CS 1030 – Spring, 2020 – Exam #2 – Total 100 Points

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You have until 6:00 pm for the exam. This is a 5-page, no electronics exam except for your computer. You can use the Python Programming Study Guide (famous file #62). Write all answers in this exam file. Scratch paper is not graded. The first part of the exam is Python programming worth 50 points. The second part contains essay questions worth 50 points.

**PART 1: WRITE PYTHON PROGRAMS**

1. (10 points) Write a program that prompts repeatedly for decimal numbers. Store each number in a list. Stop asking for numbers when the user enters a 0 which is not stored in the list. Calculate and print two lines of output as follows:

Line 1 The sum of all the numbers: *sum goes here*

Line 2 The average of all the numbers: *average goes here*

Example: for inputs of 10.5, 9.5, 8, -6.0 and 0, the four numbers are stored in a list and the program generates this output:

The sum of all the numbers: 22.0

The average of all the numbers: 5.5

num\_list = []

print("Enter any number of decimal numbers.")

print("Enter a '0' when you are done entering numbers\n")

while True:

from\_user = input("Please enter a decimal number: ")

if float(from\_user) == 0:

break

else:

num\_list.append(float(from\_user))

sum = 0

for number in num\_list:

sum += number

average = sum / len(num\_list)

print(sum)

print(average)

2. (15 points) Write a program that generates a list of 6 lottery numbers between 1 and 49 without duplicates. Use the random.randint(1,49) function to generate the random numbers. When you have 6 unique numbers, print them sorted in ascending order. If your list is named ‘lottery’ then the standalone statement lottery.sort() sorts the list. You will need to import the random class at the start of your program.

import random

num\_list = []

counter =0

while counter < 6:

number = random.randint(1, 49)

if number not in num\_list:

num\_list.append(number)

counter += 1

num\_list.sort()

for number in num\_list:

print(number)

3. (25 points) Write a program that reads file “ZipAndCity.txt” which contains pairs of items one pair to a line -- a zip code and the city -- and creates an entry in the dictionary called zip\_code. The pair of items are separated by a comma. Sample lines:

80220,Denver

54901,Oshkosh

10024,New York

You can separate the two items with Python’s split function. For example, say:

line = “80220,Denver”

list = line.split(“,”)

creates a list [“80220”,”Denver”]. From each list entry, create a dictionary entry, with the zip code as the key and the city as the value. Using the 80220 example, the first entry in the zip\_code dictionary would be zip\_code = { ‘80220’ : ‘Denver’ }

zip\_code = {}

file = open("ZipAndCity.txt")

for line in file:

address = line.split(",")

zip\_code[address[0]] = address[1]

**PART 2: ESSAY QUESTIONS**

4. (25 points) Pick a video from the attached video selection. Write no more than two paragraphs of 3-5 sentences each summarizing the video. *Clearly identify which video you are summarizing by indicating the title of the talk* (or lose 10 points).

Selected Video: The ethical dilemma we face on AI and autonomous technology

The video is primarily discussed the potential ethical situations we may face in the future with the advancement of technology. Autonomous technology is going to be one of the most revolutionary technologies of the modern century. However, autonomous technology has both pros and cons. This ted talk discusses autonomous tech from a national defense perspective and how technology has evolved at a rate that a lot of people did not expect. The question she presented is whether or not technology could one day discriminate between combatants and civilians. In the present, machines are not capable of this discrimination, but in the future, the answer could be different.

She also discussed unforeseen consequences of technology, like the need for a cyber command or the hacking of Sony by the Koreans. In many of these situations, we can see how we should have prepared for the potential consequences of our actions. This foresight is especially important with the rise of technologies such as machine learning algorithms, driverless cars, or the internet of things. Preparing now to prevent unintended consequences of technology should be a big concern of anyone creating these technologies, and that is the main message she is trying to present.

5. (25 points) What is the difference between Artificial Intelligence and Machine Learning? Give one example of each and show how they are similar and how they are different. Write no more than two paragraphs of 3-5 sentences each.

Both machine learning and artificial intelligence are in the same “sphere” of technology in that they both focus on a computer’s ability to learn and adapt. Both of these concepts have computer programs that are capable of learning without a person explicitly programming that knowledge into the computer program. Both are able to take an input and interpret it, perhaps discovering new patterns or features about that input, and potentially creating an output. However, there the difference between the two is complexity.

Artificial intelligence refers to a much higher level of computer intelligence. While machine learning is mostly a tool that allows a computer program to take data, interpret that data, and create a knowledge base to perform a task with a certain accuracy, artificial intelligence is focused more on replicating true intelligence. Artificial intelligence is when these programs can not only able to learn and improve, but when their complexity is enough to start rivaling human intelligence. For example, the Turing test was a thought experiment created by Turing to test for artificial intelligence. In the test, if a computer could trick humans into believing that it was human, or more accurately, the intelligence of the computer was close enough to a human’s to be indistinguishable, then that intelligence is has passed the test. Not only would this intelligence need to be able to learn, but it would have to have interpretation skills that rival a human’s.