Python 3 cheatsheet (the basics)

GROK LEARNING

Interact with the user (*input* and *output*)

Print a message

```
print('Hello, world!')
```

Print multiple values (of different types)

```
ndays = 365
print('There are', ndays, 'in a year')
```

Asking the user for a string

```
name = input('What is your name? ')
```

Asking the user for a whole number (an integer)

```
num = int(input('Enter a number: '))
```

Decide between options

Decide to run a block (or not)

```
x = 3
if x == 3:
  print('x is 3')
```

Decide between two blocks

```
mark = 80
if mark >= 50:
  print('pass')
else:
  print('fail')
```

Decide between many blocks

```
mark = 80
if mark >= 65:
  print('credit')
elif mark >= 50:
  print('pass')
else:
  print('fail')
```

- `elif` can be used without `else`
- `elif` can be used many times

Are two values equal?

```
x == 3
```

⚠ two equals signs, not one

Are two values not equal?

```
x != 3
```

Less than another?

```
x < 3
```

Greater than another?

```
x > 3
```

Less than or equal to?

```
x <= 3
```

Greater than or equal to?

```
x >= 3
```

The answer is a *Boolean*: `True` or `False`

String manipulation

Compare two strings

```
msg = 'hello'
if msg == 'hello':
  print('howdy')
```

Less than another string?

```
if msg < 'n':
  print('a-m')
else:
  print('m-z')
```

⚠ strings are compared character at a time (*lexicographic order*)

Is a character in a string?

```
'e' in msg
```

Is a string in another string?

```
'ell' in msg
```

Convert to uppercase

```
msg.upper()
```

also `lower` and `title`

Count a character in a string

```
msg.count('l')
```

Replace a character or string

```
msg.replace('l','X')
```

Delete a character or string

```
msg.replace('l','')
```

Is the string all lowercase?

```
msg.islower()
```

also `isupper` and `istitle`

Text (*strings*)

Single quoted

```
'perfect'
```

Double quoted

```
"credit"
```

Multi-line

```
'''Hello,
World!'''
```

Add (*concatenate*) strings

```
'Hello' + 'World'
```

Multiply string by integer

```
'Echo...'*4
```

Length of a string

```
len('Hello')
```

Convert string to integer

```
int('365')
```

Variables

Creating a variable

```
celsius = 25
```

Using a variable

```
celsius*9/5 + 32
```

Whole numbers (*integers*)

Addition and subtraction

```
365 + 1 - 2
```

Multiplication and division

```
25*9/5 + 32
```

Powers (*2 to the power of 8*)

```
2**8
```

Convert integer to string

```
str(365)
```

Repeat a block (a fixed number of times)

Repeat a block 10 times

```
for i in range(10):
  print(i)
```

Sum the numbers 0 to 9

```
total = 0
for i in range(10):
  total = total + i
print(total)
```

Repeat a block over a string

```
for c in 'Hello':
  print(c)
```

Keep printing on one line

```
for c in 'Hello':
  print(c, end=' ')
print('!')
```

Count from 0 to 9

```
range(10)
```

⚠ range starts from 0 and goes up to, *but not including*, 10

Count from 1 to 10

```
range(1, 11)
```

Count from 10 down to 1

```
range(10, 0, -1)
```

Count 2 at a time to 10

```
range(0, 11, 2)
```

Count down 2 at a time

```
range(10, 0, -2)
```

Repeat a block over list (or string) indices

```
msg = 'I grok Python!'
for i in range(len(msg)):
  print(i, msg[i])
```

Putting it together: Celsius to Fahrenheit converter

Ask the user for a temperature in degrees Celsius

```
celsius = int(input('Temp. in Celsius: '))
```

Calculate the conversion

```
fahrenheit = celsius*9/5 + 32
```

Output the result

```
print(fahrenheit, 'Fahrenheit')
```

Python 3 cheatsheet (next steps)

Girls' Programming Network
https://sites.google.com/site/girlsprogrammingnetwork/

Lists of things (you want to keep in order)

Create a new list

```
songs = []
```

```
songs = ["Thriller", "Downtown"]
```

Add an item to the list

```
songs.append("Space Oddity")
```

Sort the items

```
songs.sort()
```

Find the number of items

```
numSongs = len(songs)
```

Access the item at a particular index

```
index = 0
print(songs[index])
```

⚠ index counts from 0

⚠ index < length of songs

Overwrite the last item in the list

```
songs[-1] = "Billy Jean"
```

⚠ index can count backwards

Remove an item at a particular index

```
last = songs.pop()
first = songs.pop(0)
```

Find an item and remove it

```
songs.remove("Thriller")
```

⚠ The item must be found in the list

Dictionaries (you look up with a key)

Create a new dictionary

```
info = {}
```

Or provide some initial values

```
info = {
   "First name": "Ada",
   "Last name": "Lovelace",
   "Home town": "London",
}
```

Set the value for a particular key

```
info["First name"] = "Clara"
info["Last name"] = "Oswald"
```

Access a value using the key

```
first = info["First name"]
```

⚠ The key must be found

Find a value for a key that might be missing

```
first = info.get("First name")
```

Discover if a key is in the dictionary

```
if "First name" in info:
   print("Found it!")
```

Iterate over the dictionary

```
for key, value in info.items():
   print(key, "is set to", value)

for key in info:
   print(info[key])
```

⚠ When accessing lists by index, or dictionaries by key, the item must generally be in the collection. Otherwise you will see an IndexError or KeyError.

Repeat a block (until something is no longer True)

Loop forever (infinite loop)

```
while True:
   print("I know a song that will get on your nerves …")
   print(" … get on your nerves … get on your nerves!")
```

Repeat for as long as some condition is True

```
x = 1
while x < 1000:
   x = 4*x + x
   print(x)
```

Keep going until you run out of list items

```
songs = ["Thriller", "Billy Jean", "Downtown"]
while songs:
   nextSong = songs.pop(0)
   print("The next song is " + nextSong)
```

Stop looping early

```
x = 1
while True:
   x = x + 1
   if x > 10:
      break
```

Skip the current block and go round again

```
x = 10
while x:
   x = x - 1
   if x % 2 == 0:
      continue
   print(x, end=" ")
```

This will print odd numbers in descending order by 'continuing' past the even ones.