CSE 101 - Introduction to Programming
Tutorial 4 Solutions

Q1. Create a module with functions defined for the following:

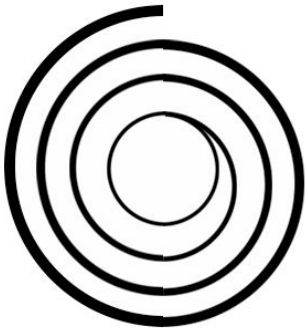
- Calculate Euclidean distance, taking x1,y1,x2,y2 as arguments
- Calculate manhattan distance, taking x1,y1,x2,y2 as arguments

Include docstrings for functions describing the formula used.
Import this module in a script and call these functions.

```
def euclidean_distance(x1, y1, x2, y2):
      ''' Formula : euclidean_distance = ( (x1-x2)^2 + (y1-y2)^2
)^0.5'''
      x = (x1-x2)**2
      y = (y1-y2)**2
      return (x+y)**0.5


def manhattan_distance(x1, y1, x2, y2):
      ''' Formula : manhattan_distance = |x1-x2| + |y1-y2| '''
      return abs(x1-x2) + abs(y1-y2)
```

Q2. Draw the following spiral using SimpleGraphics.py



HINT: Draw the outermost circle, cover the right half with a white rectangle to obtain a black semicircle.
Now, draw a smaller circle with a slightly displaced center and cover the left half with a white rectangle. This completes one loop.
Repeat similarly for inner loops.

Q3. Generate the following ‘stars’ using SimpleGraphics.py

a)

b)

HINT:
Visualise each star as a superimposition of two identical but rotated figures.

a) Superimposition of two squares(4 sided polygon), rotated by 45º.
b) Superimposition of two hexagons(6 sided polygon), rotated by 30º.

Q4. Write a Python program to swap the values of two variables with and without using a temporary variable. Use a function call for doing so. Also, notice how it affects the actual arguments passed.

```
# using a temporary variable
def swap(a,b):
      temp = a
      a = b
      b = temp
      return (a,b)

# without using a temporary variable
def swap(a,b):
      a = a + b
      b = a - b
      a = a - b
      return (a,b)

# without using a temporary variable
def swap(a,b):
      return (b,a)
```