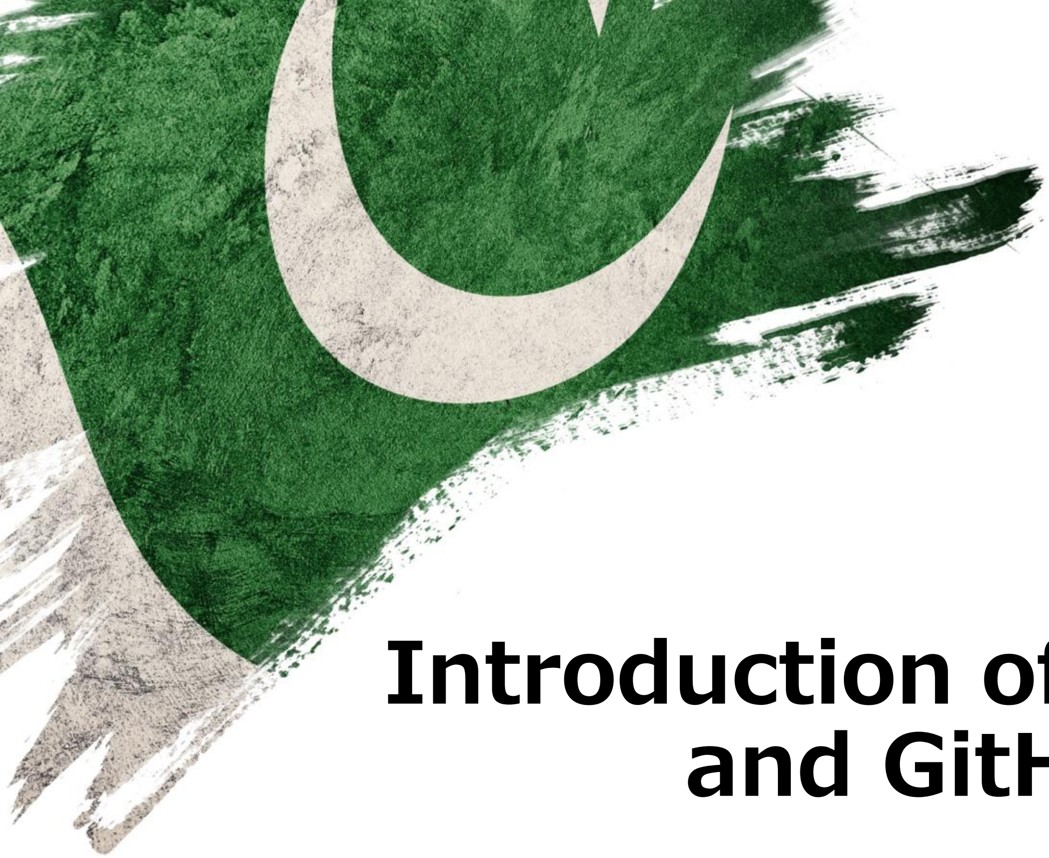

Introduction of Bash scripting language and GitHub for AI engineer

Class 16

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Acknowledgement

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AOTS

Ministry of Economy, Trade and Industry

OVERSEAS EMPLOYMENT CORPORATION OEC

Overseas Employment Corporation

What you have Learnt Last Week

We were focused on following points.

- Usage of control and loop flow statement
- Performing Linear Algebra in Numpy
- Why Requirement Analysis is so important in the process?
- Machine Learning algorithms
- Software development Life cycle
- Importance of Security compliance
- Basic Linux and its networking Commands.

What you will Learn Today

We will focus on following points.

1. Introduction of bash scripting and basic shell commands
2. Write your first bash script and run on the server
3. Variables and Datatypes, control structures, and function in bash
4. Quiz
5. Q&A Session

Introduction to Bash Scripting

What Is a Shell and Bash?

- A **shell** is a command-line interpreter that allows users to interact with the operating system.
- **Bash** (Bourne Again Shell) is the most widely used shell in Linux systems.
- It provides command execution, scripting, variables, conditionals, and loops.

Shell vs Terminal vs Console

Clarifying the Differences

Term	**Description**
Shell	Software that interprets user commands (e.g., Bash, Zsh).
Terminal	An interface (software window) to access the shell.
Console	Physical or virtual device to input/output text commands.

Example: GNOME Terminal runs the Bash shell inside a terminal window on a Linux desktop.

Why Use Bash Scripting?

Power of Automation

- Automate repetitive tasks (e.g., backups, deployments).
- Configure and manage servers.
- Scheduled tasks via cron.
- Lightweight scripting compared to Python or JavaScript.

Use Cases in DevOps:

- Setting up environments
- Automating builds and deployments
- Monitoring logs and services

Getting Help in Bash

Self-Help Tools for Every Command

Tool	Description
man	Opens manual page for a command
--help	Provides inline help (e.g., ls --help)
help	Bash built-in command help

Example:

```
man ls
ls --help
help cd
```

Introduction to Bash Scripts

What Is a Bash Script and How Does It Work?

- A **bash script** is a text file containing a series of commands executed by the Bash shell.
- It automates tasks you normally run manually.
- Bash reads and executes the file line by line.

Example Use Case: Automate system updates or log cleanups.

Creating a Bash Script File

Setting Up Your First Script

Use .sh extension for naming:

```
touch myscript.sh
```

Add the shebang at the top:

```
#!/bin/bash
```

Add a simple command:

```
echo "Hello, this is my first script!"
```

Making the Script Executable

Give It Run Permissions

Use chmod to make it executable:

```
chmod +x myscript.sh
```

Verify with ls -l — you should see x (executable) in permissions.

Running and Debugging a Bash Script

Run and Troubleshoot Easily

Run the script:

```
./myscript.sh
# OR
bash myscript.sh
```

Debug the script line by line:

```
bash -x myscript.sh
```

💡 Useful for finding syntax or logic errors.

Comments and Best Practices

Write Clean and Safe Scripts

Use # for comments:

```
# This script prints hello message
echo "Hello"
```

Best Practices:

- Use clear filenames: backup_logs.sh
- Store scripts in ~/scripts/ or /usr/local/bin/
- Avoid hardcoding sensitive info
- Always review permissions

Bash Variables

Defining and Using Variables

- Define a variable: myvar="Hello"
- Use a variable: echo $myvar
- No spaces around = when assigning
- Quotes help preserve spacing in strings

Special Bash Variables

Built-In Shell Variables

- $0 - Name of the script
- $1, $2, ... - Positional arguments
- $@ - All arguments
- $# - Number of arguments
- $? - Exit status of last command

Working with Strings and Numbers

Operations and Manipulations

- String: greeting="Hello"
- String operations: echo ${#greeting} (length)

Numbers:

num1=5

num2=3

sum=$((num1 + num2))

echo $sum

Reading User Input and Conditional Statements

Using read Command

- read -p "Enter your name: " username
- echo "Welcome, $username"

if, elif, else Blocks

```
if [ $age -ge 18 ]; then
 echo "Adult“
elif [ $age -ge 13 ]; then
  echo "Teenager“
else  echo "Child"fi
```

Use [or test, and -eq, -lt, -ge, etc.

Logical Operators

Using && and ||

- && - Executes second command only if the first succeeds
- || - Executes second if the first fails

```
[ -f file.txt ] && echo "File exists" || echo "File missing"
```

Bash Loops - For Loop and While Loop

Iterating Over Lists

```
for i in 1 2 3 4 5; do
 echo "Number $i“
done
```

Run While Condition is True

```
count=1
while [ $count -le 5 ]; do
echo $count
((count++))
done
```

Bash Loops - Until Loop

Until Condition is True

```
x=1

until [ $x -gt 5 ]; do

  echo $x

 ((x++))

done
```

Case Statements

Cleaner Multiple Condition Handling

```
read -p "Enter a letter: " letter

case $letter in

 a|A) echo "Apple";;

 b|B) echo "Banana";;

  *) echo "Unknown";;

esac
```

Writing Functions in Bash

Organizing Code with Functions

```
say_hello() {

echo "Hello, $1!"}

say_hello "John"
```

Return Values and Scope

Return & Local Variables

```
add()
 {  local sum=$(( $1 + $2 ))
  echo $sum
}


result=$(add 3 4)
echo "Sum: $result"
```

Use local to limit scope within function

Exit Status and Error Handling

Checking Script Success

- Use exit 0 for success, exit 1 for error
- Check with $?:

```
Command
if [ $? -ne 0 ]; then
  echo "Error occurred“
fi
```

Exit Status and Error Handling

Checking Script Success

- Use exit 0 for success, exit 1 for error
- Check with $?:

```
Command
if [ $? -ne 0 ]; then
  echo "Error occurred“
fi
```

Assignment

If Else Example

```
#!/bin/bash
if systemctl is-active --quiet apache; then

   echo "Apache is running."

else

   echo "Apache is not running."

fi
```

```
#!/bin/bash

# Get the input path from the user
echo "Enter the path:"
read path

# Check if it's a file
if [ -f "$path" ]; then
    echo "$path is a file."

# Check if it's a directory
elif [ -d "$path" ]; then
    echo "$path is a directory."

# If it doesn't exist
else
    echo "$path does not exist."
fi
```

Error Handling

```
#!/bin/bash

read -p "Enter GitHub repo URL: " url
dir=$(basename -s .git "$url")

if [ -d "$dir" ]; then
  echo "Directory '$dir' already exists.
Skipping clone."
else
  git clone "$url"
fi
```

- basename extracts repo.git.
- -s .git removes .git suffix.
- Result is repo.
- repo is assigned to variable dir.=

Task 1

Task 1

Create a script with a function that adds two numbers.

Instructions:

Create sum.sh:

Bash Functions and Return Values

bash:

```
#!/bin/bash
add() {
  local sum=$(( $1 + $2 ))
  echo "Sum is: $sum"
}
add 5 10
```

Task 2

Task 2

🎯 **Objective:**

Create a bash script named login.sh that asks the user to

enter a username.

- If the username is **admin**, display: Welcome, admin!
- If the username is anything else, display: Access Denied.

Read Input and Make Decisions

```
#!/bin/bash
read -p "Enter username: " user

if [ "$user" = "admin" ]; then
  echo "Welcome, admin!"
else
  echo "Access Denied."
fi
```

Quiz Section

Quiz

Everyone student should click on submit button before time ends otherwise MCQs will not be submitted

[Guidelines of MCQs]

1. There are 20 MCQs
2. Time duration will be 10 minutes
3. This link will be share on 12:25pm (Pakistan time)
4. MCQs will start from 12:30pm (Pakistan time)
5. This is exact time and this will not change
6. Everyone student should click on submit button otherwise MCQs will not be submitted after time will finish
7. Every student should submit Github profile and LinkedIn post link for every class. It include in your performance

Assignment

Assignment should be submit before the next class

[Assignments Requirements]

1. Create a post of today's lecture and post on LinkedIn.
2. Make sure to tag @Plus W @Pak-Japan Centre and instructors LinkedIn profile
3. Upload your code of assignment and lecture on GitHub and share your GitHub profile in respective

   your region group WhatsApp group
4. If you have any query regarding assignment, please share on your region WhatsApp group.
5. Students who already done assignment, please support other students

Q&A Session

ありがとうございます。
Thank you.
شكريا

+W

For the World with Diverse Individualities