

Experiment 8: Shell Programming (Continued)

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Aim:

- To extend shell programming concepts by using conditional statements, advanced scripting constructs, and command-line arguments.
- To practice writing scripts that perform decision-making and parameter handling.

Requirements

- A Linux system with bash shell.
- Text editor and permission to create/execute shell scripts.

Theory

Conditional execution in shell scripts allows branching logic using `if`, `elif`, `else`, and `case` statements. Scripts can accept command-line arguments using `$1`, `$2`, ... and `$@` for all arguments. Control flow constructs combined with user input and arguments allow dynamic and reusable scripts.

Procedure & Observations

Exercise 1: Using `if-else`

Task Statement:

Write a script to check whether a given number is positive, negative, or zero.

Explanation:

We used an `if-elif-else` construct to compare the number against 0.

Command(s):

```
#!/bin/bash
num=$1
if [ $num -gt 0 ]; then
    echo "$num is positive"
elif [ $num -lt 0 ]; then
    echo "$num is negative"
else
    echo "$num is zero"
fi
```

Output:

```
vinit@LAPTOP-P8DCHODS:/mnt/c/Users/HP/OneDrive/Desktop/day 8$ vim if.sh
vinit@LAPTOP-P8DCHODS:/mnt/c/Users/HP/OneDrive/Desktop/day 8$ cat if.sh
#!/bin/bash
num=$1
if [ $num -gt 0]; then
    echo "$num is positive"
elif[ $num -lt 0]; then
    echo "$num is negative "
else
    echo "$num is zerp "
fi
vinit@LAPTOP-P8DCHODS:/mnt/c/Users/HP/OneDrive/Desktop/day 8$ |
```

Exercise 2: Using `case`

Task Statement:

Write a script that takes a character as input and classifies it as vowel, consonant, digit, or special character.

Explanation:

The `case` statement provides pattern matching for multiple options.

Command(s):

```
#!/bin/bash
ch=$1
case $ch in
    [aeiouAEIOU]) echo "$ch is a vowel" ;;
    [bcdfghjklmnpqrstvwxyzBCDFGHJKLMNPQRSTUVWXYZ]) echo "$ch is a consonant" ;;
    [0-9]) echo "$ch is a digit" ;;
    *) echo "$ch is a special character" ;;
esac
```

Output:

```
vinit@LAPTOP-P8DCHODS:/mnt/c/Users/HP/OneDrive/Desktop/day 8$ vim cash.sh
vinit@LAPTOP-P8DCHODS:/mnt/c/Users/HP/OneDrive/Desktop/day 8$ cat cash.sh
#!/bin/bash
ch=$1
case $ch in
    [ aeiouAEIOU]) echo "$ch is a vowel";;
    [bcdfghjjl mnpqrstvwxyz]) echo "$ch is a consonant";;
    [0-9]) echo "$ch is a digit ";;
    *) echo "$ch is a special character";;
esac
vinit@LAPTOP-P8DCHODS:/mnt/c/Users/HP/OneDrive/Desktop/day 8$ |
```

Exercise 3: Command-line arguments

Task Statement:

Write a script that accepts filename(s) as arguments and prints the number of lines in each file.

Explanation:

Command-line arguments are accessed using `$@`. Looping through each argument allows file-wise operations.

Command(s):

```
#!/bin/bash
for file in "$@"; do
    if [ -f "$file" ]; then
        echo "$file: $(wc -l < "$file") lines"
    else
        echo "$file not found"
    fi
done
```

Output:

```
vinit@LAPTOP-P8DCHODS:/mnt/c/Users/HP/OneDrive/Desktop/day 8$ vim loop.sh
vinit@LAPTOP-P8DCHODS:/mnt/c/Users/HP/OneDrive/Desktop/day 8$ cat loop.sh
#!/bin/bash
for file in "$@"; do
    if [-f "$file" ]; then
        echo "$file: $(wc -l < "%file") lines "
    else
        echo "%file not found "
    fi
done
vinit@LAPTOP-P8DCHODS:/mnt/c/Users/HP/OneDrive/Desktop/day 8$ |
```

Exercise 4: Nested conditionals

Task Statement:

Write a script to check if a year is a leap year.

Explanation:

A leap year is divisible by 4, but if divisible by 100 it must also be divisible by 400.

Command(s):

```
#!/bin/bash
year=$1
if (( year % 400 == 0 )); then
    echo "$year is a leap year"
elif (( year % 100 == 0 )); then
    echo "$year is not a leap year"
elif (( year % 4 == 0 )); then
```

```
    echo "$year is a leap year"
else
    echo "$year is not a leap year"
fi
```

Output:

```
vinit@LAPTOP-P8DCHODS:/mnt/c/Users/HP/OneDrive/Desktop/day 8$ vim year.sh
vinit@LAPTOP-P8DCHODS:/mnt/c/Users/HP/OneDrive/Desktop/day 8$ cat year.sh
#!/bin/bash
year=$1
if (( year % 400 == 0 )); then
    echo "$year is a leap year "
elif(( year % 100 == 0 )); then
    echo "$year is not a leap year "
else
    echo "$year is not a leap year "
fi
vinit@LAPTOP-P8DCHODS:/mnt/c/Users/HP/OneDrive/Desktop/day 8$ |
```

Result

- Implemented conditional statements (`if-else`, `case`) in shell scripts.
- Practiced handling command-line arguments and nested conditions.
- Wrote reusable and flexible shell scripts.

Challenges Faced & Learning Outcomes

- Challenge 1: Forgetting to quote variables in conditions — resolved by using "\$var" to avoid word splitting.
- Challenge 2: Pattern matching in `case` — practiced with multiple examples.

Learning:

- Learned practical use of branching and decision-making in shell scripting.
- Understood command-line argument handling for automation.

Conclusion

This experiment extended shell programming by introducing decision-making and parameter handling. The scripts demonstrate the flexibility of shell programming for different use cases.