THE UNIVERSITY OF THE WEST INDIES
Department of Computing
COMP1126–Introduction to Computing I
Tutorial 4A

Question 1

Write a function in python to calculate the trigonometric function `sine` in radians. The sine of an angle (specified in radians) can be computed by the following:

$$\sin x = \begin{cases} x & \text{if } x < 0.00001 \\ 3*\sin(x/3) - 4*\sin(x/3)**3 & \text{otherwise} \end{cases}$$

Does your implementation generate an iterative or recursive process?

Question 2

Complete the function `power` in python that raises an integer n to its n^{th} power and returns that value. If n is less than or equal to 0 then the function should return 0. **(Don't use the inbuilt python exponentiation operator)**.

e.g.

```
power(3)  = 27
              3^3 = 3*3^2
              3^2 = 3*3^1
              3^1 = 3*3^0
              3^0 = 1

    def power2(x):
        def helper(x,y):
            …

        …
        else:
            return helper(x,x)
```

Question 3

Complete the following, recursive function (`helper`) to calculate the factorial of a given number. `helper` maintains the state of the computation. The factorial of a number N, is calculated as follows:

N! = 1 x 2 x 3 x... x N

Below are factorial values for a few small integers,

N	Result
1	1
2	2
3	6
4	24

```
def ifactorial(n):
    def helper(x, result):
        if … :
            return …
        else:
            return …

     return helper …
```