  **Faculty of Science**

**Computer Science Department**

**Data Processing & Structures Midterm Exam (CS602)**

**Program: CS Academic Year: 2020-2021**

**Grade: MSc Students Semester: 2nd**

**Date: June 20, 2021 Time: 1 hour**

**Model Answer**

**I) 1-** Trace the execution of the following program:

|  |  |
| --- | --- |
| def MyGenerator(n):  i=0  yield i  j=1  yield j  k = 0  while k<=n:  m = i + j  yield m  i = j  j = m  k+=1 | def main():  values = []  for i in MyGenerator(5):  values.append(i)  print(values)  main() |

1. Using the class ***ArrayQueue***, write a main program that reads a string from the keyboard, which consists of two parts separated by a colon ':', then displays one of the following messages:

*The left part (before the colon) is longer than the right part.*

*The right part (after the colon) is longer than the left part.*

*The left and right parts have the same length but are different.*

*The left and right parts are exactly the same.*

(Hint: use a queue to keep the left part of the string while processing the right part.)

1. Trace of the execution of the given program:

[0, 1, 1, 2, 3, 5, 8, 13]

1. **String Matching Program:**

from ArrayQueue import ArrayQueue

def main():

q = ArrayQueue() # Create a queue

str = input("Enter a string in the form string1:string2 ")

len3 = len(str)

left, right = str.split(':')

len1 = len(left)

len2 = len(right)

for i in range(len1):

q.enqueue(left[i])

match = True

i = 0

if len1 == len2 :

while not q.is\_empty() :

if right[i] != q.dequeue() :

match = False

break

i = i + 1

if len1 == len2 and match :

print("The left and right parts are exactly the same")

elif len1 == len2 and not match :

print("The left and right parts have the same length "

+ "but are different.")

elif len1 > len2 :

print("The left part (before the colon) is longer than "

+ "the right part.")

elif len1 < len2 :

print("The right part (after the colon) is longer than "

+ "the left part.")

main()

**II) 1-** Write a program that stores the pairs of

EGYPT CAIRO

FRANCE PARIS

UK LONDON

USA WASHINGTON

ITALY ROME

countries and their capitals, shown in the figure, in a ***dictionary***. Your program should prompt the user to enter a country and should display the capital for the country, if it is in the ***dictionary***; otherwise it displays the message "No such country". Note that the program accepts input in lowercase or uppercase, and should loop until user presses *Enter* by itself.

1. Write a program that accepts a sentence as input and prints its words without duplication and sorted alphabetically.
2. Capitals program that uses Dictionary

countries = {'EGYPT':'CAIRO', 'FRANCE':'PARIS', 'UK':'LONDON',

'USA':'WASHINGTON', 'ITALY':'ROME'}

country = '\*'

while country != '': # Loop until user presses return by itself

country = input('Enter a Country ')

country = country.upper()

if country in countries:

print('The capital of ', country, ' is ', countries[country])

else:

print('No such country')

sentence=input("Enter a sentence: ")

words=sentence.split(" ")

print(words)

wordsSet = set(words)

print(wordsSet)

words2 = list(wordsSet)

words2.sort()

print(words2)

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