Lecture 8 - Functions and conditionals

* prayer / spiritual thought
* announcements
* Unit of the day

1 kcal = 4184 J

↳ approximately the amount of energy to raise 1 kg of water 1°C at 1 atm of pressure.

- counterpart of BTU

(A) today's lecture consists mainly of examples.

I. Conditionals

See example script

We cover:

* The if statement, syntax, variables
* else & elif statements
* nesting & multiple elif statements
* one-line if statements

Practice - conditionals

* Debug the practice example

II. Functions

* what is a function?

- A mapping

in → [func.] → out

• formulas, e.g. $f(x) = x^2$

• non-formulas, e.g. g('cba') = 'abc'

- An abstraction. A chunk of code

• A way to organize code

• A way to re-use code

See example script

We cover:

* Libraries of functions

- Built-in functions

- standard libraries: math

- numpy: numerical python (fast numerical arrays)

- scipy: scientific python (numerical methods)

- matplotlib: plotting

- syntax of using libraries

```
import math
import numpy as np
from scipy import linalg
from math import *
```

* Function syntax
  - calling a function
  - defining a function
  - docstrings & help
* Function order & driver functions

* Scope: global & local variables

* Function arguments
  - defaults
  - other functions
  - order

* lambda functions

Practice - Functions