# COMP10001 Foundations of Computing
# Semester 2, 2022

### Tutorial Questions: Week 3

— VERSION: 1659, DATE: AUGUST 8, 2022 —

Welcome to the second tutorial. From this week onwards we will be covering a lot of content from lectures and the Grok Worksheets. Attempt the Discussion Questions and Exercises in your tutorial. You may not get time for the Problems in class, but they're good for practice and you can find the solutions on the LMS.

## 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. What is an operator? Which operators have we learned so far and what do they do?
4. What is operator overloading? What is the difference between using `+` with numerical types and strings/sequences?
5. What is a variable? How do we use variables and why are they helpful?
   **Now try Exercises 3 & 4**

   **Extra questions:**
6. How does the `input()` function work?
7. What is a literal?
8. Why does `0.1+0.1+0.1+0.1+0.1+0.1+0.1+0.1+0.1+0.1` evaluate to `0.9999999999999999` rather than `1.0`?

## Exercises

1. Look at the following customer data form, and decide which data types (`str`, `int`, `float`, or `bool`) 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 by hand:

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

   (b) `int(5 / 2)`

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

   (d) `bool("anything")`

3. Evaluate the following by hand, 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`

4. 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"`

## 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 asked for their birth date, so print both.

2. Write a program which asks the user for two integers and multiplies them together, printing the equation in the form `1 * 2 = 2` for the case of 1 and 2.

3. Write a program which asks the user for a temperature in degrees Fahrenheit and prints the corresponding value in Celsius. The conversion formula is below:

$$C = \frac{F - 32}{1.8}$$