# Lesson Plan 1.03: Script Mode and Variables

## Learning Objectives

Students will be able to...
* Define and identify: **script**, **print**, **run**, **output**, **variable**
* Write a simple script and run it in the IDE
* Print values out to the console (both composed values and from variables)
* Compare script mode vs interactive mode
* Know how to store a value into a variable

## Materials/Preparation

* [Do Now]
* [Lab - Printing & Variables] ([printable lab document]) ([editable lab document])
* [Associated Reading - section 1.2](https://tealsk12.gitbook.io/intro-cs-2/readings#1-2)
* Read through the Do Now, Lab, and Lesson so that you are familiar with the requirements and can assist students.

## Pacing Guide

| **Duration** | **Description** |
| ---------- | ------------------ |
| 5 Minutes | Do Now |
| 20 Minutes | Printing Lesson/Lab Part 1 |
| 20 Minutes | Variables Lesson/Lab Part 2 |
| 10 Minutes | Debrief |

## Instructor's Notes

### 1. Do Now

* Project the Do Now on the board, circulate around the class to check that students are working and understand the instructions.

### 2. Printing Lesson/Lab Part 1

* Explain that the file is the center section of the screen. Sometimes this is called a **script**.
* Reminder questions: 1. how do you save/run a file? 2. What happened when you ran the file from the do now?
* Explain the purpose of the `print` statement, which will print whatever is in between the parentheses to the console.
* Explain to students that what appears on the console is called **output**
* Talk to students about reading a program and the order in which the computer executes statements.
* Ask students how they would print the following:
```python
Hello World Hello World Hello World Hello World Hello World
```
* Have students work on Part 1 of the lab for 10 Minutes

#### SNAP Flashback – Hello World

![Hello World](HelloWorld-Code.png)

### 3. Variables Lesson/Lab Part 2

* **Variable**: a name that refers to a value
* An assignment statement creates new variables and gives them values:
```python
>>> message = 'And now for something completely different'
>>> n = 17
>>> pi = 3.1415926535897932
```
* Ask the students what they think the assignment operator is.
* Using the example above, ask which are the variables, and which are the values.
* Tell students how assignments work from right to left, so the item on the right is assigned to the item on the left.
* Have students work on Part 2 of the lab for 10 Minutes

### 4. Four Fours

* Four Fours is a mathematical puzzle where the goal is to find a mathematical expression for every whole number from 0 to some maximum, using only common mathematical symbols and the digit 4 (no other digit is allowed).
* In this version, students can use use 44 which counts as two fours even though equations for 0 to 4 can be solved without using 44.
* For example, zero can be solved with either: 44 - 44 or 4 + 4 - 4 - 4
* Students can easily be challenged by extending the limit from the 0-4 to 5 and above.

### 5. Debrief

* Talk about the difference between interactive and script mode. Discuss why you might want to use the interpreted mode: sometimes it can be faster to debug a single line and make sure it works!
* Talk about differences between SNAP! and Python for declaring variables.

## Accommodation/Differentiation

If students are moving quickly, ask students to come up with a way to print two lines with only one print statement. Allow for students to search the `\n` character.

[Lab - Printing & Variables]:lab.md.html
[Do Now]:do_now.md.html

## Forum discussion

[Lesson 1.03: Script Mode and Variables (TEALS Discourse Account Required)](https://forums.tealsk12.org/c/2nd-semester-unit-1/1-03-script-mode-and-variables)

[printable lab document]: https://github.com/TEALSK12/2nd-semester-introduction-to-computer-science/raw/master/units/1_unit/03_lesson/lab.pdf
[editable lab document]: https://github.com/TEALSK12/2nd-semester-introduction-to-computer-science/raw/master/units/1_unit/03_lesson/lab.docx