Assignment 3 – Modify an Existing Script

Objective

> Enhance and customize a script by adding user input and validation.

Tasks Overview

- Select a script from `Scripts/` (e.g., `print_numbers.sh`)
- Modify it so the user provides start, end, and step values as input
- Validate inputs (e.g., step must be positive)
- Save as `enhanced_numbers.sh`
- Explain original vs. new behavior and show example runs

Original Script: `print_numbers.sh`

Purpose

Prints numbers from 1 to 5.

Original Script Content

```
#!/bin/bash
for i in {1..5}
do
  echo $i
done
```

Line-by-Line Explanation

1. `#!/bin/bash`

   > Specifies the script should run with the Bash shell.

2. `for i in {1..5}`

   > Loops through numbers 1 to 5.

3. `do ... done`

   > Marks the start and end of the loop block.

4. `echo $i`

> Prints the current number.

🛠️ Enhanced Script: `enhanced_numbers.sh`

📄 New Features

- User provides **start**, **end**, and **step** values as command-line arguments.
- Script validates that **step** is positive and all inputs are integers.

🧩 Enhanced Script Content

```
#!/bin/bash
# Usage: ./enhanced_numbers.sh <start> <end> <step>

if [ $# -ne 3 ]; then
  echo "Usage: $0 <start> <end> <step>"
  exit 1
fi

start=$1
end=$2
step=$3

# Validate that step is positive
if ! [[ $step =~ ^[1-9][0-9]*$ ]]; then
  echo "Error: Step must be a positive integer."
  exit 1
fi

# Validate that start and end are integers
if ! [[ $start =~ ^-?[0-9]+$ && $end =~ ^-?[0-9]+$ ]]; then
  echo "Error: Start and end must be integers."
  exit 1
fi

for ((i=start; i<=end; i+=step)); do
  echo $i
done
```

📝 Line-by-Line Explanation

1. `if [ $# -ne 3 ]; then ... fi`

   > Checks if exactly 3 arguments are provided; if not, prints usage and exits.

2. `start=$1`, `end=$2`, `step=$3`

   > Assigns command-line arguments to variables.

3. `if ! [[ $step =~ ^[1-9][0-9]*$ ]]; then ... fi`

   > Validates that step is a positive integer.

4. `if ! [[ $start =~ ^-?[0-9]+$ && $end =~ ^-?[0-9]+$ ]]; then ... fi`

   > Validates that start and end are integers.

5. `for ((i=start; i<=end; i+=step)); do ... done`

   > Loops from start to end, incrementing by step, and prints each number.

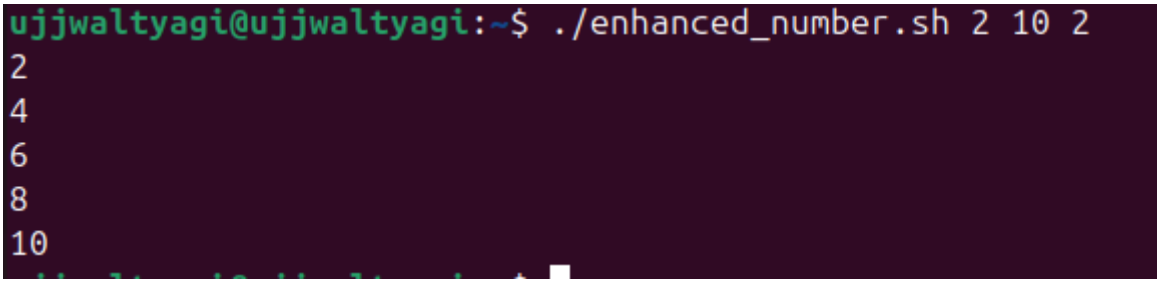
🔄 Original vs. Enhanced Behavior

Feature	Original (`print_numbers.sh`)	Enhanced (`enhanced_numbers.sh`)
Range	Fixed (1 to 5)	User-defined (start, end, step)
Input	None	Command-line arguments
Validation	None	Checks for valid integers and step > 0
Flexibility	Low	High

▶️ Example Runs

Example 1:

```
$ bash enhanced_numbers.sh 2 10 2
2
4
6
8
10
```



Example 2 (Invalid Step):

```
$ bash enhanced_numbers.sh 1 5 0
Error: Step must be a positive integer.
```

```
ujjwaltyagi@ujjwaltyagi:~$ ./enhanced_number.sh 1 5 0
Error: Step must be a positive integer.
```

❓ Extra Questions

1️⃣ What is the difference between `$1`, `$@`, and `$#` in bash?

- `$1`: The first command-line argument to the script.
- `$@`: All command-line arguments as separate words.
- `$#`: The number of command-line arguments.

2️⃣ What does `exit 1` mean in a script?

> `exit 1` ends the script with a status code of 1, indicating an error occurred.

✨ **End of Assignment 3 – Script Enhancement & Explanation**