



## **S.B. JAIN INSTITUTE OF TECHNOLOGY MANAGEMENT & RESEARCH, NAGPUR**

### **Practical 03**

**Aim:** Automate student marksheets generation, system information display, Fibonacci and prime number generation, and file management operations using shell scripts to enhance computational efficiency and user interaction.

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❖ **Aim:** Automate student marksheet generation, system information display, Fibonacci and prime number generation, and file management operations using shell scripts to enhance computational efficiency and user interaction.

❖ **Tasks to be done in this Practical.**

- a) Write a shell script to generate mark- sheet of a student. Take 3 subjects, calculate and display total marks, percentage and Class obtained by the student.
- b) Write a menu driven shell script which will print the following menu and execute the given task.
  - Display calendar of current month.
  - Display today's date and time.
  - Display usernames those are currently logged in the system.
  - Display your terminal number
- c) Write a shell script which will generate first n Fibonacci numbers like: 1, 1, 2, 3, 5, 13
- d) Write a shell script which will accept a number b and display first n prime numbers as output.
- e) Write menu driven program for file handling activity
  - Creation of file.
  - Write content in the file.
  - Upend file content.
  - Delete file content

❖ **Objectives:**

1. Automate marksheet generation with total, percentage, and class classification.
2. Develop menu-driven scripts for system information and file operations.
3. Generate Fibonacci and prime numbers for user-defined inputs.

❖ **Requirements:**

✓ **Hardware Requirements:**

- Processor: Minimum 1 GHz
- RAM: 512 MB or higher
- Storage: 100 MB free space



**✓ Software Requirements:**

- Operating System: Linux/Unix-based
- Shell: Bash 4.0 or higher
- Text Editor: Nano, Vim, or any preferred editor

**❖ Theory:**

Shell scripting is a powerful way to automate repetitive tasks and manage system operations efficiently. It allows users to write programs using shell commands and scripting constructs. Shell scripts are interpreted line-by-line by a shell interpreter, making them ideal for administrative tasks, file management, and system automation. This practical encompasses a variety of real-world scenarios that demonstrate the utility of shell scripting for computing tasks and resource management.

## **1. Marksheets Generation**

This script takes input marks for three subjects, calculates the total marks, percentage, and determines the class of the student based on predefined conditions. Conditional statements (if-else) are used to classify the performance into distinction, first class, second class, or fail. This exercise emphasizes the use of arithmetic operations and decision-making constructs.

Key concepts include:

- Reading user input using read
- Arithmetic operations with \$((expression))
- Conditional statements for decision-making

## **2. Menu-Driven Script for System Information**

Menu-driven scripts enhance user interaction by presenting a list of options for performing different tasks. In this practical, options are provided to display the calendar of the current month, the current date and time, logged-in users, and the terminal number. The script utilizes looping constructs (while) and case statements for structured flow control.



**Commands used:**

- cal for displaying the calendar
- date for showing current date and time
- who to list logged-in users
- tty to identify the terminal

## **3. Fibonacci Number Generation**

Fibonacci numbers are a sequence where each term is the sum of the two preceding ones. The script uses iterative constructs (for loop) to generate n terms based on user input. This practical illustrates the use of loop control and variable swapping to generate series data efficiently.

#### **4. Prime Number Display**

This script accepts an integer n and outputs the first n prime numbers. A nested loop checks divisibility to determine if a number is prime. The practical demonstrates logic building for number-theoretic operations using loops and conditionals.

#### **5. Menu-Driven File Management**

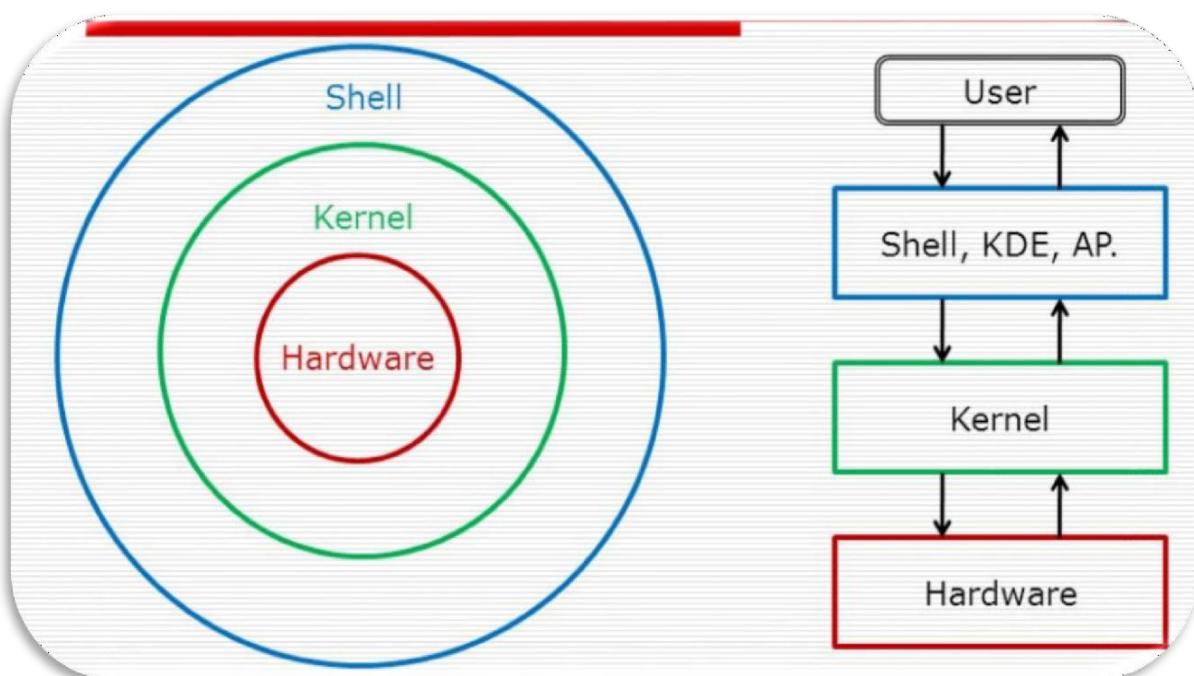
The file handling script enables users to create, write, append, and delete file content. The case construct manages different file operations.

Commands include:

- touch to create files
- cat for writing and appending content
- rm for deleting files

This exercise emphasizes text manipulation, input handling, and file control mechanisms in Unix-like environments.

#### **Diagrammatical View of Shell**



❖ CODES

1. Write a shell script to generate mark- sheet of a student. Take 3 subjects, calculate and display total marks, percentage and Class obtained by the student.

```
#!/bin/bash

echo "Enter Student Name:"
read name

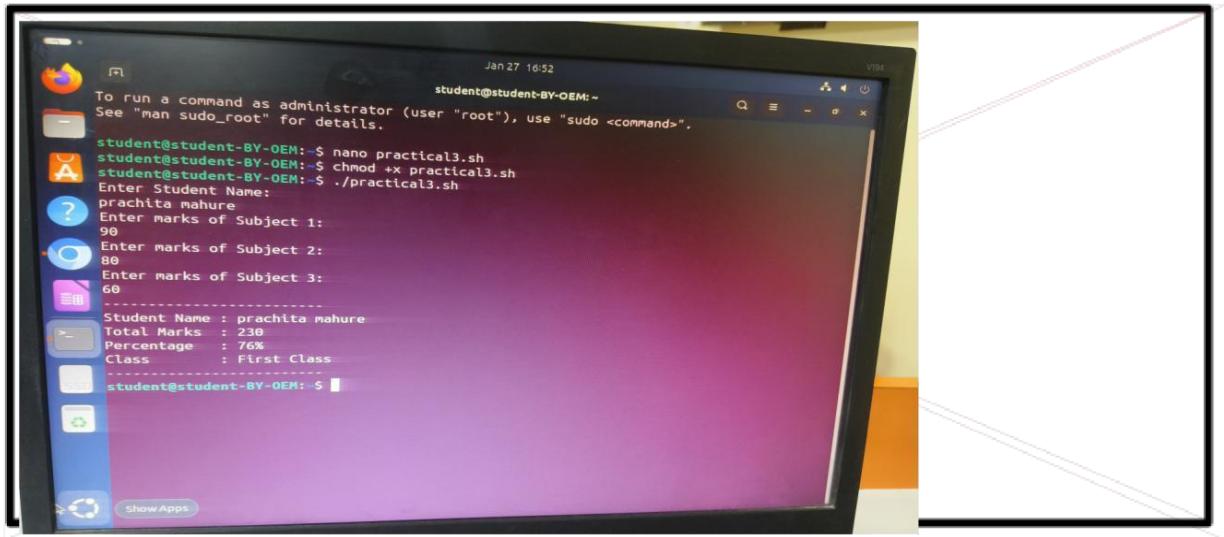
echo "Enter marks of Subject 1:"
read m1
echo "Enter marks of Subject 2:"
read m2
echo "Enter marks of Subject 3:"
read m3

total=$((m1 + m2 + m3))
percentage=$((total / 3))

if [ $percentage -ge 60 ]; then
    class="First Class"
elif [ $percentage -ge 50 ]; then
    class="Second Class"
elif [ $percentage -ge 40 ]; then
    class="Pass"
else
    class="Fail"
fi

echo "-----"
echo "Student Name : $name"
echo "Total Marks : $total"
echo "Percentage : $percentage%"
echo "Class       : $class"
echo "-----"
```

Output 1:

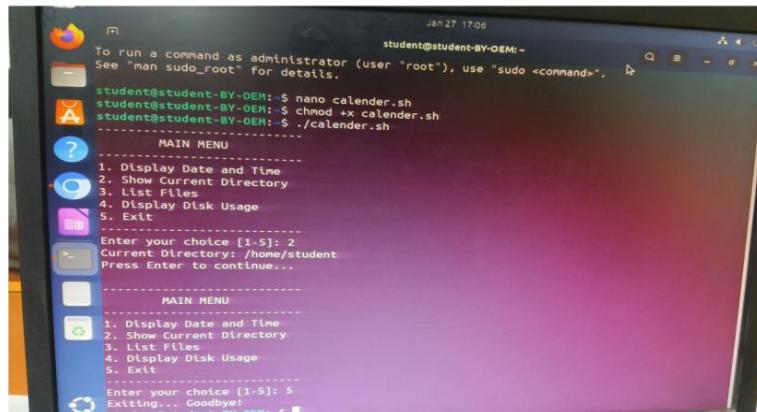


**2. Write a menu driven shell script which will print the following menu and execute the given task.**

- Display calendar of current month.**
- Display today's date and time.**
- Display usernames those are currently logged in the system.**
- Display your terminal number**

```

#!/bin/bash
while true
do
    # Display Menu
    echo "-----"
    echo "      MAIN MENU"
    echo "-----"
    echo "1. Display Date and Time"
    echo "2. Show Current Directory"
    echo "3. List Files"
    echo "4. Display Disk Usage"
    echo "5. Exit"
    echo "-----"
    read -p "Enter your choice [1-5]: " choice
    case $choice in
        1)
            echo "Current Date and Time: $(date)"
            ;;
        2)
            echo "Current Directory: $(pwd)"
            ;;
        3)
            echo "Files in Current Directory:"
            ls -l
            ;;
        4)
            echo "Disk Usage:"
            df -h
            ;;
        5)
            echo "Exiting... Goodbye!"
            exit 0
            ;;
        *)
            echo "Invalid choice! Please select 1-5."
            ;;
    esac
    echo "Press Enter to continue..."
    read
done
```



**3. Write a shell script which will generate first n Fibonacci numbers like:  
1, 1, 2, 3, 5, 13**

```
#!/bin/bash

# Shell Script to generate first n Fibonacci numbers

# Input n
read -p "Enter the number of Fibonacci terms: " n

# Initialize first two terms
a=1
b=1

echo "Fibonacci sequence:"

# Print first n terms
for (( i=1; i<=n; i++ ))
do
    echo -n "$a "
    # Calculate next term
    fn=$((a + b))
    a=$b
    b=$fn
done

echo ""
```

**Output 3**

The screenshot shows a terminal window titled 'student@student-BY-OEM: ~'. The terminal displays the following session:

```
student@student-BY-OEM: ~$ nano fibo.sh
student@student-BY-OEM: ~$ chmod +x fibo.sh
student@student-BY-OEM: ~$ ./fibo.sh
Enter the number of Fibonacci terms: 7
Fibonacci sequence:
1 1 2 3 5 8 13
student@student-BY-OEM: ~$
```

**4. Write a shell script which  
will accept a number b and display first n prime numbers as output.**

```
#!/bin/bash

# Shell script to display first n prime numbers

# Input: number of prime numbers to display
read -p "Enter the number of prime numbers to display: " n

count=0      # To count how many primes are found
num=2        # Number to check for prime

echo "First $n prime numbers:"

while [ $count -lt $n ]
do
    is_prime=1  # Assume num is prime
    # Check if num is divisible by any number from 2 to num-1
    for (( i=2; i*i<=num; i++ ))
    do
        if (( num % i == 0 )); then
            is_prime=0
            break
        fi
    done

    if (( is_prime == 1 )); then
        echo -n "$num "
        ((count++))
    fi

    ((num++))
done

echo ""
```

## Output 4:

```

student@student-BY-OEM: $ nano prime.sh
student@student-BY-OEM: $ chmod +x prime.sh
student@student-BY-OEM: $ ./prime.sh
Enter the number of prime numbers to display: 8
First 8 prime numbers:
2 3 5 7 11 13 17 19
student@student-BY-OEM:-

```

### 5. Write menu driven program for file handling activity

- Creation of file.
- Write content in the file.
- Upend file content.
- Delete file content

```

#!/bin/bash

while true
do
    # Display Menu
    echo "-----"
    echo "      FILE HANDLING MENU"
    echo "-----"
    echo "1. Create a File"
    echo "2. Display File Content"
    echo "3. Copy a File"
    echo "4. Rename a File"
    echo "5. Delete a File"
    echo "6. Exit"
    echo "-----"

    read -p "Enter your choice [1-6]: " choice

    case $choice in
        1)
            read -p "Enter filename to create: " filename
            touch "$filename"
            echo "File '$filename' created successfully."
            ;;

        2)
            read -p "Enter filename to display: " filename
            if [ -f "$filename" ]; then
                echo "Content of '$filename':"
                cat "$filename"
            else
                echo "File '$filename' does not exist."
            fi
            ;;

        3)
            read -p "Enter source filename: " src
            read -p "Enter destination filename: " dest
            if [ -f "$src" ]; then
                cp "$src" "$dest"
                echo "File copied from '$src' to '$dest'."
            else
                echo "Source file '$src' does not exist."
            fi
            ;;

        4)
            read -p "Enter current filename: " oldname
            read -p "Enter new filename: " newname
            if [ -f "$oldname" ]; then
                mv "$oldname" "$newname"
                echo "File renamed from '$oldname' to '$newname'."
            else
                echo "File '$oldname' does not exist."
            fi
            ;;

        5)
            read -p "Enter filename to delete: " filename
            if [ -f "$filename" ]; then
                rm "$filename"
                echo "File '$filename' deleted successfully."
            else
                echo "File '$filename' does not exist."
            fi
            ;;

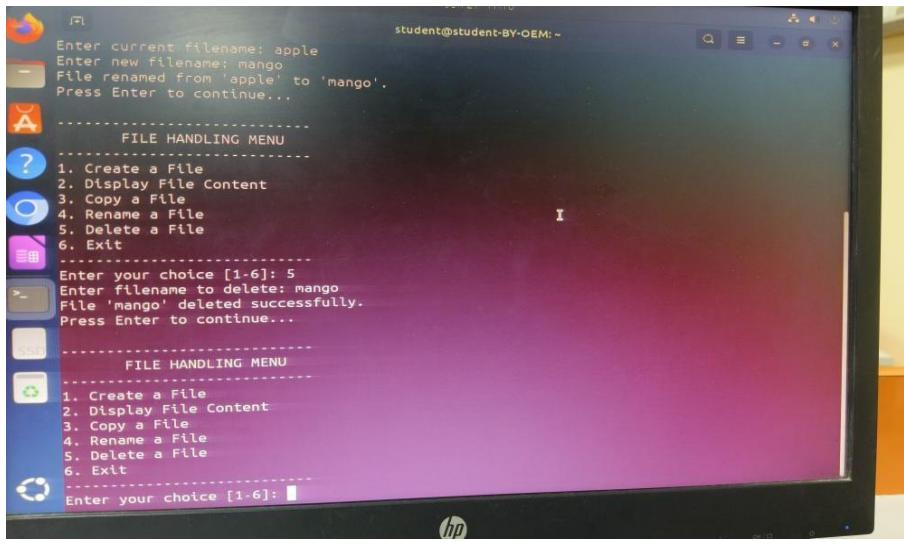
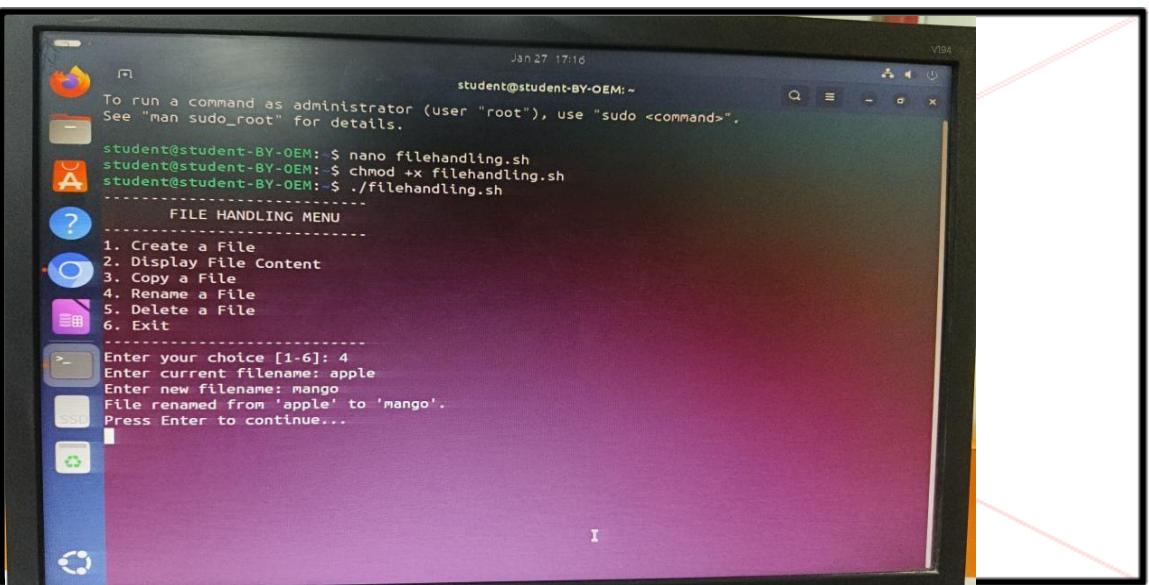
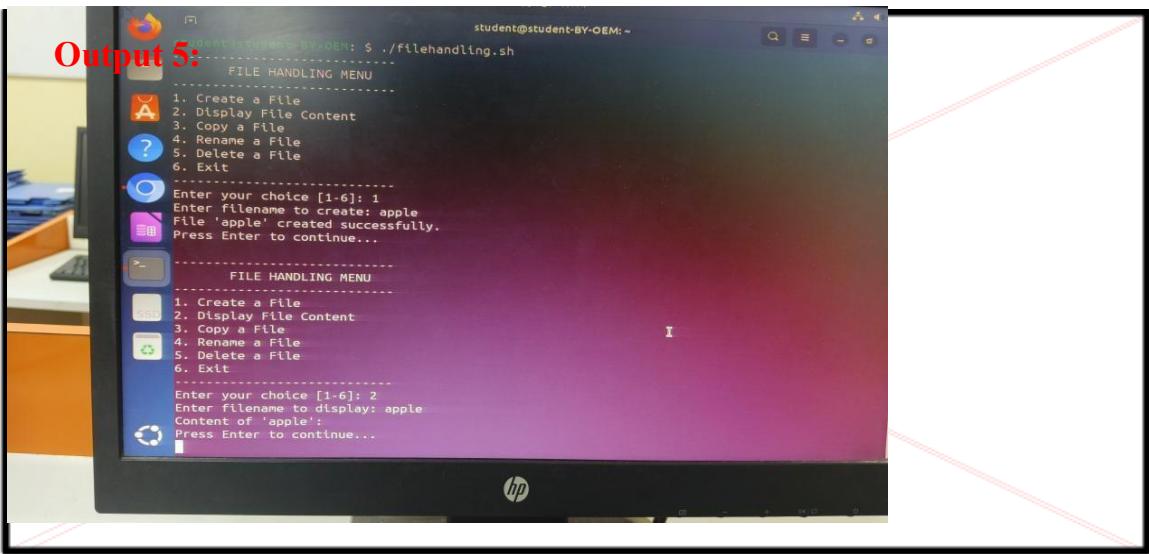
        6)
            echo "Exiting... Goodbye!"
            exit 0
            ;;

        *)
            echo "Invalid choice! Please select 1-6."
            ;;

    esac

    echo "Press Enter to continue..."
    read
done

```



❖ **Conclusion:** In this practical, we conclude that shell scripting efficiently automates tasks like marksheet generation, system information display, number computations, and file management, enhancing system operations and user interaction through command-line utilities.

❖ **Discussion Questions:**

- 1. What is the purpose of using shell scripting in this practical?**
- 2. Which command is used to display the current date and time?**
- 3. How does the script calculate the Fibonacci sequence?**
- 4. Which command is used to create a file in the file management script?**
- 5. How does the prime number script determine if a number is prime?**

❖ **References:**

[https://www.tutorialspoint.com/unix/shell\\_scripting.html](https://www.tutorialspoint.com/unix/shell_scripting.html)  
<https://www.javatpoint.com/shell-scripting-tutorial>

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Signature

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