUTTERFLY PATTERN

```
sheikh@Ubuntu:~$ cd Lab3_Shell_Scripting
sheikh@Ubuntu:~/Lab3_Shell_Scripting$ mkdir Pattern
sheikh@Ubuntu:~/Lab3_Shell_Scripting$ cd Pattern
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Pattern$ touch pattern.sh
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Pattern$ chmod +x pattern.sh
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Pattern$ nano pattern.sh
```

```
#!/bin/bash

n=$(cat .counter)

echo "n = $n"

echo $((n+1)) > .counter

for (( i=1; i<=n+1; i++ ))
do
    for (( j=1; j<=i; j++ ))
    do
        echo -n "*"

    done

    for (( k=1; k<=2*n+1-2*i; k++ ))
    do
        echo -n " "

    done

    limit=$i
    if [ $i -eq $((n+1)) ]; then
        limit=$((i-1))
    fi

    for (( l=1; l<=limit; l++ ))
    do
        echo -n "*"

    done
    echo ""
done

for (( i=n; i>=1; i-- ))
do
    for (( j=1; j<=i; j++ ))
    do
        echo -n "*"

    done

    for (( k=1; k<=2*n+1-2*i; k++ ))
    do
```

```
        echo -n " "

    done

    for (( l=1; l<=i; l++ ))
    do
        echo -n "*"

    done
    echo ""
done
```

```

sheikh@Ubuntu:~/Lab3_Shell_Scripting/Pattern$ echo 0 > .counter
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Pattern$ ./pattern.sh
n = 0
*
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Pattern$ ./pattern.sh
n = 1
* *
***
* *
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Pattern$ ./pattern.sh
n = 2
*  *
** **
*****
** **
*  *
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Pattern$ ./pattern.sh
n = 3
*   *
**  **
*** ***
*****
*** ***
**  **
*   *
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Pattern$ ./pattern.sh
n = 4
*    *
**   **
***  ***
**** ****
*****
**** ****
***   ***
**    **
*     *
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Pattern$ 

```

.counter is a hidden file (because it starts with a dot) that stores a single numeric value. Each time the Bash script is executed, it reads this number, uses it as n, then increments and saves the updated value back to the file. This allows the script to remember the previous value across runs.

```

sheikh@Ubuntu:~/Lab3_Shell_Scripting/Pattern$ ls -a
.  ..  .counter  pattern.sh

```

Pattern 2:

```
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Pattern$ cat pattern2.sh
#!/bin/bash

start_num=9
padding=0

for (( i=start_num; i>=1; i-=2 ))
do
    for (( j=0; j<padding; j++ ))
    do
        echo -n "  "
    done

    echo -n "$i"

    if [ $i -gt 1 ]; then
        for (( k=1; k<=2*(i-1)-1; k++ ))
        do
            echo -n " "
        done
        echo -n "$i"
    fi

    echo ""
    ((padding++))
done
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Pattern$ ./pattern2.sh
9          9
 7        7
   5      5
    3    3
     1
```

Part 4: Practical Exercises

Exercise 1: Basic Shell Scripts

Task 1: Create a greeting script

```
sheikh@Ubuntu:~$ pwd
/home/sheikh
sheikh@Ubuntu:~$ cd Lab3_Shell_Scripting
sheikh@Ubuntu:~/Lab3_Shell_Scripting$ mkdir Exercise1
sheikh@Ubuntu:~/Lab3_Shell_Scripting$ cd Exercise1
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Exercise1$ touch greet.sh
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Exercise1$ chmod +x greet.sh
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Exercise1$ nano greet.sh
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Exercise1$ cat greet.sh
#!/bin/bash

echo -n "Enter your name:"
read name

echo "Welcome to DevOps, $name!"
echo "Today's date is: $(date +%Y%m%d)"

sheikh@Ubuntu:~/Lab3_Shell_Scripting/Exercise1$ ./greet.sh
Enter your name:Sheikh Nabeel
Welcome to DevOps, Sheikh Nabeel!
Today's date is: 20260213
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Exercise1$
```

Task 2: System information script

```
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Exercise1$ touch sysinfo.sh
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Exercise1$ nano sysinfo.sh
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Exercise1$ ./sysinfo.sh
bash: ./sysinfo.sh: Permission denied
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Exercise1$ chmod +x sysinfo.sh
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Exercise1$ ./sysinfo.sh
=== System Information ===
Hostname: Ubuntu
Current User: sheikh
Current Directory: /home/sheikh/Lab3_Shell_Scripting/Exercise1
Disk Usage:
/dev/sda2      25G   7.4G   16G   32% /
/dev/sr0       6.0G   6.0G    0 100% /media/sheikh/Ubuntu 24.04.3 LTS amd64

Memory Usage:
              total        used        free      shared  buff/cache   available
Mem:          5.8Gi        2.2Gi        1.7Gi        108Mi        2.1Gi        3.6Gi
Swap:          0B           0B           0B

sheikh@Ubuntu:~/Lab3_Shell_Scripting/Exercise1$
```

Task 3: File backup script

```
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Exercise1$ touch backup.sh
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Exercise1$ chmod +x backup.sh
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Exercise1$ nano backup.sh
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Exercise1$ ./backup.sh
Usage: ./backup.sh <directory_to_backup>
```

```
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Exercise1$ ./backup.sh ..
Creating backup of .....
tar: Removing leading `..' from member names
tar: Removing leading `../' from member names
Backup created successfully: backup_20260213_123627.tar.gz
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Exercise1$ ls
backup_20260213_123437.tar.gz  backup_20260213_123627.tar.gz  backup.sh  greet.sh  sysinfo.sh
```

Exercise 2: Conditional Logic

Task 1: File checker script

```
sheikh@Ubuntu:~/Lab3_Shell_Scripting$ cd Exercise2
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Exercise2$ touch filecheck.sh
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Exercise2$ chmod +x filecheck.sh
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Exercise2$ nano filecheck.sh
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Exercise2$ ./filecheck.sh
Enter filename: test.txt
./filecheck.sh: line 6: [-f: command not found
File does not exist
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Exercise2$ nano filecheck.sh
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Exercise2$ ./filecheck.sh
Enter filename: test.txt
File does not exist
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Exercise2$ touch test.txt
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Exercise2$
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Exercise2$ ./filecheck.sh
Enter filename: test.txt
File exists!
Size: 0
Permissions: -rw-rw-r--
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Exercise2$
```

Task 2: Grade calculator

```
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Exercise2$ touch grade.sh
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Exercise2$ chmod +x grade.sh
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Exercise2$ nano grade.sh
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Exercise2$ ./grade.sh
Enter your score (0-100): 68
Grade: C
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Exercise2$ ./grade.sh
Enter your score (0-100): 9
Grade: F
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Exercise2$ ./grade.sh
Enter your score (0-100): 90
Grade: A
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Exercise2$
```

Exercise 3: Loops

Task 1: File processor

```
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Exercise2$ cd ..
sheikh@Ubuntu:~/Lab3_Shell_Scripting$ mkdir Exercise3
sheikh@Ubuntu:~/Lab3_Shell_Scripting$ cd Exercise3
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Exercise3$ touch process_files.sh
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Exercise3$ chmod +x process_files.sh
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Exercise3$ nano process_files
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Exercise3$ nano process_files.sh
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Exercise3$ ./process_files.sh
Creating test files...
Created file1.txt
Created file2.txt
Created file3.txt
Created file4.txt
Created file5.txt

Listing created files:
-rw-rw-r-- 1 sheikh sheikh 22 Feb 13 13:18 file1.txt
-rw-rw-r-- 1 sheikh sheikh 22 Feb 13 13:18 file2.txt
-rw-rw-r-- 1 sheikh sheikh 22 Feb 13 13:18 file3.txt
-rw-rw-r-- 1 sheikh sheikh 22 Feb 13 13:18 file4.txt
-rw-rw-r-- 1 sheikh sheikh 22 Feb 13 13:18 file5.txt
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Exercise3$
```

Task 2: Directory size report

```
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Exercise3$ touch dirsize.sh
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Exercise3$ chmod +x dirsize.sh
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Exercise3$ nano dirsize.sh
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Exercise3$ ./dirsize.sh
=== Directory Size Report ===
*/:
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Exercise3$ mkdir dir1 dir2 dir3
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Exercise3$ ./dirsize.sh
=== Directory Size Report ===
dir1/: 4.0K
dir2/: 4.0K
dir3/: 4.0K
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Exercise3$
```


Lab Assessment Tasks

Task 1: Personal Information Script

```
sheikh@Ubuntu:~/Lab3_Shell_Scripting$ mkdir Lab_Tasks
sheikh@Ubuntu:~/Lab3_Shell_Scripting$ cd Lab_Tasks
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Lab_Tasks$ touch myinfo.sh
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Lab_Tasks$ chmod +x myinfo.sh
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Lab_Tasks$ nano myinfo.sh
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Lab_Tasks$ touch student_info.txt
```

```
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Lab_Tasks$ cat myinfo.sh
#!/bin/bash

echo -n "Enter your name: "
read name

echo -n "Enter your ID: "
read std_id

echo -n "Enter your favorite programming language: "
read fav_language

echo ""
echo "Name: $name" | tee -a student_info.txt
echo "ID: $std_id" | tee -a student_info.txt
echo "Your favorite programming language: $fav_language" | tee -a student_info.txt
echo "Current Date & Time: $(date)" | tee -a student_info.txt
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Lab_Tasks$ ./myinfo.sh
Enter your name: Sheikh Nabeel
Enter your ID: 2024588
Enter your favorite programming language: JavaScript

Name: Sheikh Nabeel
ID: 2024588
Your favorite programming language: JavaScript
Current Date & Time: Fri Feb 13 01:51:03 PM UTC 2026
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Lab_Tasks$ cat student_info.txt
Name: Sheikh Nabeel
ID: 2024588
Your favorite programming language: JavaScript
Current Date & Time: Fri Feb 13 01:51:03 PM UTC 2026
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Lab_Tasks$
```

Task 2: File Organizer Script

```
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Lab_Tasks$ mkdir Task2
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Lab_Tasks$ cd Task2
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Lab_Tasks/Task2$ pwd
~/Lab3_Shell_Scripting/Lab_Tasks/Task2
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Lab_Tasks/Task2$ ls
documents  images  others  scripts
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Lab_Tasks/Task2$ touch file.txt doc.pdf img.jpg img.png script.sh index.html style.css script.js
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Lab_Tasks/Task2$ ls
doc.pdf  documents  file.txt  images  img.jpg  img.png  index.html  others  script.js  scripts  script.sh  style.css
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Lab_Tasks/Task2$ touch organize.sh
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Lab_Tasks/Task2$ chmod +x organize.sh
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Lab_Tasks/Task2$ nano organize.sh
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Lab_Tasks/Task2$ cat organize.sh
```

```
#!/bin/bash

script_name=$(basename "$0")

for file in *; do
    if [ -d "$file" ]; then
        continue
    fi

    if [ "$file" == "$script_name" ]; then
        continue
    fi

    ext="${file##*}"
    ext_lower=$(echo "$ext" | tr '[:upper:]' '[:lower:]')

    case "$ext_lower" in
        txt|pdf)
            mv "$file" documents/
            ((doc_count++))
            ;;
        jpg|png)
            mv "$file" images/
            ((img_count++))
            ;;
        sh)
            mv "$file" scripts/
            ((sh_count++))
            ;;
        *)
            mv "$file" others/
            ((other_count++))
            ;;
    esac
done
```

```
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Lab_Tasks/Task2$ ./organize.sh
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Lab_Tasks/Task2$ ls
documents  images  organize.sh  others  scripts
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Lab_Tasks/Task2$ cd documents
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Lab_Tasks/Task2/documents$ ls
doc.pdf  file.txt
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Lab_Tasks/Task2/documents$ cd ..
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Lab_Tasks/Task2$ cd images
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Lab_Tasks/Task2/images$ ls
img.jpg  img.png
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Lab_Tasks/Task2/images$ cd ..
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Lab_Tasks/Task2$ cd others
sheikh@Ubuntu:~/Lab3_Shell_Scripting/Lab_Tasks/Task2/others$ ls
index.html  script.js  style.css
```

== THE END ==