

Programming exercises:

1) Start up an interactive Python session and try typing each of the following commands. Write down the results you see:

- a) Hello, world"
- b) Hello world!
- c) 3
- d) 3.0
- e)5
- f) 5.0
- g)23
- h)2+3= 5
- i) 6
- j) 8
- k) 2.3333333333333335
- l) 2

2) Enter and run the chaos program from Section 1.6 Try it with various values of input to see that it functions as described in the chapter.

```
Anaconda Prompt (anaconda3)
>>> print(7 // 3)
2
>>> quit()

(base) C:\Users\LisaP>cd OneDrive
(base) C:\Users\LisaP\OneDrive>cd Documents
(base) C:\Users\LisaP\OneDrive\Documents>cd DHprogramming
(base) C:\Users\LisaP\OneDrive\Documents\DHprogramming>python chaos.py
This program illustrates a chaotic function
Enter a number between 0 and 1: 0.25
0.73125
0.76644140625
0.6981350104385375
0.8218958187902304
0.5708940191969317
0.9553987483642099
0.166186721954413
0.5404179120617926
0.9686289302998042
0.11850901017563877

(base) C:\Users\LisaP\OneDrive\Documents\DHprogramming>python chaos.py
This program illustrates a chaotic function
Enter a number between 0 and 1: 0.26
0.75036
0.73054749456
0.7677066257332165
0.6954993339002887
0.8259420407337192
0.5606709657211202
0.9606442322820199
0.14744687593470315
0.49025454937601765
0.9746296021493285

(base) C:\Users\LisaP\OneDrive\Documents\DHprogramming>
```

3) Modify the chaos program using 2.0 in place of 3.9;

```
Anaconda Prompt (anaconda3)
0.9746296021493285

(base) C:\Users\LisaP\OneDrive\Documents\DHprogramming>python chaos.py
This program illustrates a chaotic function
Enter a number between 0 and 1: 0.25
0.375
0.46875
0.498046875
0.49999237060546875
0.4999999998835847
0.5
0.5
0.5
0.5
0.5

(base) C:\Users\LisaP\OneDrive\Documents\DHprogramming>python chaos.py
This program illustrates a chaotic function
Enter a number between 0 and 1: 0.26
0.38480000000000003
0.47345792000000003
0.49859103597854726
0.4999960296407725
0.499999999684725
0.4999999999999994
0.4999999999999994
0.4999999999999994
0.4999999999999994
0.4999999999999994
```

Write a short paragraph describing any differences that you notice in the behaviour of the two versions

When I change from 3.9 to 2.0 the last 5 results are the same and also do not differ that much when with similar starting values. With 3.9 the first few numbers were similar but then differed quite a lot

4) Modify the chaos program so that it prints out 20 values instead of 10

Change range(10) to range(20)

5) Modify the chaos program so that the number of values to print is determined by the user.

```
(base) C:\Users\LisaP\OneDrive\Documents\DHprogramming>python chaos.py
This program illustrates a chaotic function
Enter a number between 0 and 1: 0.25
How many numbers should I print? 20
0.375
0.46875
0.498046875
0.49999237060546875
0.4999999998835847
0.5
0.5
0.5
0.5
0.5
0.5
0.5
0.5
0.5
0.5
0.5
0.5
0.5
0.5
```

```
chaos.py X
C: > Users > LisaP > OneDrive > Documents > DHprogramming > chaos.py > ...

1 # File: chaos.py
2 # A simple program illustrating chaotic behavior.
3 def main():
4     print("This program illustrates a chaotic function")
5     x = eval(input("Enter a number between 0 and 1: "))
6     n = eval(input("How many numbers should I print? "))
7     for i in range(n):
8         x = 2.0 * x * (1 - x)
9         print(x)
10    main()
11
12
```

I added an extra line defining n, and then changing the number of range to n;

7) Modify the chaos program so that it accepts two inputs and then prints a table with two columns similar to the one shown in Section 1.8

```
Anaconda Prompt (anaconda3)

(base) C:\Users\LisaP>cd OneDrive
(base) C:\Users\LisaP\OneDrive>cd Documents
(base) C:\Users\LisaP\OneDrive\Documents>cd DHprogramming
(base) C:\Users\LisaP\OneDrive\Documents\DHprogramming>python chaos.py
This program illustrates a chaotic function
Enter a number between 0 and 1: 0.25
Enter a number between 0 and 1: 0.26
How many numbers should I print? 10
0.73125 0.75036
0.76644140625 0.73054749456
0.6981350104385375 0.7677066257332165
0.8218958187902304 0.6954993339002887
0.5708940191969317 0.8259420407337192
0.9553987483642099 0.5606709657211202
0.166186721954413 0.9606442322820199
0.5404179120617926 0.14744687593470315
0.9686289302998042 0.49025454937601765
0.11850901017563877 0.9746296021493285
```

I had to add another line defining y; then adding the calculation for y and adding the y to the print command;