**Activity overview**

Previously, you discussed how the Bash shell helps you communicate with a computer’s operating system.

When you communicate with the shell, the commands in the shell can take input and return output or error messages.

In this lab activity, you’ll use the echo command to examine how input is received and how output is returned in the shell. Next, you’ll use the expr command to further explore input and output while performing some basic calculations in the shell.

This activity will build foundations in understanding how you communicate with the Linux operating system through the shell. As a security analyst, you'll need to input commands into the shell and recognize when the shell returns either output or an error message.

Next, you'll explore the scenario!

**Scenario**

As a security professional, it’s important to understand the concept of communicating with your computer via the shell.

In this scenario, you have to input a specified string of text that you want the shell to return as output. You'll also need to input a few mathematical calculations so the OS (operating system) can return the result.

Here’s how you’ll do this: **First**, you’ll use the echo command to generate some output in the shell. **Second**, you’ll use the expr command to perform basic mathematical calculations. **Next**, you’ll use the clear command to clear the Bash shell window. **Finally**, you’ll have an opportunity to explore the echo and expr commands further.

Get ready to examine input and output in the Bash shell!

***Note:****The lab starts with your user account, called analyst, already logged in to the Bash shell. This means you can start with the tasks as soon as you click the****Start Lab****button.***Disclaimer:** For optimal performance and compatibility, it is recommended to use either **Google Chrome** or **Mozilla Firefox** browsers while accessing the labs.

**Start your lab**

Before you begin, you can review the instructions for using the Qwiklabs platform under the **Resources** tab in Coursera.

If you haven't already done so, click **Start Lab**. This brings up the terminal so that you can begin completing the tasks!

When you have completed all the tasks, refer to the **End your Lab** section that follows the tasks for information on how to end your lab.

**Task 1. Generate output with the echo command**

The echo command in the Bash shell outputs a specified string of text. In this task, you’ll use the echo command to generate output in the Bash shell.

1. Type echo hello into the shell and press **ENTER**.

The hello string should be returned:

hello

The command echo hello is the **input** to the shell, and hello is the **output** from the shell.

1. Rerun the command, but include quotation marks around the string data. Type echo "hello" into the shell and press **ENTER**.

The hello string should be returned again:

hello

***Note:****The output is the same as before. The quotation marks are****optional****in this case, but they tell the shell to group a series of characters together. This can be useful if you need to pass a string that contains certain characters that might be otherwise misinterpreted by the command.*

1. Use the echo command to output your name to the shell.

Type echo "name" into the shell, replacing "name" with your own name, and press **ENTER**.

The name you’ve entered as the string should return as the output.

Click **Check my progress** to verify that you have completed this task correctly.

You have completed this task and used the echo command to output the strings to the shell.

Generate output with the echo command

Check my progress

*You have completed this task and used the echo command to output the strings to the shell.*

**Task 2. Generate output with the expr command**

In this task, you’ll use the expr command to generate some additional output in the Bash shell. The expr command performs basic mathematical calculations and can be useful when you need to quickly perform a calculation.

Imagine that the system has shown you that you have 32 alerts, but only 8 required action. You want to calculate how many alerts are false positives so that you can provide feedback to the team that configures the alerts.

To do this, you need to subtract the number of alerts that required action from the total number of alerts.

1. Calculate the number of false positives using the expr command.

Type expr 32 - 8 into the shell and press **ENTER**.

The following result should be returned:

24

***Note:****The expr command requires that all terms and operators in an expression are separated by spaces. For example: expr 32 - 8, and****not****expr 32-8.*

**Now**, you need to calculate the average number of login attempts that are expected over the course of a year. From the information you have, you know that an average of 3500 login attempts have been made each month so far this year.

So, you should be able to calculate the total number of logins expected in a year by multiplying 3500 by 12.

1. Type expr 3500 \* 12 into the shell and press **ENTER**.

The correct result should now be returned:

42000

Click **Check my progress** to verify that you have completed this task correctly.

You have completed this task and successfully used the expr command to perform basic mathematical calculations.

Generate output with the expr command

Check my progress

*You have completed this task and successfully used the expr command to perform basic mathematical calculations.*

**Task 3. Clear the Bash shell**

In this task, you’ll use the clear command to clear the Bash shell of all existing output. This allows you to start with the cursor at the top of the Bash shell window.

When you work in a shell environment, the screen can fill with previous input and output data. This can make it difficult to process what you’re working on. Clearing the screen allows you to create a clutter-free text environment to allow you to focus on what is important at that point in time.

* Type clear into the shell and press **ENTER**.

***Note:****All previous commands and output will be cleared, and the user prompt and cursor will return to the upper left of the shell window.*

Click **Check my progress** to verify that you have completed this task correctly.

You have completed this task and cleared the Bash shell display.

Clear the Bash shell

Check my progress

*You have completed this task and cleared the Bash shell display.*

**Optional task: Perform more calculations with the expr command**

You have the opportunity to explore input and output further using the echo and expr commands.

1. Generate at least one new output using the echo command.

(Remember the echo "hello" output you generated).

1. Perform at least one new calculation using the expr command.

The mathematical operators you can use with the expr command for **adding, subtracting, dividing,** and **multiplying** are +, -, / and \*.

***Note:****The expr command performs integer mathematical calculations only, so you cannot use the decimal point or expect a fractional result. All results are rounded down to the nearest integer. Also, all terms and operators in an expression need to be separated by spaces. For example: expr 25 + 15, and****not****expr 25+15.*

**Conclusion**

Great work!

You now have practical experience in using basic Linux Bash shell commands to

* generate output with the echo command,
* generate output with the expr command, and
* clear the Bash shell with the clear command.

Understanding input and output is essential when communicating through the shell. It’s important that you’re comfortable with these basic concepts before you go on to work with additional commands.

**End your lab**

Before you end the lab, make sure you’re satisfied that you’ve completed all the tasks, and follow these steps:

1. Click **End Lab**. A pop-up box will appear. Click **Submit** to confirm that you're done. Ending the lab will remove your access to the Bash shell. You won’t be able to access the work you've completed in it again.
2. Another pop-up box will ask you to rate the lab and provide feedback comments. You can complete this if you choose to.
3. Close the browser tab containing the lab to return to your course.
4. Refresh the browser tab for the course to mark the lab as complete.