

Instructions: Please answer the following questions making sure to write your answers legibly on the second page. The code below is the contents of python file that we will work with.

- Since we are writing python code please be careful about spacing / indent. Leave enough room that it is obvious when you want things indented.
- Make sure to write legibly.
- If you are unfamiliar with the `time` module, `time.time()` returns an integer representation of time, subtracting two of these objects, as we do in the code below will return the number of elapsed seconds.
- Similarly, `time.sleep()` when provided an integer will “pause” the program for that many seconds.

```
import time

def timing_decorator(func):
    def wrapper(*args, **kwargs):
        start = time.time()
        result = func(*args, **kwargs)
        end = time.time()
        print(f'QUESTION 1: {kwargs}')
        print(f"{func.__name__}")
        print(f"took {end - start} seconds")
        return result
    return wrapper

def add_two(a, b):
    return a + b

def add_three(a, b, c):
    return a + b + c

@timing_decorator
def calc_function(var1, var2, var3='Processor', var4=1):
    print(f"Calc Type: {var3}, number: {var4}")
    time.sleep(var1 + var2)

if __name__ == "__main__":
    calc_function(1, 2, var3='computer', var4=3)
```

1. The decorator above reports the time that it takes for the function to complete. The line
`print(f'QUESTION 1: kwargs')`
will print something to the terminal.
 - (a) In this line of code what type of python object does `kwargs` behave like?
 - (b) When the code is executed what will be printed to the terminal by this line (only return what will be printed by this specific line)?
2. In the second f-string in the decorator is the phrase `func.__name__`. If the code above is run, what will be printed here?
3. The functions `add_two` and `add_three` are defined above. Please write a function (`F`) which accepts either function and arguments. It should send those arguments to the function specified and return the result of that function multiplied by two.
In other words `F(add_two, 1, 2)` should return $2 \cdot (1 + 2) = 6$ and `F(add_three, 1, 2, 3)` should return $2 \cdot (1 + 2 + 3) = 12$.