

WIPRO – CAPSTONE PROJECT

TITLE: BASH SCRIPTING SUITE FOR SYSTEM MAINTENANCE

Objective: Write a suite of Bash scripts to automate system maintenance tasks such as backup, system updates, and log monitoring.

CODES:

Day 1: Write a script for automated system backups.

#code:

```
#!/usr/bin/env bash  
set -euo pipefail  
IFS=$'\n\t'
```

```
SCRIPT_NAME="my_backup"  
TIMESTAMP="$(date +'%Y-%m-%d_%H%M%S')"  
USER_HOME="${HOME:-/home/$(whoami)}"  
DEFAULT_SRC="$USER_HOME"  
DEFAULT_DEST="$USER_HOME/bashsuite_backups"  
LOGDIR="${HOME}/bashsuite_logs"  
LOGFILE="$LOGDIR/backup.log"  
RETENTION_DAYS=60
```

```
mkdir -p "$LOGDIR" "$DEFAULT_DEST"  
src="${1:-$DEFAULT_SRC}"  
dest="${2:-$DEFAULT_DEST}"  
archive_name="backup_${TIMESTAMP}.tar.gz"  
archive_path="$dest/$archive_name"
```

```
trap 'echo "[$(date)] ERROR: backup failed" >> "$LOGFILE"; exit 1' ERR  
echo "[$(date)] Starting backup: $src -> $archive_path" | tee -a "$LOGFILE"  
if [ ! -d "$src" ]; then  
    echo "[$(date)] ERROR: source directory $src not found" | tee -a "$LOGFILE"
```

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```
exit 2
fi
mkdir -p "$dest"
tar -czf "$archive_path" -C "$(dirname "$src")" "$(basename "$src")"
echo "[$(date)] Backup archived to $archive_path" | tee -a "$LOGFILE"
find "$dest" -type f -name 'backup_*.tar.gz' -mtime +"$RETENTION_DAYS" -print -delete | tee -a
"$LOGFILE"

echo "[$(date)] Backup completed successfully." | tee -a "$LOGFILE"
exit 0
```

Day 2: Create a script to perform system updates and clean up.

#code:

```
#!/usr/bin/env bash
set -euo pipefail
IFS=$'\n\t'

LOGDIR="${HOME}/bashsuite_logs"
LOGFILE="$LOGDIR/update_cleanup.log"
mkdir -p "$LOGDIR"
trap 'echo "[$(date)] ERROR: update script failed" >> "$LOGFILE"; exit 1' ERR
echo "[$(date)] Starting system update & cleanup" | tee -a "$LOGFILE"

if command -v apt >/dev/null 2>&1; then
    echo "Using apt package manager" | tee -a "$LOGFILE"
    sudo apt update | tee -a "$LOGFILE"
    sudo DEBIAN_FRONTEND=noninteractive apt -y upgrade | tee -a "$LOGFILE"
    sudo apt -y autoremove | tee -a "$LOGFILE"
    sudo apt -y autoclean | tee -a "$LOGFILE"
    echo "[$(date)] apt update & cleanup done" | tee -a "$LOGFILE"
elif command -v dnf >/dev/null 2>&1; then
```

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```
echo "Using dnf package manager" | tee -a "$LOGFILE"
sudo dnf -y upgrade --refresh | tee -a "$LOGFILE"
sudo dnf -y autoremove | tee -a "$LOGFILE"
echo "[$(date)] dnf update & cleanup done" | tee -a "$LOGFILE"

elif command -v yum >/dev/null 2>&1; then
    echo "Using yum" | tee -a "$LOGFILE"
    sudo yum -y update | tee -a "$LOGFILE"
    echo "[$(date)] yum update done" | tee -a "$LOGFILE"

else
    echo "No supported package manager (apt/dnf/yum) found. Exiting." | tee -a "$LOGFILE"
    exit 3
fi

echo "[$(date)] Update & cleanup finished successfully." | tee -a "$LOGFILE"
exit 0
```

Day 3: Develop a log monitoring script to alert on certain conditions.

#code:

```
#!/usr/bin/env bash
set -euo pipefail
IFS=$'\n\t'

LOGDIR="${HOME}/bashsuite_logs"
mkdir -p "$LOGDIR"
LOGFILE="$LOGDIR/log_monitor.log"
REPORT="$LOGDIR/log_report_$(date +%Y%m%d_%H%M%S).txt"
default_term="ERROR"
default_minutes=2880

if [ -f /var/log/syslog ]; then
```

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```
system_log="/var/log/syslog"
elif [ -f /var/log/messages ]; then
    system_log="/var/log/messages"
else
    system_log=""
fi

input_log="${1:-$system_log}"
search_term="${2:-$default_term}"
since_minutes="${3:-$default_minutes}"

if [ -z "$input_log" ]; then
    echo "No system log found and no logfile provided." | tee -a "$LOGFILE"
    exit 2
fi

echo "[$(date)] Scanning $input_log for '$search_term' in last $since_minutes minutes..." | tee -
a "$LOGFILE"

if command -v journalctl >/dev/null 2>&1; then
    echo "Using journalctl to fetch logs" | tee -a "$LOGFILE"
    journalctl --since "${since_minutes} minutes ago" --no-pager | grep -i --color=never -E
    "$search_term" | tee "$REPORT"
else
    grep -i --binary-files=text -E "$search_term" "$input_log" | tee "$REPORT"
fi

count=$(wc -l < "$REPORT" || true)
echo "[$(date)] Found $count matching lines. Report saved to $REPORT" | tee -a "$LOGFILE"
exit 0
```

Day 4: Combine scripts into a maintenance suite with a menu to execute them.

#code:

```
#!/usr/bin/env bash
set -euo pipefail
```

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```
IFS=$'\n\t'
if [[ ! -t 0 ]]; then
    echo "This script requires an interactive terminal. Run it from a terminal, not cron or a
background job."
    exit 1
fi
BASE_DIR="${HOME}/bashsuite"
BIN_DIR="$BASE_DIR/bin"

PS3="Choose an action (number) > "

options=(
    "Run backup (default targets)"
    "Run backup (choose directory)"
    "Run update & cleanup"
    "Run log monitor (default)"
    "Run all (backup + update + log monitor)"
    "Schedule daily backup (add cron)"
    "Exit"
)
if [ "${#options[@]}" -eq 0 ]; then
    echo "No menu options available. Exiting."
    exit 2
fi
function run_backup_default{
    "$BIN_DIR/backup.sh"
}
function run_backup_custom{
    read -r -p "Enter source directory to backup: " src
    read -r -p "Enter destination directory (press enter for default): " dest
    "$BIN_DIR/backup.sh" "$src" "$dest"
```

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```
}

function run_update_cleanup {
    "$BIN_DIR/update_cleanup.sh"
}

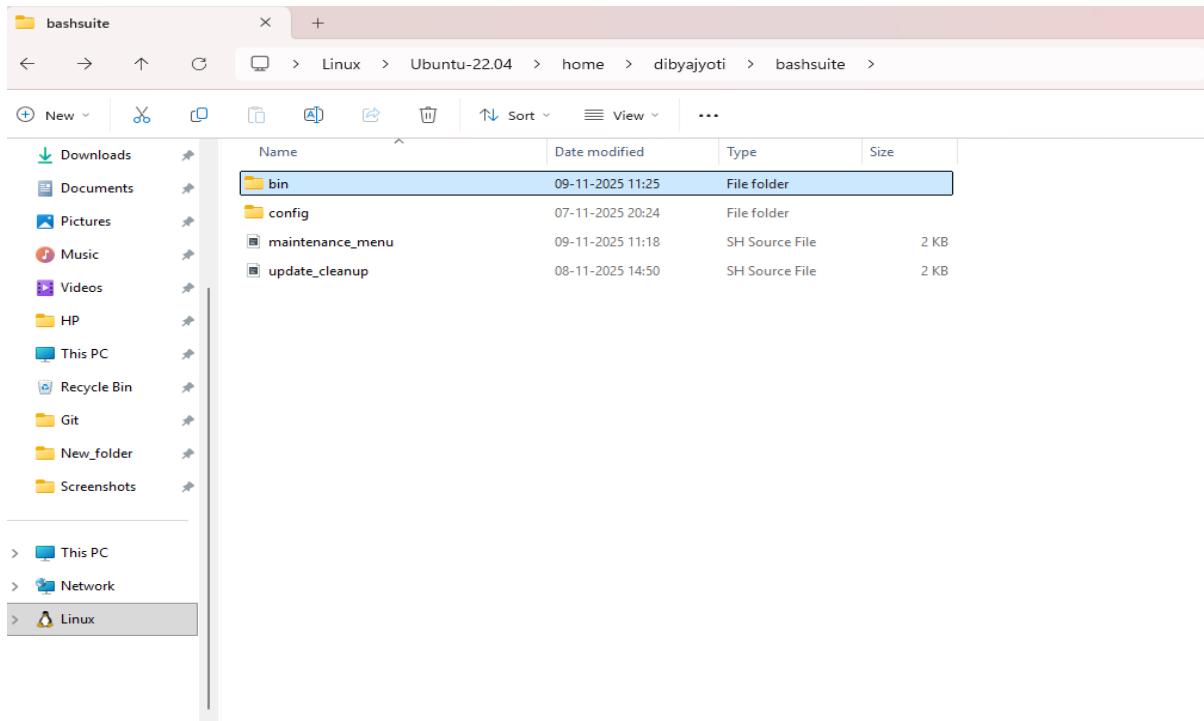
function run_log_monitor {
    read -r -p "Enter search term (default ERROR): " term
    term="${term:-ERROR}"
    "$BIN_DIR/log_monitor.sh" "" "$term"
}

function schedule_backup_cron {
    (crontab -l 2>/dev/null | grep -v 'bsuite/bin/backup.sh' ; echo "30 2 * * * $HOME/bsuite/bin/backup.sh") | crontab -
    echo "Cron job added: daily backup at 02:30"
}

select opt in "${options[@]}"; do
    case $REPLY in
        1) run_backup_default; break ;;
        2) run_backup_custom; break ;;
        3) run_update_cleanup; break ;;
        4) run_log_monitor; break ;;
        5) run_backup_default; run_update_cleanup; run_log_monitor; break ;;
        6) schedule_backup_cron; break ;;
        7) echo "Goodbye!"; exit 0 ;;
        *) echo "Invalid option: $REPLY. Please enter a number between 1 and ${#options[@]}." ;;
    esac
done
```

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FULL SCREENSHOTS:



```
Welcome to Ubuntu 22.04.5 LTS (GNU/Linux 6.6.87.2-microsoft-standard-WSL2 x86_64)

* Documentation: https://help.ubuntu.com
* Management: https://landscape.canonical.com
* Support: https://ubuntu.com/pro

System information as of Sat Nov  8 14:39:28 IST 2025

System load: 0.38      Processes:        45
Usage of /: 0.5% of 1006.85GB  Users logged in:     0
Memory usage: 18%          IPv4 address for eth0: 172.30.9.195
Swap usage:  0%

* Strictly confined Kubernetes makes edge and IoT secure. Learn how MicroK8s
just raised the bar for easy, resilient and secure K8s cluster deployment.

https://ubuntu.com/engage/secure-kubernetes-at-the-edge

This message is shown once a day. To disable it please create the
/home/dibyajyoti/.hushlogin file.
dibyajyoti@DESKTOP-UN0UIDR:~$ pwd
/home/dibyajyoti
dibyajyoti@DESKTOP-UN0UIDR:~$ cd bashsuite
dibyajyoti@DESKTOP-UN0UIDR:~/bashsuite$ tree ~/bashsuite
/home/dibyajyoti/bashsuite
    ├── bin
    │   ├── backup.sh
    │   ├── log_monitor.sh
    │   └── maintenance_menu.sh
    ├── config
    │   └── bashsuite.conf
    └── maintenance_menu.sh
        └── update_cleanup.sh

2 directories, 7 files
```

```
dibyajyoti@DESKTOP-UN0UIDR:~/bashsuite$ nano bin/backup.sh
dibyajyoti@DESKTOP-UN0UIDR:~/bashsuite$ nano bin/log_monitor.sh
dibyajyoti@DESKTOP-UN0UIDR:~/bashsuite$ nano maintenance_menu.sh
dibyajyoti@DESKTOP-UN0UIDR:~/bashsuite$ nano update_cleanup.sh
```

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```
dibyajyoti@DESKTOP-UN0UIDR:~/bashsuite$ chmod +x ~/bashsuite/bin/backup.sh
dibyajyoti@DESKTOP-UN0UIDR:~/bashsuite$ ./~/bashsuite/bin/backup.sh
-bash: ./~/bashsuite/bin/backup.sh: No such file or directory
dibyajyoti@DESKTOP-UN0UIDR:~/bashsuite$ ./backup.sh
-bash: ./backup.sh: No such file or directory
dibyajyoti@DESKTOP-UN0UIDR:~/bashsuite$ ./bin/backup.sh
[Sat Nov 8 14:43:36 IST 2025] Starting backup: /home/dibyajyoti -> /home/dibyajyoti/bashsuite_backups/backup_2025-11-08_144336.tar.gz
[Sat Nov 8 14:43:36 IST 2025] Backup archived to /home/dibyajyoti/bashsuite_backups/backup_2025-11-08_144336.tar.gz
[Sat Nov 8 14:43:36 IST 2025] Backup completed successfully.
```

```
dibyajyoti@DESKTOP-UN0UIDR:~/bashsuite$ chmod +x ~/bashsuite/bin/log_monitor.sh
dibyajyoti@DESKTOP-UN0UIDR:~/bashsuite$ ./bin/log_monitor.sh
[Sat Nov 8 14:45:34 IST 2025] Scanning /var/log/syslog for 'ERROR' in last 2880 minutes...
Using journalctl to fetch logs
Nov 07 20:17:19 DESKTOP-UN0UIDR kernel: RAS: Correctable Errors collector initialized.
Nov 07 20:17:20 DESKTOP-UN0UIDR systemd[1]: Condition check resulted in Process error reports when automatic reporting is enabled (file watch) being skipped.
Nov 07 20:17:20 DESKTOP-UN0UIDR systemd[1]: Condition check resulted in Process error reports when automatic reporting is enabled (timer based) being skipped.
Nov 07 20:17:20 DESKTOP-UN0UIDR networkd-dispatcher[267]: ERROR:Unknown state for interface NetworkctlListState(idx=1, name='lo', type='loopback', operational='n/a', administrative='unmanaged'): n/a
Nov 07 20:17:20 DESKTOP-UN0UIDR networkd-dispatcher[267]: ERROR:Unknown state for interface NetworkctlListState(idx=2, name='eth0', type='ether', operational='n/a', administrative='unmanaged'): n/a
Nov 07 20:17:24 DESKTOP-UN0UIDR unknown: WSL (190) ERROR: CheckConnection: getaddrinfo() failed: -5
Nov 07 20:41:19 DESKTOP-UN0UIDR systemd[1]: Condition check resulted in Process error reports when automatic reporting is enabled (file watch) being skipped.
Nov 07 20:41:19 DESKTOP-UN0UIDR systemd[1]: Condition check resulted in Process error reports when automatic reporting is enabled (timer based) being skipped.
Nov 07 23:06:27 DESKTOP-UN0UIDR unknown: WSL (190) ERROR: CheckConnection: getaddrinfo() failed: -5
Nov 07 23:07:00 DESKTOP-UN0UIDR unknown: WSL (190) ERROR: CheckConnection: getaddrinfo() failed: -5
Nov 08 00:50:47 DESKTOP-UN0UIDR unknown: WSL (190) ERROR: CheckConnection: getaddrinfo() failed: -5
Nov 08 14:39:22 DESKTOP-UN0UIDR kernel: RAS: Correctable Errors collector initialized.
Nov 08 14:39:23 DESKTOP-UN0UIDR systemd[1]: Condition check resulted in Process error reports when automatic reporting is enabled (file watch) being skipped.
Nov 08 14:39:23 DESKTOP-UN0UIDR systemd[1]: Condition check resulted in Process error reports when automatic reporting is enabled (timer based) being skipped.
Nov 08 14:39:24 DESKTOP-UN0UIDR networkd-dispatcher[264]: ERROR:Unknown state for interface NetworkctlListState(idx=1, name='lo', type='loopback', operational='n/a', administrative='unmanaged'): n/a
Nov 08 14:39:24 DESKTOP-UN0UIDR networkd-dispatcher[264]: ERROR:Unknown state for interface NetworkctlListState(idx=2, name='eth0', type='ether', operational='n/a', administrative='unmanaged'): n/a
Nov 08 14:39:29 DESKTOP-UN0UIDR unknown: WSL (191) ERROR: CheckConnection: getaddrinfo() failed: -5
[Sat Nov 8 14:45:35 IST 2025] Found 17 matching lines. Report saved to /home/dibyajyoti/bashsuite_logs/log_report_20251108_144534.txt
```

```
dibyajyoti@DESKTOP-UN0UIDR:~/bashsuite$ nano maintenance_menu.sh
dibyajyoti@DESKTOP-UN0UIDR:~/bashsuite$ chmod +x ~/bashsuite/maintenance_menu.sh
dibyajyoti@DESKTOP-UN0UIDR:~/bashsuite$ ./maintenance_menu.sh
1) Run backup (default targets) 4) Run log monitor (default) 7) Exit
2) Run backup (choose directory) 5) Run all (backup + update + log monitor)
3) Run update & cleanup 6) Schedule daily backup (add cron)
Choose an action (number) > 1
[Sun Nov 9 11:20:43 IST 2025] Starting backup: /home/dibyajyoti -> /home/dibyajyoti/bashsuite_backups/backup_2025-11-09_112043.tar.gz
[Sun Nov 9 11:20:43 IST 2025] Backup archived to /home/dibyajyoti/bashsuite_backups/backup_2025-11-09_112043.tar.gz
[Sun Nov 9 11:20:43 IST 2025] Backup completed successfully.
dibyajyoti@DESKTOP-UN0UIDR:~/bashsuite$ 4
4: command not found
dibyajyoti@DESKTOP-UN0UIDR:~/bashsuite$ chmod +x ~/bashsuite/update_cleanup.sh
dibyajyoti@DESKTOP-UN0UIDR:~/bashsuite$ ./update_cleanup.sh
[Sun Nov 9 11:21:51 IST 2025] Starting system update & cleanup
Using apt package manager
[sudo] password for dibyajyoti:

WARNING: apt does not have a stable CLI interface. Use with caution in scripts.

Hit:1 http://archive.ubuntu.com/ubuntu jammy InRelease
Get:2 http://security.ubuntu.com/ubuntu jammy-security InRelease [129 kB]
Get:3 http://archive.ubuntu.com/ubuntu jammy-updates InRelease [128 kB]
Get:4 http://archive.ubuntu.com/ubuntu jammy-backports InRelease [127 kB]
Fetched 384 kB in 2s (234 kB/s)
Reading package lists...
Building dependency tree...
Reading state information...
47 packages can be upgraded. Run 'apt list --upgradable' to see them.

WARNING: apt does not have a stable CLI interface. Use with caution in scripts.

Reading package lists...
Building dependency tree...
Reading state information...
```

```
dibyajyoti@DESKTOP-UN0UIDR:~/bashsuite$ ./maintenance_menu.sh
1) Run backup (default targets) 4) Run log monitor (default) 7) Exit
2) Run backup (choose directory) 5) Run all (backup + update + log monitor)
3) Run update & cleanup 6) Schedule daily backup (add cron)
Choose an action (number) > 4
Enter search term (default ERROR):
[Sun Nov 9 11:23:50 IST 2025] Scanning /var/log/syslog for 'ERROR' in last 2880 minutes...
Using journalctl to fetch logs
Nov 07 20:17:19 DESKTOP-UN0UIDR kernel: RAS: Correctable Errors collector initialized.
Nov 07 20:17:20 DESKTOP-UN0UIDR systemd[1]: Condition check resulted in Process error reports when automatic reporting is enabled (file watch) being skipped.
Nov 07 20:17:20 DESKTOP-UN0UIDR systemd[1]: Condition check resulted in Process error reports when automatic reporting is enabled (timer based) being skipped.
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Nov 08 00:50:47 DESKTOP-UN0UIDR unknown: WSL (190) ERROR: CheckConnection: getaddrinfo() failed: -5
Nov 08 14:39:22 DESKTOP-UN0UIDR kernel: RAS: Correctable Errors collector initialized.
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Nov 08 14:39:24 DESKTOP-UN0UIDR networkd-dispatcher[264]: ERROR:Unknown state for interface NetworkctlListState(idx=2, name='eth0', type='ether', operational='n/a', administrative='unmanaged'): n/a
```

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GITHUB LINK:

<https://github.com/Dibyajyoti10/WIPRO>