Assignment 1 (Due Friday 30th August):

Task: <u>Use your code from Lab 2</u> to create a python routine to find **all zeros** of a function within a given range. To do this you should use the **bracketing** and **secant** methods, as separate functions, from Lab 2.

Details:

You should create a function **findallzeros** that can be called in the following way (see **testfile1.py**)

```python
import numpy as np
import mysearch as mys

def f(x):
    return (x-0.7)*(x+0.5)

a = -2
b = 2
tol = 1e-8
zlist = mys.findallzeros(f,a,b,tol)
print('Zeros found: ',zlist)
```

The function **findallzeros** should therefore be contained within your own **mysearch.py** module. The output to **findallzeros** should be a list of floats that correspond to the zeros that are found (see **output1.txt**). E.g.

```
In [5]: run testfile1.py
Zeros found:  [-0.49999999999999994, 0.6999999999999954]

In [6]:
```

If no zeros are found the list should be empty.

Important notes:

The module must work on the first try, and for an arbitrary function as an input. If it does not then marks will be deducted.

Try to make you code as robust as possible so that it does not miss any zeros. You may have to modify your bracketing procedure to do this.

Files to submit:

You should upload (only) the following files:

mysearch.py   - a python module that contains the **findallzeroes** function, as well as any other functions that it needs to run

Lab2_Q4.py   - the code from Lab 2 that you used/adapted to create your bracketing function.

This can be your own code or from the provided solutions

Lab2_Q5.py   - the code from Lab 2 that you used/adapted to create your secant function

This can be your own code or from the provided solutions

Grading:

The code will be graded according to the following scale:

Compliance: This is whether the code is submitted as instructed	30%
Effectiveness (i.e. whether the code passes independent tests):	50%
Comments (whether they are comprehensible):	20%

Important information (academic integrity):

1. You have to write the code yourself. Any copying of code from an external source other than the lab solutions that you provide will result in a mark of zero being awarded.

2. **The code must be clearly adapted from your Lab solutions.** If the code does not do this then a mark of zero may be awarded. If your code from the Labs does not work then you can use the Lab Solutions provided on Canvas (include these files in the upload instead of your own).