Lab Assignment 4 (01/26/2023)
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Tasks:

1. Extend myfuncs.py that includes the two functions discussed in lecture04 -- (a) my sqrt and (b) my factorial. (Submit your code)
2. Run tests with python prompt
3. Extend the demo_myfuncs.py that performs the same tests, and run it on the terminal (Submit both code and screenshots)
4. Push the code to GitHub
5. File transfer and Up-to-date in Nova cluster

Submission Files and Results:

1. I extended myfuncs.py, which includes the functions (i) my_sqrt: square root function with newton's method and (ii) my_factorial: factorial method. And I also used the my_factorial function inside the my_exp, as mentioned in the class. I submitted the myfuncs.py along with this file. I also pushed the code to the GitHub repository.
2. Ran tests comparing NumPy functions through Python prompt for x=2 example for the my_sqrt and my_factorial. Here is the screenshot for the execution.

```
(base) ubuntu@ubuntu-vm:~/Documents/chandanaWorkspace/CPRE 525 Spring 2023/CPRE525Spring2023/3. Lab Assignment 4$ python3
Python 3.9.12 (main, Apr  5 2022, 06:56:58)
[GCC 7.5.0] :: Anaconda, Inc. on linux
Type "help", "copyright", "credits" or "license" for more information.
>>> import numpy as np
>>> import myfuncs as mf
>>> x = 2
>>> smine = mf.my_sqrt(x)
>>> snum = np.math.sqrt(x)
>>> serr = smine - snum
>>> print("My sqrt: ", smine)
My sqrt:  1.414213562373095
>>> print("Numpy sqrt: ", snum)
Numpy sqrt:  1.4142135623730951
>>> print("Error between my sqrt(%f) and numpy sqrt(%f) is %.5E" % (x,x,abs(serr)))
Error between my sqrt(2.000000) and numpy sqrt(2.000000) is 2.22045E-16
>>> smine = mf.my_factorial(x)
>>> snum = np.math.factorial(x)
>>> serr = smine - snum
>>> print("My factorial: ", smine)
My factorial:  2
>>> print("Numpy factorial: ", snum)
Numpy factorial:  2
>>> print("Error between my factorial(%f) and numpy factorial(%f) is %.5E" % (x,x,abs(serr)))
Error between my factorial(2.000000) and numpy factorial(2.000000) is 0.00000E+00
>>>
```

3. Extended demo_myfuncs.py that performed the same tests for the x=2 example and ran it on the terminal. Here is the screenshot for the execution.

```
(base) ubuntu@ubuntu-vm:~/Documents/chandanaWorkspace/CPRE 525 Spring 2023/CPRE525Spring2023/3. Lab Assignment 4$ python3 demo_m
yfuncs.py
==========================================
Input number:  2

--------[Results for my_sqrt]----------------
My sqrt:  1.414213562373095
Numpy sqrt:  1.4142135623730951
Error between my sqrt(2.000000) and numpy sqrt(2.000000) is 2.22045E-16

--------[Results for my_factorial]----------------
My factorial:  2
Numpy factorial:  2
Error between my factorial(2.000000) and numpy factorial(2.000000) is 0.00000E+00

--------[Results for my_exp]----------------
My Exp:  7.3890560989301735
Numpy Exp:  7.38905609893065
Error between my exp(2.000000) and numpy exp(2.000000) is 4.76952E-13

--------[Results for my_ln]----------------
My Ln:  0.6931471805599455
Numpy Ln:  0.6931471805599453
Error between my ln(2.000000) and numpy log(2.000000) is 2.22045E-16
(base) ubuntu@ubuntu-vm:~/Documents/chandanaWorkspace/CPRE 525 Spring 2023/CPRE525Spring2023/3. Lab Assignment 4$
```

4. Push the code to GitHub
   a. Git status check

```
(base) ubuntu@ubuntu-vm:~/Documents/chandanaWorkspace/CPRE 525 Spring 2023/CPRE525Spring2023$ git status
On branch main
Your branch is up to date with 'origin/main'.

Changes to be committed:
  (use "git restore --staged <file>..." to unstage)
        new file:   2. Lab Assignment 3/vi mysqrt2.py

Changes not staged for commit:
  (use "git add/rm <file>..." to update what will be committed)
  (use "git restore <file>..." to discard changes in working directory)
        deleted:    1. Lab Assignment 2/__pycache__/myfuncs.cpython-310.pyc
        deleted:    1. Lab Assignment 2/__pycache__/myfuncs.cpython-39.pyc
        modified:   2. Lab Assignment 3/demo_pythonlist.py
        deleted:    2. Lab Assignment 3/vi mysqrt2.py

Untracked files:
  (use "git add <file>..." to include in what will be committed)
        2. Lab Assignment 3/2. Lab Assignment 3 Screen Shots.pdf
        3. Lab Assignment 4/
```

   b. Git add and git status

```
(base) ubuntu@ubuntu-vm:~/Documents/chandanaWorkspace/CPRE 525 Spring 2023/CPRE525Spring2023$ git add .
(base) ubuntu@ubuntu-vm:~/Documents/chandanaWorkspace/CPRE 525 Spring 2023/CPRE525Spring2023$ git status
On branch main
Your branch is up to date with 'origin/main'.

Changes to be committed:
  (use "git restore --staged <file>..." to unstage)
        deleted:    1. Lab Assignment 2/__pycache__/myfuncs.cpython-310.pyc
        deleted:    1. Lab Assignment 2/__pycache__/myfuncs.cpython-39.pyc
        new file:   2. Lab Assignment 3/2. Lab Assignment 3 Screen Shots.pdf
        modified:   2. Lab Assignment 3/demo_pythonlist.py
        new file:   3. Lab Assignment 4/1. Lab Assignment 2 Screen Shots for both 2 and 3 steps.pdf
        new file:   3. Lab Assignment 4/demo_myfuncs.py
        new file:   3. Lab Assignment 4/myfuncs.py
```
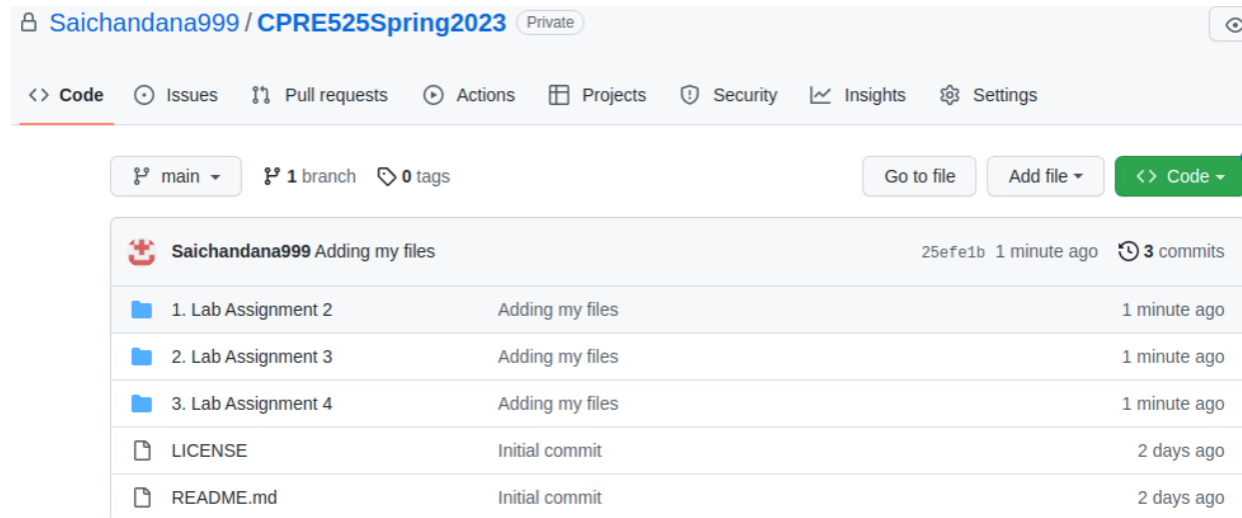
   c. Git committed the files

```
(base) ubuntu@ubuntu-vm:~/Documents/chandanaWorkspace/CPRE 525 Spring 2023/CPRE525Spring2023$ git commit -m "Adding my files"
[main 25efe1b] Adding my files
 7 files changed, 106 insertions(+), 45 deletions(-)
 delete mode 100644 1. Lab Assignment 2/__pycache__/myfuncs.cpython-310.pyc
 delete mode 100644 1. Lab Assignment 2/__pycache__/myfuncs.cpython-39.pyc
 create mode 100644 2. Lab Assignment 3/2. Lab Assignment 3 Screen Shots.pdf
 create mode 100644 3. Lab Assignment 4/1. Lab Assignment 2 Screen Shots for both 2 and 3 steps.pdf
 create mode 100644 3. Lab Assignment 4/demo_myfuncs.py
 create mode 100644 3. Lab Assignment 4/myfuncs.py
```

d. Git push


```
(base) ubuntu@ubuntu-vm:~/Documents/chandanaWorkspace/CPRE 525 Spring 2023/CPRE525Spring2023$ git push
Username for 'https://github.com': Saichandana999
Password for 'https://Saichandana999@github.com':
Enumerating objects: 13, done.
Counting objects: 100% (13/13), done.
Delta compression using up to 8 threads
Compressing objects: 100% (9/9), done.
Writing objects: 100% (9/9), 1.33 MiB | 4.05 MiB/s, done.
Total 9 (delta 2), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (2/2), completed with 2 local objects.
To https://github.com/Saichandana999/CPRE525Spring2023.git
   c6090b0..25efe1b  main -> main
```

e. Final GitHub repository

5. Files transferred and up-to-date in Nova cluster


```
[vsc@nova ~]$ ls
CPRE525Spring2023
[vsc@nova ~]$ tree
.
└── CPRE525Spring2023
    ├── 1. Lab Assignment 2
    │   ├── 1. Lab Assignment 2 Screen Shots for both 2 and 3 steps.pdf
    │   ├── demo_myfuncs.py
    │   └── myfuncs.py
    ├── 2. Lab Assignment 3
    │   ├── 2. Lab Assignment 3 Screen Shots.pdf
    │   └── demo_pythonlist.py
    ├── 3. Lab Assignment 4
    │   ├── 1. Lab Assignment 2 Screen Shots for both 2 and 3 steps.pdf
    │   ├── demo_myfuncs.py
    │   └── myfuncs.py
    ├── LICENSE
    └── README.md

4 directories, 10 files
```