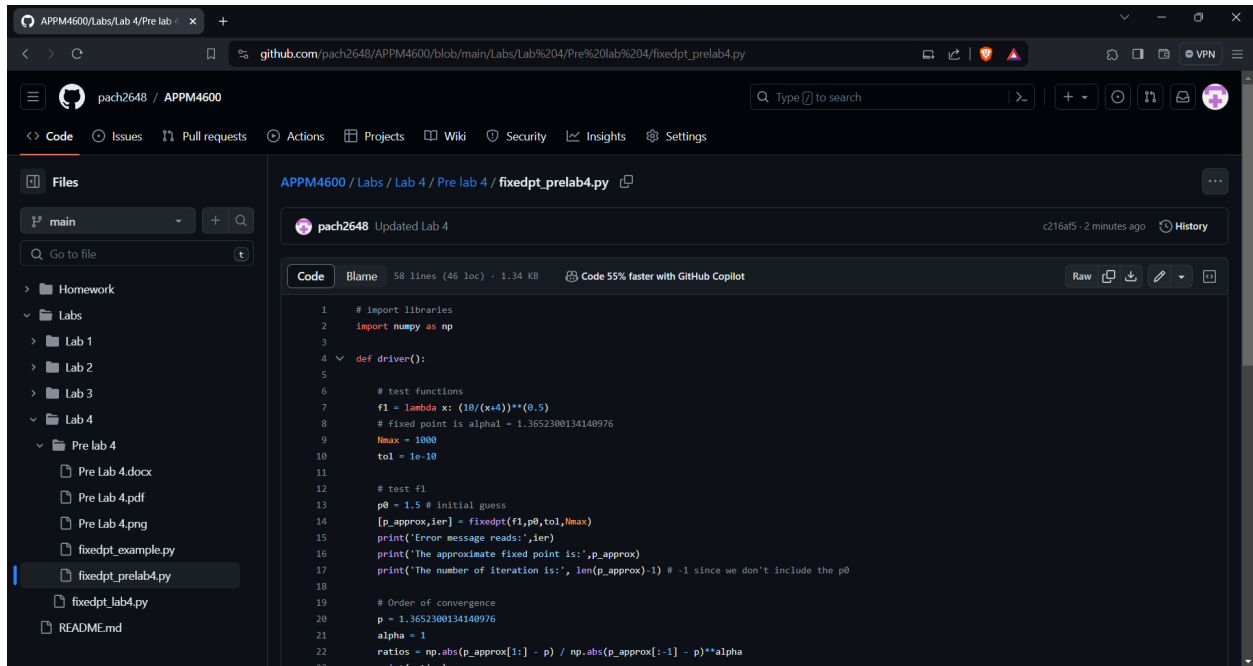


## Pre-lab 4

1. Create a new fixed point iteration subroutine that returns a vector whose entries are the approximations of the fixed point at all the iterations in order.



```
1 # import libraries
2 import numpy as np
3
4 def driver():
5
6     # test functions
7     f1 = lambda x: (10/(x+4))**(0.5)
8     # fixed point is alpha = 1.3652380134140976
9     Nmax = 1000
10    tol = 1e-10
11
12    # test f1
13    p0 = 1.5 # initial guess
14    [p_approx,ier] = fixedpt(f1,p0,tol,Nmax)
15    print('Error message reads:',ier)
16    print('The approximate fixed point is:',p_approx)
17    print('The number of iteration is:', len(p_approx)-1) # -1 since we don't include the p0
18
19    # Order of convergence
20    p = 1.3652380134140976
21    alpha = 1
22    ratios = np.abs(p_approx[1:] - p) / np.abs(p_approx[:-1] - p)**alpha
23    print(ratios)
```

Github link:

[https://github.com/pach2648/APPM4600/blob/main/Labs/Lab%204/Pre%20lab%204/fixedpt\\_prelab4.py](https://github.com/pach2648/APPM4600/blob/main/Labs/Lab%204/Pre%20lab%204/fixedpt_prelab4.py)