Final Exam – Review Problems – Part I

Instructions. There are two parts to these review problems. You should attempt the problems in this part (Part I) without a computer. Part II is in a Jupyter Notebook. Feel free to use your class materials and the course website to attempt the problems in Part II.

Problem 1. What is the output of the following Python code?

```
1  l = range(4)
2  for i in l:
3      print(i)
```

(a)

```
1
2
3
4
```

(b)

```
0
1
2
3
4
```

(c)

```
0
1
2
3
```

(d)

```
4
```

Problem 2. What is the value of x after running the following?

```
1  x = 1
2  for i in range(2, 5):
3      if x < 3:
4          x = 2 * x
5      elif x < 4:
6          x += 1
7      else:
8          x -= 3
```

(a) 5   (b) 1   (c) 3   (d) −2

Problem 3. Suppose you have two square NumPy arrays A and B of the same size. Which of the following are ways to compute the matrix product?

(a) `A*B`   (b) `A**B`   (c) `A.dot(B)`   (d) `numpy.matmul(A,B)`

Problem 4. Suppose you have a list `L = [1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024]`. Which of the slices will generate a truncated list that has 512 as its last element and contains all the previous odd powers of 2 (i.e. `[2, 8, 32, 128, 512]`)?

   (a) `L[1:10:2]`   (b) `L[1:9:2]`   (c) `L[0:10:1]`   (d) `L[1:10:1]`

Problem 5. What is the result of the following code?

```
1   n = 0
2   while True:
3       if n < 0:
4           break
5       elif n < 2021:
6           n = n ** 2
7       else:
8           n -= 2019
9   print(n)
```

   (a) `n = 0`
   (b) `n = 2021`
   (c) `n = -2019`
   (d) the computer will continue to run through this loop and never stop unless you force it to stop

Problem 6. Suppose you defined the function below.

```
1   import numpy as np
2
3   def func(x, y):
4       a = x ** 2 + y ** 3
5       b = x - 4 * y
6       return [a , b]
```

What does Python return for `func(2, 1)`?

   (a) 5   (b) −2   (c) `[5,-2]`   (d) `[2,1]`

Problem 7. If you ran the code

```
1   n = input("How old are you?")
2   try:
3       if n < 40:
4           print("Wow you look great.")
5       else:
6           print("Maybe you should exercise more.")
7   except TypeError:
8       print("Please enter a numerical value for your age.")
```

and entered 22 when asked for input, what would be displayed on the screen?

(a) `Please enter a numerical value for your age.`
(b) `Wow you look great.`
(c) `Maybe you should exercise more.`
(d) You would get an error and nothing would return.

Problem 8. Suppose you defined the class below.

```
1   class Drive():
2       """This class will document a long drive."""
3       def __init__(self, distance):
4           """Initialize the distance and weather in your drive."""
5           self.distance = distance
6
7       def duration(self):
8           """This gives an approximation of the duration."""
9           T = self.distance / 60
10          return print(f"Your trip will take about {T} hours.")
11
```

If you run the following, what is the result?

```
1   D = Drive(150)
2   D.duration()
```

(a) an error
(b) `Your trip will take about 2.5 hours.`
(c) `self.distance`
(d) `T`