b) Write a shell program to find factorial of a number.

c) Write a shell program to find gross salary of an employee.

d) Write a shell program to display the menu and execute instructions accordingly

- (i)List of files (ii)Process Status (iii) Date (iv) users in program (v) Quit

Background Study:

A shell script is a file with a set of commands in it. The shell reads this file and executes the instructions as if they were input directly on the command line.

A shell is a command-line interpreter and operations such as file manipulation, program execution and text printing are performed by shell script. So, we will use vi editor to edit our files.

Question Bank:

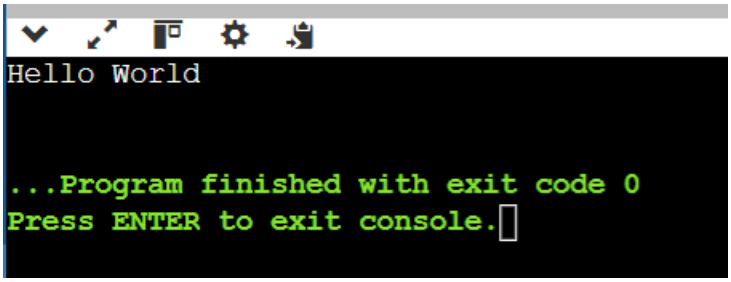
1. What is a shell?
2. What is the significance of $#?
3. What are the different types of commonly used shells on a typical Linux system?
4. How will you pass and access arguments to a script in Linux?
5. Use sed command to replace the content of the file (emulate tac command)

Student Work Area

Algorithm/Flowchart/Code/Sample Outputs/Question Bank Solutions

A

echo "Hello World"



B

main.bash

```bash
#!/bin/bash

# Function to calculate factorial
factorial() {
    if [ "$1" -le 1 ]; then
        echo 1
    else
        prev=$(factorial $(( $1 - 1 )))
        echo $(( $1 * prev ))
    fi
}

# Read number from user
echo "Enter a number: "
read number

# Calculate factorial and print result
if [ "$number" -lt 0 ]; then
    echo "Factorial is not defined for negative numbers."
else
    result=$(factorial "$number")
    echo "The factorial of $number is $result"
fi
```

c)

main.bash

```bash
#!/bin/bash

# Read Basic Salary from user
echo "Enter Basic Salary: "
read basic

# Read HRA and DA as percentages of the basic salary
echo "Enter HRA percentage: "
read hra_percent

echo "Enter DA percentage: "
read da_percent

# Calculate HRA and DA
hra=$(echo "scale=2; $basic * $hra_percent / 100" | bc)
da=$(echo "scale=2; $basic * $da_percent / 100" | bc)

# Calculate Gross Salary
gross_salary=$(echo "scale=2; $basic + $hra + $da" | bc)

# Print the Gross Salary
echo "The Gross Salary is: $gross_salary"
```

d)

main.bash

```bash
#!/bin/bash
# Function to display the menu
show_menu() {
    echo "----------------------------------------"
    echo "Menu:"
    echo "1. List of files"
    echo "2. Process status"
    echo "3. Display current date and time"
    echo "4. Users currently logged in"
    echo "5. Quit"
    echo "----------------------------------------"
    echo "Enter your choice: "
}
```

```
# Infinite loop to keep the menu active until the user chooses to quit
while true; do
    # Display the menu
    show_menu
    # Read user choice
    read choice
    # Execute instructions based on the user's choice
    case $choice in
        1)
            echo "Listing files in the current directory:"
            ls
            ;;
        2)
            echo "Displaying process status:"
            ps
            ;;
        3)
            echo "Displaying current date and time:"
            date
            ;;
        4)
            echo "Displaying users currently logged in:"
            who
            ;;
        5)
            echo "Quitting..."
            break
            ;;
        *)
            echo "Invalid choice! Please select a valid option."
            ;;
    esac
    echo ""  # Print a blank line for readability
done
```

Answer – 1: A shell is a command-line interface to interact with the Linux operating system, allowing users to execute commands, run programs, and manage files. Examples include Bash, Zsh, and Fish.

Answer – 2: In Linux shell scripting, $# represents the number of command-line arguments passed to a script.