

## Lab Activity

Week 3: Variables and Data Types

Duration: 55 minutes — Work in pairs!

Name: \_\_\_\_\_ Partner: \_\_\_\_\_

### Lab Goals

By the end of this lab, you will be able to:

- Create variables to store different types of data
- Understand how Python stores values in memory
- Work with integers, floats, strings, and booleans
- Draw memory diagrams to visualize variables

### Getting Started

1. Extract the given [week3\\_lab.zip](#) file to your desktop. This folder contains all the files you need for this lab.

## 1 Exercise 1: Let's Create Variables! (7 minutes)

Open the template file [week3\\_ex1.py](#) in Thonny. Type this code exactly as shown and run it:

```
1 name = "Ahmed"
2 age = 13
3 height = 5.2
4 is_student = True
5
6 print("Name:", name)
7 print("Age:", age)
8 print("Height:", height)
9 print("Is student?", is_student)
```

 **Checkpoint:** Show your teacher the output before moving on!

Now modify the code:

- Change the name to your own name
- Change the age to your age
- Add a new variable called `favorite_subject` and set it to your favorite subject
- Print the new variable too

 **Tip:** Variables are like labeled boxes that store values. The = sign puts a value into the box!

## 2 Exercise 2: Complete the Variable Program (6 minutes)

Open the file `week3_ex2.py` in Thonny. This program is about your school. Replace the blanks with your code to make this program work:

```

1 # Program about my school
2 school_name = _____ # Put your school name in quotes
3 students_in_class = _____ # Number of students (no quotes!)
4 lunch_break_minutes = 30.0 # This is already correct
5 has_computer_lab = _____ # Should be True or False
6
7 print("My school:", _____) # Which variable shows school name?
8 print("Students in my class:", students_in_class)
9 print("Lunch break:", lunch_break_minutes, "minutes")
10 print("Has computer lab?", _____) # Which variable is suitable for this?
    
```

Test your understanding:

- Why does `school_name` need quotes but `students_in_class` doesn't?

\_\_\_\_\_

- What type of data is `lunch_break_minutes`? (hint: it has a decimal point)

\_\_\_\_\_

✔ **Checkpoint:** All variables printing correctly? Excellent!

## 3 Exercise 3: Memory Diagram Practice (8 minutes)

👥 **Pair Programming:** Switch who types every 5 minutes!

Let's visualize how Python stores variables in memory. Create a new file in thonny, you are not required to save it. Just run it to see the output.

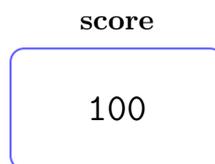
**Step 1:** Run this code:

```

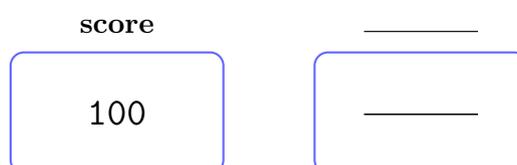
1 score = 100
2 player = "Ali"
3 bonus = 50
4 score = score + bonus
    
```

**Step 2:** Draw what happens in memory:

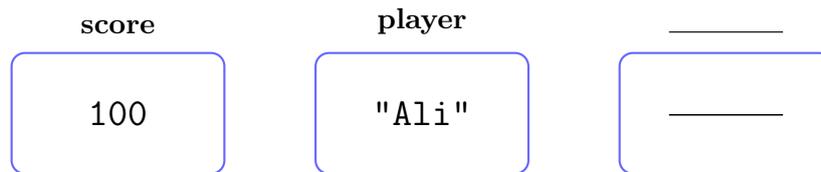
After line 2 (`score = 100`):



After line 3 (`player = "Ali"`):



After line 4 (bonus = 50):



After line 5 (score = score + bonus):



**Tip:** When we change a variable's value, Python updates what's in the box!

## 4 Exercise 4: Experiment with Data Types (10 minutes)

**Pair Programming:** Switch who types every 5 minutes!

Let's explore how different data types behave. Create a new file in Thonny, you don't have to save it, just run it to see the output.

**Step 1:** Type the following code:

```

1 my_int = 42
2 my_float = 42.0
3 my_string = "42"
4 my_bool = True
5
6 print(type(my_int))
7 print(type(my_float))
8 print(type(my_string))
9 print(type(my_bool))
    
```

**Step 2:** Try these experiments (run after each change):

1. What happens if you add `print(my_int + my_float)` after line 9?  
Result: \_\_\_\_\_
2. What happens if you add `print(my_int + my_string)`?  
Result: \_\_\_\_\_

**Tip:** Python is picky about mixing different types. Strings (text) and numbers don't mix without conversion!

## 5 Exercise 5: Pakistani Rupee Calculator (12 minutes)

Create a new file in Thonny. Write a program that:

1. Stores the price of samosas in rupees
2. Stores how many samosas you want to buy

3. Calculates and displays the total cost
4. Adds a student discount (10%)

**Example Output:**

```
Price per samosa: Rs. 20
Number of samosas: 5
Total cost: Rs. 100
After student discount: Rs. 90.0
```

**Bonus:** Can you add a variable for the student’s name and make the output more personal?

✔ **Checkpoint:** Calculator working with correct discount? Show it to your teacher!

👥 **Pair Programming:** Switch who types every 5 minutes!

## 6 Exercise 6: What Will Happen? (5 minutes)

Before running this code, predict what it will output:

```
1 x = 10
2 y = 4
3 z = x / y
4 x = 5
5 print("x =", x)
6 print("y =", y)
7 print("z =", z)
```

**Your prediction:**

- x = \_\_\_\_\_
- y = \_\_\_\_\_
- z = \_\_\_\_\_

Now open [week3\\_ex6.py](#) file and run it. Were you correct?  Yes  No

If not, can you explain why z didn’t change when x changed?

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## 7 Exercise 7: Fix the Variable Issues (7 minutes)

Open the file [week3\\_ex7.py](#) in Thonny. This code has 4 issues. Work with your partner to find and fix them:

```
1 # Broken code - fix me!
2 Name = "Sara"
3 print(name)
4
5 age = "fourteen"
6 next_age = age + 1
7
8 height = 5.5
9 Height = height + 0.1
```

```

10 print(height)
11
12 2nd_grade = 85
13 print("Grade:", 2nd_grade)
    
```

**Hints:**

- Error 1: Check the capital letter - variable names are case-sensitive!
- Error 2: Can you add a number to text?
- Error 3: Did we update the right variable?
- Error 4: Variable names can't start with numbers!

✔ **Checkpoint:** Fixed code runs without errors? Show your teacher!

## 8 Lab Summary

✔ **Checkpoint:** Final checkpoint - make sure you have:

- Completed all exercises with your partner
- Drawn at least one memory diagram
- Understood the difference between = and == (*assignment vs comparison*)
- Shown all checkpoints to your teacher

### Reflection (2 minutes)

Rate your understanding of today's concepts:

Concept	☹️ Need Help	😬 Getting It	😊 Got It!
Creating variables	○	○	○
Different data types	○	○	○
Memory diagrams	○	○	○
Type conversion	○	○	○

One thing I learned today: \_\_\_\_\_

One thing I'm still confused about: \_\_\_\_\_

😊 **Great work with variables today!**