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CSE 160 Spring 2024 - Midterm Exam

Instructions:

- You have **40 minutes** to complete this exam.
- The exam is **closed book**, including no calculators, computers, phones, watches or other electronics.
- You are allowed a single sheet of notes for yourself.
- We also provide a syntax reference sheet.
- Turn in *all sheets* of this exam, together and in the same order when you are finished.
- When time has been called, you must put down your pencil and stop writing.
 - **Points will be deducted if you are still writing after time has been called.**
- You may only use parts and features of Python that have been covered in class up to this point.
- You may ask questions by raising your hand, and a TA will come over to you.

Good luck!

Question	Topic
Question 1	Expressions
Question 2	Loops, Ifs
Question 3	Lists
Question 4	Files
Question 5	Dictionaries, Lists

Question 1) For each of the below expressions, write what the expression evaluates to and the type of that value. You should assume that variables have been declared and assigned as follows:

```
a = "cse160 is fantastic"
b = 10
c = 3.6
d = True
e = ["you're", "going", 2, "be", "amazing"]
f = [10, 7, 3, 6, 9]
g = {"is": "python", 2.0: "fun"}
```

If evaluating the expression would result in an error, write "Error" in both the value and type columns.

Expression	Value of output	type
output = 8 + b * c	44	float
output = a[3]	"1"	string
output = str(b) + " " + e[2]	Error	Error
output = b % 2 == 0 and not d	False	boolean
output = f.sort()	None	NoneType
output = a + 'Let's do it!'	Error	Error
output = e[-1] + g["is"] + g[b / len(f)]	"awesomepythonfun"	string

Question 2) For all sub-parts (a through c) of this question, assume that `words` is defined as follows:

```
words = ["Python ", "in a ", "expanse ", "dance ", "is a ", "digital "]
```

a) What is the output of the following code snippet?

```
poem = ""

for i in [0, 4, 3, 1, 5, 2]:
    poem += words[i]

poem += "."
print(poem)
```

Python is a dance in a digital expanse .

b) What is the output of the following code snippet?

```
for i in [0, 4, 3, 1, 5, 2]:
    if i % 2 == 0:
        print(words[i])
    else:
        line = ""
        for j in range(i):
            line += words[i]
        print(line)
```

**Python
is a
dance dance dance
in a
digital digital digital digital digital
expanse**

- c) Given the following list `words2`, write a short program that will find all the strings that occur in both lists, `words` and `words2`, and print them out in a list. To receive full credit, you ***must*** use `range()`

The `words` list is the same as it was on the previous page:

```
words = ["Python ", "in a ", "expanse ", "dance ", "is a ", "digital "]
```

And `words2` is defined as:

```
words2 = ["in a ", "digital ", "space ", "Python ", "has ", " a " , "
place"]
```

The output should be: `['Python ', 'in a ', 'digital ']`

```
shared_words = []

for i1 in range(len(words)):
    for i2 in range(len(words2)):
        if words[i1] == words2[i2]:
            shared_words.append(words[i1])

print(shared_words)
```

Question 3) What is the output of the following code?

```
foods = ['beef', 'burger', 'sushi', 'fries', 'carrot', 'pizza']
result = []
for i in range(0, 6, 2):
    result.append(foods[i][-1])
result = result + ['z', 'is']

if (len(foods) % 2) == 0:
    result.extend('awesome')
else:
    result.insert(0, 'cool')

print(result)
```

```
['f', 'i', 't', 'z', 'is', 'a', 'w', 'e', 's', 'o', 'm', 'e']
```

Question 4) Given a list of lists of integers, where each list contains all the exam scores of a class, write code that writes to a file "max_scores.txt" that contains a line **Class <class number>'s maximum score is <max_score>** for each class. You may not use the `max` built-in python function. You may assume that the `class_scores` variable is already defined.

For example, given

```
class_scores = [[66, 78, 43], [33, 12, 99], [67, 87, 2]]
```

The file `max_scores.txt` should contain the following content after running your code:

```
Class 1's maximum score is 78.  
Class 2's maximum score is 99.  
Class 3's maximum score is 87.
```

```
f = open("max_scores.txt", "w")  
for i in range(len(class_scores)):  
    max_score = 0  
    for score in class_scores[i]:  
        if score > max_score:  
            max_score = score  
    f.write("Class " + str(i + 1) + "'s maximum score is "  
          + max_score + ".\n")  
f.close()
```

Question 5) A vet clinic wants you to create a function `average_weight()` that will find the average weight of their dogs in order to track the changes in canine obesity overtime. It will take in a list of dictionaries (`patient_data`) and return a float. You can assume that this is the only species that we care about.

For example if given the list:

```
[{'Patient': 'Lucky', 'Height': 23, 'Weight': 30, 'Species': 'Dog'},  
{'Patient': 'Remi', 'Height': 30, 'Weight': 40, 'Species': 'Dog'},  
{'Patient': 'Licorice', 'Height': 10, 'Weight': 15, 'Species': 'Cat'},  
{'Patient': 'Shadow', 'Height': 15, 'Weight': 25, 'Species': 'Cat'}]
```

The function would return:

35.0

```
def average_weight(patient_data):  
    number_of_dogs = 0  
    total_weight = 0  
    for i in patient_data:  
        if i['Species'] == 'Dog':  
            number_of_dogs += 1  
            total_weight += i['Weight']  
    return total_weight / number_of_dogs
```