Hands-on Lab: Advanced Bash Scripting

Estimated time needed: **30** minutes

Welcome to this hands-on lab, where you will take your Bash scripting chops to the next level. The skills you practice here will serve as logical building blocks for an endless variety of scripting applications. These concepts will also be essential for demonstrating your new skills in the Final Project for this course.

As you develop your Bash scripts, it's always recommended that you test your results at each stage to ensure your logic is behaving as expected. Think of each stage as a building block of your final script that accomplishes an easily digestible sub-task.

Learning Objectives

After completing this lab, you will be able to:

- Run sets of commands using conditional statements
- Create `true`/`false` comparisons with logical operators
- Use arithmetic operators to perform basic mathematical calculations
- Use list-like arrays to store and access data
- Execute repetitive tasks with `for` loops

About Skills Network Cloud IDE

Skills Network Cloud IDE (based on Theia and Docker) provides an environment for hands-on labs for course and project related labs. Theia is an open-source IDE (Integrated Development Environment) that can be run on a desktop or on the cloud. To complete this lab, we will be using the Cloud IDE based on Theia running in a Docker container.

Important notice about this lab environment

Please be aware that sessions for this lab environment are not persisted. Every time you connect to this lab, a new environment is created for you. Any data you may have saved in the earlier session would get lost. Plan to complete these labs in a single session to avoid losing your data.

Exercise 1 - Using conditional statements and logical operators

In this exercise, you will create a simple Bash script containing a conditional statement to handle the following tasks:

- Prompt the user for a `Yes` or `No` response to a question
- Print a response based on the user's answer

1.1. Create a new Bash script

Create a Bash script file and make it executable.

▶ Click here for Hint
▶ Click here for Solution

1.2. Query the user and store their response

Now get your script to:

1. Ask the user a binary "yes or no" question of your choosing
2. Store the user's answer in a variable.

▶ Click here for Hint
▶ Click here for Solution

1.3. Use a conditional block to select a response for the user

Finally, use a conditional block to print a message to the user based on their response to your query.

Tip: It's best practice to also handle the case where the reponse doesn't match any of the allowable responses.

▶ Click here for Hint
▶ Click here for Solution

Exercise 2 - Performing basic mathematical calculations and numerical logical comparisons

In this exercise, you will create a Bash script that performs basic arithmetic calculations on two integers entered by the user. You will also use logical comparisons to determine which calculation leads to the greatest result.

2.1. Create a Bash script

Create an executable Bash script that prompts the user for two integers, then stores and prints both the sum and product of the two integers.

▶ Click here for Hint
▶ Click here for Solution

2.2. Add logic to your script

Add logic to your script that determines whether the sum is greater than, less than, or equal to the product. Display an appropriate statement corresponding to each possible result.

Assume the user inputs two integers. Don't worry about handling the case where the user inputs a non-integer string by mistake.

▶ Click here for Hint
▶ Click here for Solution

Exercise 3 - Using arrays for storing and accessing data within *for* loops

In this exercise, you will create a report based on a supplied dataset using the CSV format. You will extract the columns of the dataset into separate arrays and create a new column using arithmetic and array logic. Finally, you will combine the dataset with the new column and save the resulting report as a CSV file.

3.1. Download a CSV file to your current working directory

The file, `arrays_table.csv`, is located at the following url:

```
https://cf-courses-data.s3.us.cloud-object-storage.appdomain.cloud/IBM-LX0117EN-SkillsNetwork/labs/M3/L2/arrays_table.csv
```

▶ Click here for Hint
▶ Click here for Solution

3.2. Display the CSV file to understand what it looks like

▶ Click here for Hint
▶ Click here for Solution

3.3. Create a Bash script that parses table columns into 3 arrays

▶ Click here for Hint
▶ Click here for Solution

3.4. Create a new array as the difference of the third and second columns.

Initialize your new array with a header (a column name), and remember to validate your results.

▶ Click here for Hint 1
▶ Click here for Hint 2
▶ Click here for Solution

3.5. Create a report by combining your new column with the source table

Save your report as a CSV file.

Remember to validate your results.

▶ Click here for Hint 1
▶ Click here for Hint 2
▶ Click here for Solution

Conclusion

Congratulations! You have just completed a hands-on lab using advanced Bash scripting logic.

In this lab, you learned that you can use:

- Conditional statements to run commands based on whether a specified condition is `true` or `false`
- Logical operators to make `true`/`false` operators
- Arithmetic operators to perform basic mathematical calculations
- List-like arrays to store and access data
- `for` loops to execute repetitive tasks

You covered a lot of material here that will be very useful going forward. You will encounter similar problems in your practice and final projects and, best of all, in your career! Remember - you can always come back and review your labs.

> **Tip**: It is worth noting that had we been only interested in efficiency, one of the steps could have been avoided. Specifically, you could have redirected your calculations to a text file line-by-line rather than storing them in an array and then writing the array to file.

Finally, we encourage you to post a review and a rating for this course at any time!

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