

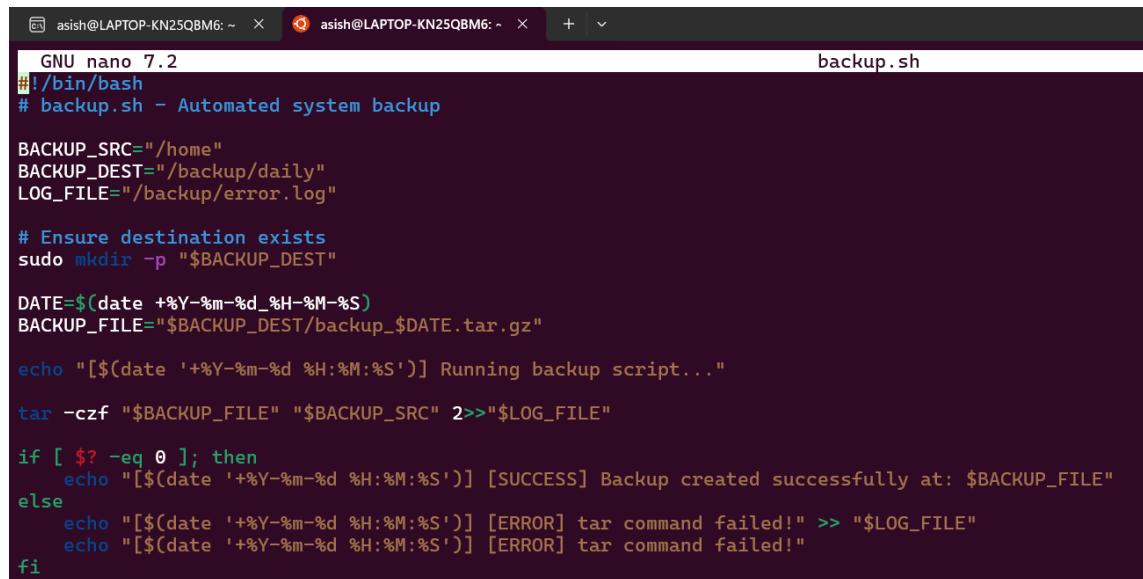
# Bash Scripting Suite for System Maintenance

## Objective

The main goal of this project is to create a smart System Maintenance Suite using Bash scripting that works like a digital assistant for your Linux system. It automatically takes care of important tasks such as data backups, software updates, cleaning unused packages, and monitoring system logs — all without needing constant human effort. With built-in features like timestamped logs, centralized reporting, and error handling, the system ensures everything runs smoothly and efficiently. The menu-driven interface makes it simple and user-friendly, allowing even non-technical users to manage complex maintenance operations easily, just like having a helpful humanoid assistant keeping the system healthy and secure.

## Source Code

### backup.sh



A screenshot of a terminal window titled "backup.sh" in the nano 7.2 editor. The terminal shows the script code for an automated system backup. The code includes variables for source and destination paths, a log file, and logic to ensure the destination exists and handle tar command errors.

```
GNU nano 7.2
#!/bin/bash
# backup.sh - Automated system backup

BACKUP_SRC="/home"
BACKUP_DEST="/backup/daily"
LOG_FILE="/backup/error.log"

# Ensure destination exists
sudo mkdir -p "$BACKUP_DEST"

DATE=$(date '+%Y-%m-%d %H:%M:%S')
BACKUP_FILE="$BACKUP_DEST/backup_${DATE}.tar.gz"

echo "[${(date '+%Y-%m-%d %H:%M:%S')}] Running backup script..."

tar -czf "$BACKUP_FILE" "$BACKUP_SRC" 2>>"$LOG_FILE"

if [ $? -eq 0 ]; then
    echo "[${(date '+%Y-%m-%d %H:%M:%S')}] [SUCCESS] Backup created successfully at: $BACKUP_FILE"
else
    echo "[${(date '+%Y-%m-%d %H:%M:%S')}] [ERROR] tar command failed!" >> "$LOG_FILE"
    echo "[${(date '+%Y-%m-%d %H:%M:%S')}] [ERROR] tar command failed!"
fi
```

## update.sh

```
GNU nano 7.2                                         update.sh
#!/bin/bash
set -euo pipefail
trap 'echo "[ERROR] Update script failed at line $LINENO" | tee -a "$LOG_FILE"' ERR

LOG_FILE="$HOME/update_cleanup.log"
TIMESTAMP=$(date +"%Y-%m-%d %H:%M:%S")

echo "[${TIMESTAMP}] Starting system update..." >> "$LOG_FILE"
sudo apt update -y && sudo apt upgrade -y >> "$LOG_FILE" 2>&1
echo "[${TIMESTAMP}] System updated successfully." >> "$LOG_FILE"

echo "[${TIMESTAMP}] Performing cleanup..." >> "$LOG_FILE"
sudo apt autoremove -y && sudo apt clean >> "$LOG_FILE" 2>&1
echo "[${TIMESTAMP}] Cleanup completed." >> "$LOG_FILE"
```

## logmonitor.sh

```
GNU nano 7.2                                         logmonitor.sh
#!/bin/bash
set -euo pipefail
trap 'echo "[ERROR] Log monitor failed at line $LINENO" | tee -a "$ALERT_LOG"' ERR

LOG_FILE="/var/log/syslog"
ALERT_LOG="$HOME/log_alerts.log"
KEYWORDS=("error" "fail" "critical")
TIMESTAMP=$(date +"%Y-%m-%d %H:%M:%S")

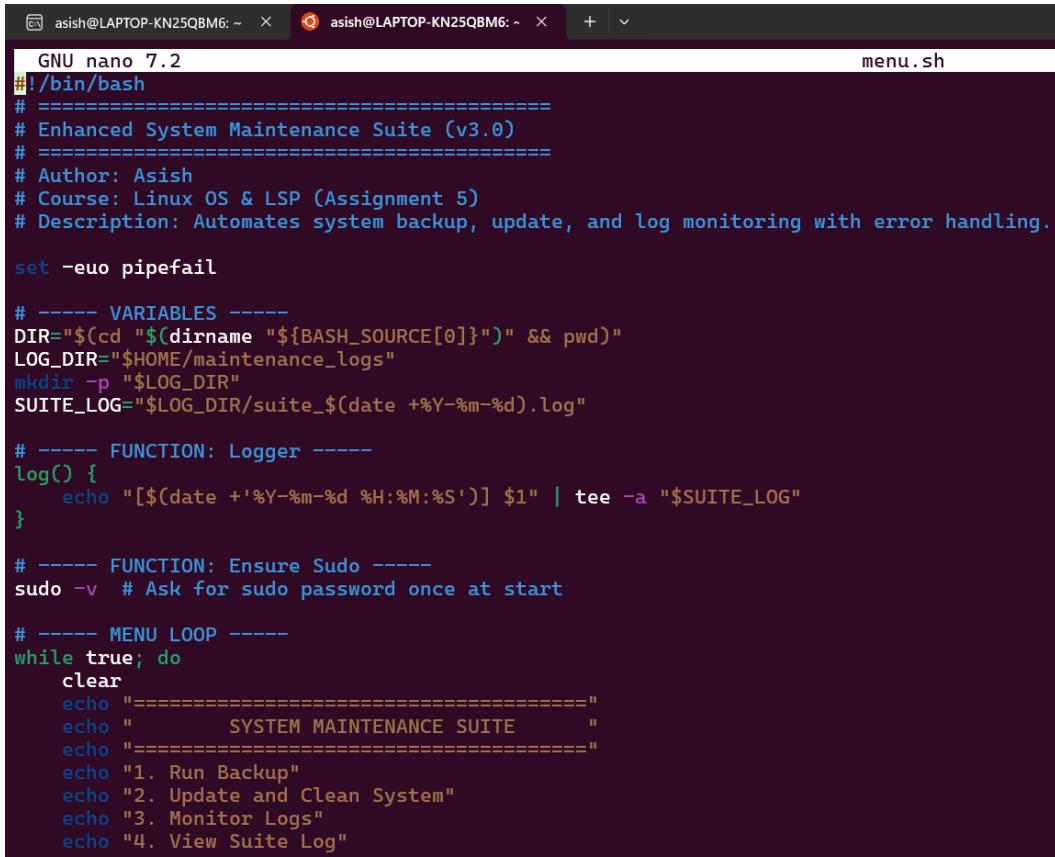
echo "[${TIMESTAMP}] Monitoring logs for issues..." >> "$ALERT_LOG"

FOUND_ISSUE=false

for keyword in "${KEYWORDS[@]}"; do
    if grep -iq "$keyword" "$LOG_FILE"; then
        echo "[${TIMESTAMP}] Found keyword: $keyword" >> "$ALERT_LOG"
        grep -i "$keyword" "$LOG_FILE" >> "$ALERT_LOG"
        FOUND_ISSUE=true
    fi
done

if [ "$FOUND_ISSUE" = true ]; then
    echo "[${TIMESTAMP}] ALERT: Issues detected in system logs!" >> "$ALERT_LOG"
else
    echo "[${TIMESTAMP}] No critical issues found." >> "$ALERT_LOG"
fi
```

## menu.sh



```
GNU nano 7.2                                     menu.sh
#!/bin/bash
# =====
# Enhanced System Maintenance Suite (v3.0)
# =====
# Author: Asish
# Course: Linux OS & LSP (Assignment 5)
# Description: Automates system backup, update, and log monitoring with error handling.

set -euo pipefail

# ----- VARIABLES -----
DIR=$(cd "${dirname "${BASH_SOURCE[0]}"}" && pwd)
LOG_DIR="$HOME/maintenance_logs"
mkdir -p "$LOG_DIR"
SUITE_LOG="$LOG_DIR/suite_$(date +%Y-%m-%d).log"

# ----- FUNCTION: Logger -----
log() {
    echo "[$(date +'%Y-%m-%d %H:%M:%S')] $1" | tee -a "$SUITE_LOG"
}

# ----- FUNCTION: Ensure Sudo -----
sudo -v # Ask for sudo password once at start

# ----- MENU LOOP -----
while true; do
    clear
    echo "===== SYSTEM MAINTENANCE SUITE ====="
    echo "1. Run Backup"
    echo "2. Update and Clean System"
    echo "3. Monitor Logs"
    echo "4. View Suite Log"
    echo "5. Exit"
    read -p "Select an option: " choice
    case $choice in
        1) ./backup.sh
        2) ./update_system.sh
        3) ./clean_logs.sh
        4) ./monitor_system.sh
        5) exit 0
        *) echo "Invalid option selected. Please try again." >> $SUITE_LOG
    esac
done
```

## Screenshots



```
asish@LAPTOP-KN25QBM6: ~  X  asish@LAPTOP-KN25QBM6: ~  X  +  v  
=====  
SYSTEM MAINTENANCE SUITE  
=====  
1. Run Backup  
2. Update and Clean System  
3. Monitor Logs  
4. View Suite Log  
5. Exit  
-----  
Enter your choice [1-5]: 
```

```
asish@LAPTOP-KN25QBM6: ~  X  asish@LAPTOP-KN25QBM6: ~  X  +  v  
=====  
SYSTEM MAINTENANCE SUITE  
=====  
1. Run Backup  
2. Update and Clean System  
3. Monitor Logs  
4. View Suite Log  
5. Exit  
-----  
Enter your choice [1-5]: 1  
[2025-11-07 14:43:20] Running backup script...  
[2025-11-07 14:43:20] Running backup script...  
[2025-11-07 14:43:20] [SUCCESS] Backup created successfully at: /backup/daily/backup_2025-11-07_14-43-20.tar.gz  
[2025-11-07 14:43:20] Backup completed successfully.  
Press Enter to continue... 
```

```
asish@LAPTOP-KN25QBM6: ~  X  asish@LAPTOP-KN25QBM6: ~  X  +  ▾  
=====  
          SYSTEM MAINTENANCE SUITE  
=====  
1. Run Backup  
2. Update and Clean System  
3. Monitor Logs  
4. View Suite Log  
5. Exit  
-----  
Enter your choice [1-5]: 2  
[2025-11-07 14:43:30] Starting system update & cleanup...  
Hit:1 http://archive.ubuntu.com/ubuntu noble InRelease  
Hit:2 http://archive.ubuntu.com/ubuntu noble-updates InRelease  
Hit:3 http://archive.ubuntu.com/ubuntu noble-backports InRelease  
Hit:4 http://security.ubuntu.com/ubuntu noble-security InRelease  
Reading package lists... Done  
Building dependency tree... Done  
Reading state information... Done  
All packages are up to date.  
Reading package lists... Done  
Building dependency tree... Done  
Reading state information... Done  
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.  
[2025-11-07 14:43:35] System update & cleanup completed.  
Press Enter to continue... █
```

```
asish@LAPTOP-KN25QBM6: ~  X  asish@LAPTOP-KN25QBM6: ~  X  +  ▾  
=====  
          SYSTEM MAINTENANCE SUITE  
=====  
1. Run Backup  
2. Update and Clean System  
3. Monitor Logs  
4. View Suite Log  
5. Exit  
-----  
Enter your choice [1-5]: 3  
[2025-11-07 14:43:46] Running log monitor...  
[2025-11-07 14:43:46] Log monitor completed.  
Press Enter to continue... █
```

```
asish@LAPTOP-KN25QBM6: ~  X  asish@LAPTOP-KN25QBM6: ~  X  +  v  
=====  
          SYSTEM MAINTENANCE SUITE  
=====  
1. Run Backup  
2. Update and Clean System  
3. Monitor Logs  
4. View Suite Log  
5. Exit  
-----  
Enter your choice [1-5]: 4  
---- SUITE LOG (last 200 lines) ----  
[2025-11-07 12:49:38] Running backup script...  
[2025-11-07 12:49:38] Backup failed!  
[2025-11-07 12:49:46] Starting system update & cleanup...  
[2025-11-07 12:49:46] Update & cleanup failed!  
[2025-11-07 12:49:49] Monitoring system logs...  
[2025-11-07 12:49:49] Log monitoring failed!  
[2025-11-07 12:49:57] Exiting Maintenance Suite.  
[2025-11-07 14:04:56] Running backup script...  
[2025-11-07 14:04:56] Backup failed!  
[2025-11-07 14:09:59] Exiting Maintenance Suite.  
[2025-11-07 14:16:13] Running backup script...  
[2025-11-07 14:16:14] Backup failed!  
[2025-11-07 14:17:02] Exiting Maintenance Suite.  
[2025-11-07 14:40:44] Running backup script...  
[2025-11-07 14:40:44] Backup completed successfully.  
[2025-11-07 14:40:51] Running backup script...  
[2025-11-07 14:40:51] Backup completed successfully.  
[2025-11-07 14:40:54] Starting system update & cleanup...  
[2025-11-07 14:42:09] System update & cleanup completed.  
[2025-11-07 14:42:14] Starting system update & cleanup...  
[2025-11-07 14:42:18] System update & cleanup completed.  
[2025-11-07 14:42:21] Running log monitor...  
[2025-11-07 14:42:21] Log monitor completed.  
[2025-11-07 14:43:20] Running backup script...  
[2025-11-07 14:43:20] Backup completed successfully.  
[2025-11-07 14:43:30] Starting system update & cleanup...  
[2025-11-07 14:43:35] System update & cleanup completed.  
[2025-11-07 14:43:46] Running log monitor...  
[2025-11-07 14:43:46] Log monitor completed.  
-----  
Press Enter to continue... █
```

```
asish@LAPTOP-KN25QBM6: ~ × asish@LAPTOP-KN25QBM6: ~ × + ▾
=====
SYSTEM MAINTENANCE SUITE
=====
1. Run Backup
2. Update and Clean System
3. Monitor Logs
4. View Suite Log
5. Exit
-----
Enter your choice [1-5]: 5
[2025-11-07 14:48:13] Exiting Maintenance Suite.
Goodbye!
asish@LAPTOP-KN25QBM6:~/maintenance_suite$ nano backup.sh
asish@LAPTOP-KN25QBM6:~/maintenance_suite$ nano backup.sh
asish@LAPTOP-KN25QBM6:~/maintenance_suite$ nano update.sh
asish@LAPTOP-KN25QBM6:~/maintenance_suite$ nano logmonitor.sh
asish@LAPTOP-KN25QBM6:~/maintenance_suite$ nano menu.sh
asish@LAPTOP-KN25QBM6:~/maintenance_suite$ █
```

**SUBMITTED BY: -**

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Date: November 2025