Homework 3

January 19, 2024

This is the third homework assignment for AMATH 301 Winter 2024. This homework assignment is about our introduction to python.

For the written exercises, you should upload a scanned PDF to Gradescope and then follow the prompts given by Gradescope to assign certain pages of your PDF document to the correct problems.

For the coding exercises, you will be prompted to upload your python files directly to Gradescope.

The course syllabus found on Canvas has information on how homework is graded and how homework should be presented and submitted. Please let me or the TAs know if you have any questions or concerns.

This assignment is due on **Sunday, January 28 at 11:59pm.**

Written Assignment

For this week's written assignment, you will be asked to analyze two sets of python code. Try to answer the questions without writing the code in python. It is good practice for a potential coding problem that could appear on Exam 1 or Exam 2. Of course, you can double-check your analysis by writing the code in python.

1. Consider the following python code:

Code 1:

```
1  #Begining of code block
2
3  import numpy as np
4
5  n = 5
6
7  x = np.arange(1,n+1)
8
9  m = 0
10
11 for k in x:
12     m = m + k**2
13
14 print(m)
15
16 #End of code block
```

   a.) Explain in a sentence or two what is being coded in lines 4 through 10.

   b.) Explain in a sentence or two what is being coded in lines 10 through 15.

   c.) What is the value of m after the code is finished running?

2. Consider the piecewise polynomial function:

$$y = \begin{cases} (x+3)^3 & x < -1 \\ -x^2 + 9 & -1 \leq x < 1 \\ -x + 9 & 1 \leq x < 2 \\ -\frac{x^2}{4} + 8 & x \geq 2 \end{cases}.$$

   Harry the Husky, who is the mascot for the University of Washington, Seattle, has written the following code to determine the value of the piecewise polynomial above for a given value of x.

Code 2:

```
1  x = .75
2
3  if x < -1:
4      y = (x+3)^3
5  elif x < 1:
6      y = -x**2 + 9
7  if x < 2:
8      y = -x+9
9  else x >= 2:
10     y = -(1/4)*x**2
```

a.) There are **four** mistakes in Harry's code, and he has asked you to help him fix his code. Find the three mistakes and state what changes need to be made for the code to function properly.

Note: There may be more than one way to correct Harry's mistakes. Pick your favorite way to correct their mistakes. *Hint: lines 4, 7, 9, 10*

b.) Once the mistakes are fixed, state which parts of the code will run and which will be ignored by python, explain your answer for each portion of the code containing an if, elif, or else statement.