University of Cape Town ~~ Department of Computer Science Computer Science 1015F ~~ 2016

Class Test 3

Enter the following blocks to the right			esponding	A B					
Faculty (please	tick one):			C D					$\begin{array}{ccc} \square & 2 \\ \square & 3 \end{array}$
Science Engineer	ing Commerce Hu	manities	Other:	E F					☐ 4 ☐ 5
Student Number	r :			G H I					☐ 6 ☐ 7 ☐ 8
Name (optional)	:			J K L M					9
Marks :	40			O P					
	40 minutes			Q					
Instructions	:			R S	HH	HH	HH		
a) Answe	r all questions.			T					
b) Write y	our answers in P	EN in the		U		HH	HH		
	provided.			W					
c) Show a applica	all calculations wh	nere		X Y					
аррпса	ioic.			Z					
FOR	Question	1	2	3	4	5	6	7	8
OFFICIAL	Max	24	16						
USE	Marks 0								
ONLY:					HH	HH	HH		
	3								
	4 5		HH		HH	HH			HHI
	6								
	7 8								
	9								

Marker

Question 1 – Arrays, Dictionaries and Files [24]

Examine the Q1.py module listed at the end of the test and answer the following questions.

(i) From	n this module, give an example of a:	
,	A. variable that is of type 'list'	[1]
]	B. variable that is of type 'dict'	[1]
•	C. dictionary key	[1]
	cribe briefly, and in clear English, what the function out (arr) does when called. wer must explain what happens with input parameter arr of different types.	Your [5]
		_ _ _ _
 (iii) Wri	te down the exact output when Q1.py is run in the in the Python3 interpreter.	[6]
		- - -
		- - -
		- - -
		_

Write the missing code for the countWords (filename, word) function in the Q1.3 module. This function returns the number of times a given word, word, appears in the finamed filename. You do not need to worry about punctuation or capitalization in you answer (i.e. your function may count "Bob" and "bob" as different words). [10]	ile ur
<pre>def countWords(filename, word):</pre>	

Question 2 - Recursion [16]

Examine the test3_Q2_2016.py module listed on the last sheet of the test and answer the following questions.

"Run" button in Wing101)?	[2]
ii) In terms of recursion, what purpose do lines 3-4 and 5-6 serve?	[2]
iii) Consider the effect of replacing line 6 with:	
return $s[-1]+s[0]+someRec(s)$	
What would happen, in practice, if this new program was run in Win	g101? [2]

) write	an iterative version of test3_Q2_2016.py.	[7
d€	ef someIt(s):	
_		
_		
_		
_		
_		
_		
_		
Which	h version of this program (recursive or iterative) do you think is better and why?	[
Which	h version of this program (recursive or iterative) do you think is better and why?]
Which	h version of this program (recursive or iterative) do you think is better and why?]
	h version of this program (recursive or iterative) do you think is better and why? does the recursive function listed below do? For which inputs will this function fail?	
	does the recursive function listed below do? For which inputs will this function fail?	
	does the recursive function listed below do? For which inputs will this function fail? enigmaRec(x , n): if $n == 1$:	
	<pre>does the recursive function listed below do? For which inputs will this function fail? enigmaRec(x, n): if n == 1: return x</pre>	
	<pre>does the recursive function listed below do? For which inputs will this function fail? enigmaRec(x, n): if n == 1: return x else:</pre>	
	<pre>does the recursive function listed below do? For which inputs will this function fail? enigmaRec(x, n): if n == 1: return x</pre>	
	<pre>does the recursive function listed below do? For which inputs will this function fail? enigmaRec(x, n): if n == 1: return x else:</pre>	
	<pre>does the recursive function listed below do? For which inputs will this function fail? enigmaRec(x, n): if n == 1: return x else:</pre>	

Code examples for the test – you may detach this sheet.

Question 1

```
# Module Q1.py
#Q1.py
formats = {"tri":[1,2,3],}
           "dmnd": [1, 2, 4, 2, 1],
           "sqr":[3,3,3]}
def out(arr2):
    f=open("pattern.txt",'w')
    if type(arr2) == type([]):
        for row in arr2:
            if type(row) == type([]):
                 for col in row:
                     print(col, file=f, end=' ')
                print(file=f)
    f.close()
def arrFrmt(val, frmt):
    result=[]
    if frmt in formats:
        lengths=formats[frmt]
        for l in lengths:
            row=[val]*1
            result.append(row)
    return result
def countWords(filename, word):
      """Function to count the number of time a given word
appears in a file. Case and punctuation sensitive."""
    #fill in code
x=arrFrmt(0,"tri")
print(x)
y=arrFrmt('bob', "sqr")
print(y)
y=arrFrmt('x', "hrglss")
print(y)
```

_Question 2 _____

```
#Module test3_Q2_2016.py
1
     def someRec(s):
2
3
         if len(s) <= 1:
4
             return s
5
         else:
6
             return s[-1]+s[0]+someRec(s[1:-1])
7
8
     print(someRec('swizzle'))
9
     print(someRec('X'))
```