## Lab Exercise 1. Variables, assignment, types and operators

**1.** What is a Python comment? How do you indicate a comment? What purpose does it serve?

**- Commenting in python is indicated by a # for single line or (“””) for multiline**

**2.** What is a namespace in Python?

**- A namespace is the table that contains the association of a name with a value**

**3.** Whitespace:  
  
(a) When does whitespace matter? **Leading whitespaces define indentation and have a special role in Python to group blocks of code**  
(b) When does whitespace not matter? **When you are assigning values, doing math, comparing, etc.**

**4.** Mixed operations:

(a) What type results when you divide an integer by a float? A float by an integer?

**- always a float**

(b) Explain why that resulting type makes sense (as opposed to some other type).

**- Division more that often produces non-integer values so the resulting type being a float makes the most sense as it can represent both whole numbers and fractional numbers.**

**5.** Consider integer values of a, b, and c and the expression (a + b) \* c. In mathematics, we can substitute square brackets, [ ], or curly braces, { }, for parentheses, ( ). Is that same substitution valid in Python? Try it.

- **No, each set of square brackets, curly braces or parantheses have a purpose for different things (lists,arrays/dictionaries,sets)**

**6.** Which of the following are acceptable variable names for Python?

(a) xyzzy **-** **yes**

(b) 2ndVar **– no, starts with a number**

(c) rich&bill **– no, has a special character**

(d) longname **- yes**

(e) good2go **- yes**

**7.** Give the values printed by the following program for each of the labeled lines.

int\_a = 27

int\_b = 5

int\_a = 6

print(int\_a) *# Line 1*

print(int\_b + 5) *# Line 2*

print(int\_b) *# Line 3*

(a) What is printed by Line 1? **- 6**

(b) What is printed by Line 2? **- 10**

(c) What is printed by Line 3? **- 5**

**8.** Give the values printed by the following program for each of the labelled lines, and

answer the associated questions.

a\_float = 2.5

a\_int = 7

b\_int = 6

print(a\_int / b\_int) *# Line 1*

print(a\_int // a\_float) *# Line 2*

print(a\_int % b\_int) *# Line 3*

print(int(a\_float)) *# Line 4*

print(float(a\_int)) *# Line 5*

(a) Line 1: What is printed? What is its type? **1.1666666666666667, float**

(b) Line 2: What is printed? What is its type? **2.0, float**

(c) Line 3: What is printed? What is its type? **1, int**

(d) Line 4: What is printed? What is its type? **2, int**

(e) Line 5: What is printed? What is its type? **7.0, float**

**9.** Give the values printed by the following program for each of the labelled lines.

a\_int = 10

b\_int = 3

c\_int = 2

print(a\_int + b\_int \* c\_int) *# Line 1*

print( (a\_int + b\_int) \* c\_int ) *# Line 2*

print(b\_int \*\* c\_int) *# Line 3*

(a) What is printed by Line 1? **16**

(b) What is printed by Line 2? **26**

(c) What is printed by Line 3? **9**

**10.** Change the program below to calculate and print the area of a rectangle instead.

**from** math **import** pi

r = 12

area = pi \* r \*\* 2

print(**"The area of a circle with radius"**, r, **"is"**, area)

**l = 4**

**w = 6**

**area = l \* w**

**print("The area of a rectangle with length", l, "and width", w, "is", area**

**11.** Write a Python program that prompts for a number. Take that number, add 2, multiply by 3, subtract 6, and divide by 3. You should get the number you started with.

**number = int(input("Enter a number: "))**

**number = ((((number + 2) \* 3) - 6 ) / 3)**

**print(number)**

**12.** Assignment:

my\_int = 5  
my\_int = my\_int + 3  
print(my\_int)

(a) If you execute the three lines of code, what will be printed? Explain your answer using the rules of assignment.

**- The number 8 will be printed as my\_int’s value was changed after it was assigned**

(b) Rewrite my\_int = my\_int + 3 using the += symbol.

**- my\_int += 3**

**13.** Assignment:

my\_var1 = 7.0  
my\_var2 = 5  
print(my\_var1 % my\_var2)

If you execute these three lines of code, what will be printed? **– 2.0**

**14.** Prompt for input and then print the input as a string, an integer, and a float-point value. What values can you input and print without errors being generated?

**If you input ‘123’ it’ll print as a string, integer and float**

**15.** Consider the expression (a + b) \* c , but with string values for a, b, and c. Enter that into the Python shell. What happens? Why?

**The strings a and b are concatenated and then a typeerror occurs as you cannot multiply a string by a string**

**16.** (Integer operators) One way to determine whether an integer is even is to divide the number by 2 and check the remainder. Write a program that prompts for a number, converts the input to an integer, and prints a 0 when the number is even and a 1 when the number is odd.

**number = int(input("Enter a number: "))**

**if number % 2 == 0:**

**print("Number is even!")**

**else:**

**print("Number is odd!")**

**17.** Body mass index (BMI) is a number calculated from a person’s weight and height. According to the Centers for Disease Control and Prevention, the BMI is a fairly reliable indicator of body fatness for most people. BMI does not measure body fat directly, but research has shown that BMI correlates to direct measures of body fat, such as underwater weighing and dual-energy X-ray absorptiometry. The formula for BMI is

weight / height²

where weight is in kilograms and height in metres.

(a) Write a program that prompts for metric weight and height and outputs the BMI.

**weight = float(input("Enter your weight in kg: "))**

**height = float(input("Enter your height in m: "))**

**bmi = weight / (height \*\* 2)**

**print("Your BMI is: ", bmi)**

(b) Write a program that prompts for weight in pounds and height in inches, converts  
the values to metric, and then calculates the BMI.

**weight = float(input("Enter your weight in pounds: "))**

**height = float(input("Enter your height in inches: "))**

**weight = weight \* 0.453592**

**height = height \* 0.0254**

**bmi = weight / (height \*\* 2)**

**print("Your BMI is: ", bmi)**