Panupong (Peach) Chaphuphuang
APPM 4600
Pre-lab 6

Pre-lab 6

1. Use the two difference formulas above to approximate the derivative with

   $h = 0.01 * 2. ** (-numpy.arange(0, 10))$.

   This halves the value of h each time.

2. Determine the order of each of the approximation techniques.

```
|__h__|__Forward Difference__|__Centered Difference__|
-------------------------------------------------------
|__0.0100000000__|__-0.9999833334__|__-0.9999833334__|
|__0.0050000000__|__-0.9999958333__|__-0.9999958333__|
|__0.0025000000__|__-0.9999989583__|__-0.9999989583__|
|__0.0012500000__|__-0.9999997396__|__-0.9999997396__|
|__0.0006250000__|__-0.9999999349__|__-0.9999999349__|
|__0.0003125000__|__-0.9999999837__|__-0.9999999837__|
|__0.0001562500__|__-0.9999999959__|__-0.9999999959__|
|__0.0000781250__|__-0.9999999990__|__-0.9999999990__|
|__0.0000390625__|__-0.9999999997__|__-0.9999999997__|
|__0.0000195313__|__-0.9999999999__|__-0.9999999999__|
The order of forward difference method is the first-order
The order of centered difference method is the second-order
```

Github link:
https://github.com/pach2648/APPM4600/blob/main/Labs/Lab%206/Pre%20lab%206/preLab_6.py