CS5710 :- Week 5 Quiz

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This quiz will test you on the topics introduced in the first three weeks of lectures.

Instructions

- Answer all of the questions

- Read carefully the instructions for each question

- Save your answers in files `question<question_number>.py`. For example, the program for Question 1 should be stored in file `question1.py`.

- You have the full two hours of the lab session to complete the quiz. Please submit all of your files on Moodle by **6pm**.

- If your program gets stuck in an infinite loop, you can interrupt it with `CTRL-C` or click on the red box above the console window in Spyder.

Questions

1. 1 In the following fragment of Python:

```python
1  myString = "01234567"
2  for i in range(len(myString)):
3      if i < len(myString)/2:
4          print(myString[i:i+2])
```

    (a) The following will be outputted

```
01
12
23
34
```

Adjust line 4 (and only line 4) so that the output is

```
02
13
24
35
```

    (b) Update line 2 of the above code so that it uses a while loop.

    (c) Adjust the original code so that there is an additional variable `j` initialised to `0`. If the condition in the if statement is not true then check if `j` is `0`. If so, "STOP" is printed to the screen and `j` is updated to `1`.

2. Consider the following code fragment:

```
1  secret=6
2  guess=int(input("Enter a number between 0 and 10: "))
```

Extend the code fragment above into a program that initialises a variable `secret`=6, and then, proceeds to repeatedly ask the user to enter a number between 0 and 10 using a `while` loop until the secret number is correctly guessed. Once this happens, the program must print `Well done!` and terminate. When prompting the user to input a guess, the user should be told if their previous guess is too big or too small. For example a possible interaction between your program and the user may look as follows:

```
Enter a number between 0 and 10: 8
Your guess is too big. Try again: 2
Your guess is too small. Try again: 4
Your guess is too small. Try again: 9
Your guess is too big. Try again: 6
Well done!
```

3. (a) Write a function `R4` to return the first four characters of a string in reverse order.

   (b) Write a function `catTuples` that takes as input a list of tuples and returns as output a single tuple which is a concatenation of all the tuples in the list.

4. (a) Write a function `authorFreq` that takes as input a dictionary which maps books to their authors, and returns a dictionary which maps authors to the number of books they've written. Here book titles and their authors are represented by strings.
   For example on input `{"book1": "James", "book2": "Ellie", "book3": "Samantha", "book4": "James"}` your function should return `{"James":2, "Ellie":1, "Samantha":1}` .

   (b) Write a function `prolificAuthors` that takes as input a dictionary which maps books to their authors and returns a list of the authors who have written the most books.
   Hint: You may want to call `authorFreq` from the previous question. Your function should compute the maximum number of books written by a single author, and then find all authors who have written that many books.

5. You do not need to write any python code for this question. Please submit your answer in any format you prefer (e.g. .txt .doc .pdf etc).

(a) What adjustment needs to be made to the following fragment of Python? Explain your reasoning.

```
1  ages = {'N':1, 'R':2, 'W':0, 'J':4, 'H':1}
2  S = ['N','R']
3  for i in ages:
4      if i in S:
5          del(ages[i])
```

(b) In the following fragment of Python:

```
1  k = ["milk","eggs","bread","cheese","jam"]
2  v = [1,12,2,5,2]
3  def f(keys,vals):
4      d = {}
5      for i in range(len(keys)):
6          d[keys[i]] = vals[i]
7      return(d)
8  D1 = f(k,v)
```

Explain why you get an error message if you run the command `print(D1['yoghurt'])`

(c) If the for loop in the above function is replaced by

```
1      for i in range(len(keys)-1,-1,-1):
```

(the range runs from `len(keys)-1` to `0` inclusive) and `D2` is defined as `D2 = f(k,v)` will there be a difference between `D1['bread']` and `D2['bread']`? Explain your reasoning.