COMP10001 Foundations of Computing
Semester 1, 2019

Tutorial Questions: Week 3

— VERSION: 1487, DATE: MARCH 24, 2019 —

Discussion

1. What is a "data type"? Can the data type of an object change?

2. As a class, fill in the below table with the data types we have studied so far. What is the difference between the second and third type, both being numerical?

Type	Example	What does it store?	What can we do with it (functions, operations...)?	How do we convert to it?
	`"Hello"`			
	`123`			
	`3.1415`			
	`True`			

Now try Exercises 1 & 2

3. Why does `0.1 + 0.1 + 0.1 + 0.1 + 0.1 + 0.1 + 0.1 + 0.1 + 0.1 + 0.1` equal `0.9999999999999999` and not `1.0`?

4. What is an "operator"? Which operators have we learned so far and what do they do?

5. What is "operator overloading"? What is the difference between using + with numerical types and strings/sequences?

Now try Exercises 3 & 4

6. What is a "variable"? How do we use variables and why are they helpful?
Bonus question: what is a literal?

7. How does the `input()` function work?

Now try Problems 1, 2 & 3

Exercises

1. Look at the following customer data form, and decide which data types (string, integer, float or boolean) should be used to store each field.

```
Name:
Customer ID:
Address:
Postcode:
Do you own or rent?
Length of bench top:
Width of bench top:
Are you interested in further offers?
```

2. Evaluate the following:

   (a) `str(3 + 4) + "cakes"`

   (b) `int(5 / 2)`

   (c) `float("357"+ "."+ "23")`

   (d) `bool("anything")`

3. What is the output of the following? Why?

   (a) `123 + 123`

   (b) `"123"+ "123"`

   (c) `"123"+ 123`

   (d) `3 * 4`

   (e) `"3"* 4`

   (f) `"3"* "4"`

4. Evaluate the following given the assignments `a = 1, b = 2, c = 2.0`:

   (a) `a / a`

   (b) `b + b`

   (c) `b + c`

   (d) `a / b`

   (e) `a // b`

   (f) `a % b`

   (g) `a + b / c`

   (h) `(a + b) / c`

Problems

1. Write a program which asks the user for their age and calculates the year in which they were born. There will be two possibilities since you haven't taken their birth date, so print both.

2. Write a program which asks the user for two floats and multiplies them together, printing the equation in the form `1.5 * 2.0 = 3.0` for the case of 1.5 and 2.0

3. Write a program which asks the user for a temperature in degrees fahrenheit and prints the conversion into celsius. The formula is below:
$$C = \frac{F - 32}{1.8}$$