

# Scripting in Python

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Python is a programming language commonly used by biologists and many other programmers. It's simple to use but also quite powerful and powers websites like Google, Dropbox, and Reddit. It's named after Monty Python, not the snake. *Typeset conventions*: All code or code-like text is written in `constant-width font`.

## Hello World!

- Copy `/home/emjosephs/hello_world.py` to your own folder. View `hello_world.py` with vim. What do you think the script does?

- Run `hello_world.py` by typing the following command:

```
– python hello_world.py
```

- Does the script do what you thought it would do? What does `print()` do? What does “`#`” mean?
- Edit the script to print out “Hello Nancy!”

## Data types

Variables in python can take a few different forms:

**Integers** are numbers without decimal places.

**Floats** are numbers with decimal places.

**Strings** are sets of non-numeric characters. They have quotes around them.

**Lists** are collections of variables that are stored together.

- Copy `/home/emjosephs/dataTypes.py` to your own directory. View the file in vim. What types of variables are `Var1`, `Var2`, and `Var3`?

- Add together `Var1` and `Var2`. (You can use `print()` to display the answer). What is the sum of `Var1` and `Var2`? What is the sum of `Var3` and `Var2`?

- `myList` in `dataTypes.py` is a list. Add a line to the script that reads

```
– print(myList[1])
```

Write down the output of `dataTypes.py`.

- Try editing that line to read:

```
– print(myList[0:3])
```

What is the output now?

- Add a line to the script that reads:

```
– print(len(myList))
```

What do you think the `len()` function does?

- Edit your script to add another variable to your list. (Hint: you can use `+`). Edit the script to print out the new length of `myList`

- You can also use `[ ]` on **strings**. Edit the script to print out the fourth character in `Var3`. What is it?

## If and else

**If** and **else** statements let you control what happens depending on if certain conditions are true or false.

- Copy `/home/emjosephs/ifElse.py` to your own directory. Open up the file in Vim. Write down what you think will happen when you run this script?
- Run `ifElse.py`. Was your prediction correct?
- Write a new set of **if** and **else** statements to tell you whether the sum of x and y is greater than 25.

## For Loops

For loops let you move through a list of variables and let you do stuff to them.

- Copy `/home/emjosephs/forLoops.py` to your own directory. Open up the script and write down what you think the output will be.
- Write a for loop to read through the list called `myStudents` and print out all the names that have more than 5 letters in them.

## Reading in files

The `open` function lets you read files into your script.

- Copy `/home/emjosephs/readFasta.py` into your folder. Run the script and write down the output.
- Edit `readFasta.py` so that it reads in your own aligned fasta file. Run the script and write down the output.
- Comment out the line that reads `print(line)` and uncomment the line after it. (Hint: comments are any text that comes after a `#`). Write down how the output of the script is different now.