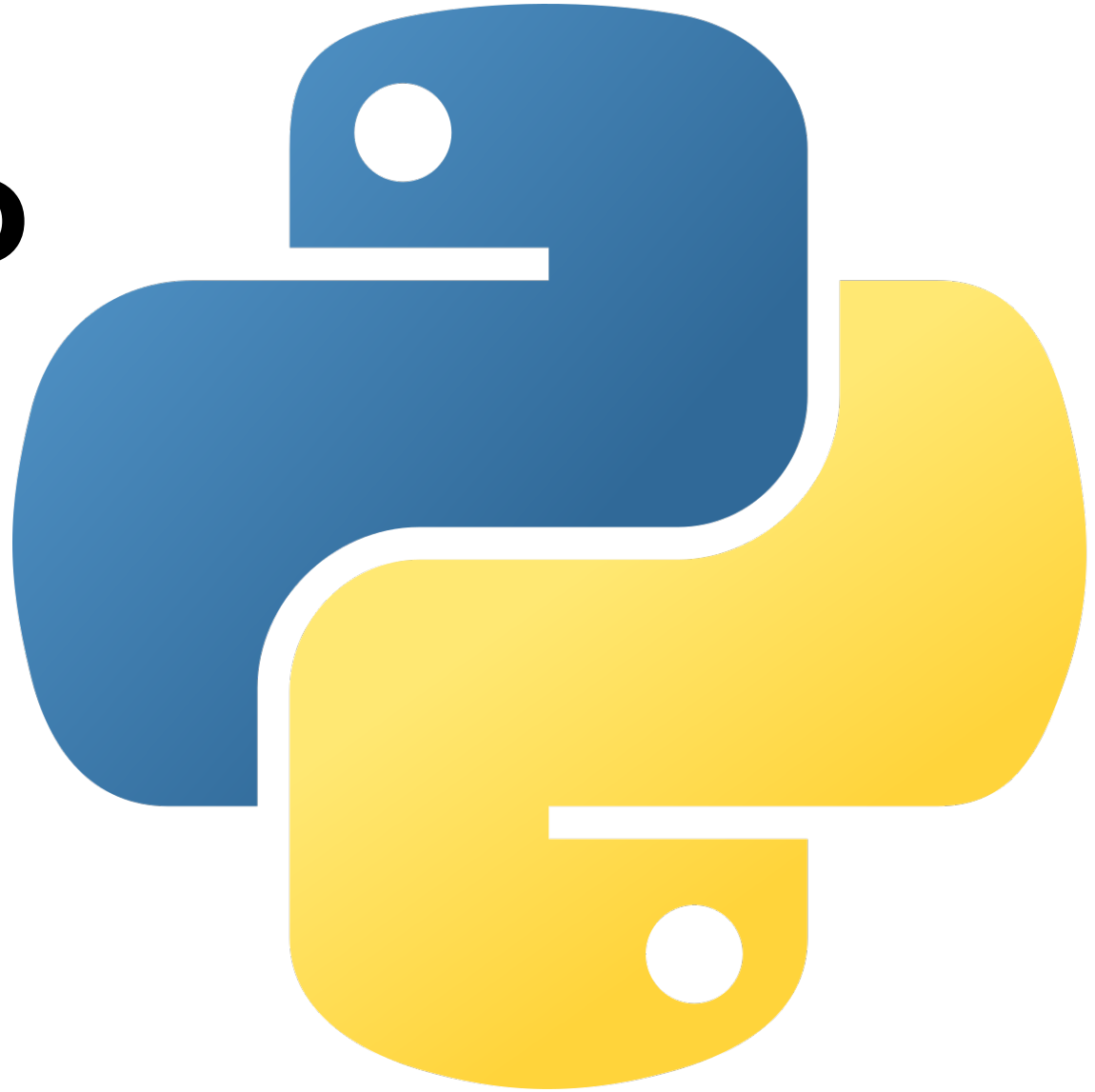
Introduction to python



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What is python?

- General-purpose programming language
- Designed to:
  - be more readable (than java, C++ etc),
  - use fewer lines of code.

Using python

- Python doesn’t have specific interface.
- Can be written in a text file and run in command line.
- A number of editors available:
  - Visual studio code
  - Spyder
  - Pycharm
  - Atom etc.

Key differences from R

- 0-based language
- Uses indentation rather than brackets
- Built more for programming than statistical analysis
- For our purposes, base functions not as helpful*

Operators

- The standard (+, -, *, /,

  ==, != , < , <= , > , >=)
- % - modulus
- ** - exponential
- // - floor division

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- % - modulus
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- // - floor division
- And, or, not, is , is not, in, not in (written)
- &, |, only used to compare binary numbers

Variables

- Can only use ‘=‘ to assign

Assignment operators

- Assignment operators
  - x *n*= 3 → x = x *n* 3
  - Where n can be any operator
  - x*=3 → x = x * 3

Variables

- Can only use ‘=‘ to assign
- Can be text, number, or logical
- Cant assign variable to any of python’s keywords (if using editor will become coloured)

False	def	if	raise
None	del	import	return
True	elif	in	try
and	else	is	while
as	except	lambda	with
assert	finally	nonlocal	yield
break	for	not	
class	from	or	
continue	global	pass	

Lists

- Python lists much simpler than R
- Also act as vectors, in python called a single dimension array
- Use squares when assigning name
- list1 = [1, 2, 3]

Indexing

- Index of first value is 0
- If multidimensional [x, y, …]
- To splice use colons [start:stop:step]
- list1[2:] → [3]
- list1[::2] → [1,3]
- list1[-1] → [3]
- list1[::-1] → [3,2,1]

Loops

- Loops use colons and indentations rather than brackets
- In r,

```
for (i in sequence) {statement}
```

- In python,

```
for i in sequence:
    statement
```

Loops

- Loops use colons and indentations rather than brackets
- In r,

  for (i in sequence) {statement}
- In python,

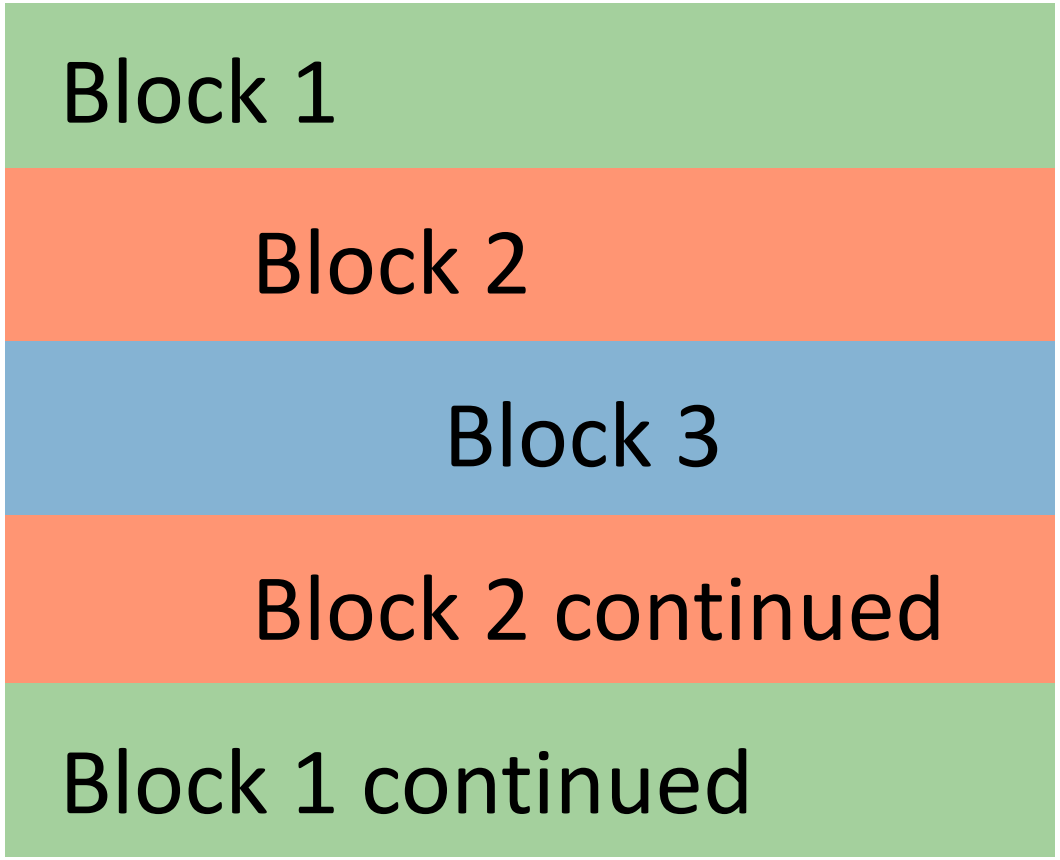
  for i in sequence:

  tab statement

Will not work if even a space in in the wrong place.

Indents must align throughout whole script

Indentation



- Many features have this syntax
  - while
  - if, else
  - with
  - def – to create a function

Packages

- Load packages using ‘import’
- Need to download first
- Can give packages shortened names
- i.e. import numpy as np
- Numpy used for fast operations on arrays

Functions

- Called from package
  - np.array(list1)
- As a function of an object
  - list1.append()
- Base functions can be stand alone
  - len(), print(), str(), int(), min(), max(), range(), round()

Time to Practise!

jupyter.org/try-jupyter
Intro_to_python.ipynb