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Assignment 5: Python

Question 1:

```
#!/usr/bin/python3
#Author: adube@my.athens.edu
#Purpose: word frequency counter

def frequency(string_text):
	string_text = string_text.split()
	str = []

	for i in string_text:
		if i not in str:
			str.append(i)

	for i in range(0, len(str)):
		print(str[i], string_text.count(str[i]))

def main():
	string_text = "Now is the time for all good men to come to the aid of the country"
	frequency(string_text)

if __name__=="__main__":
	main()
```

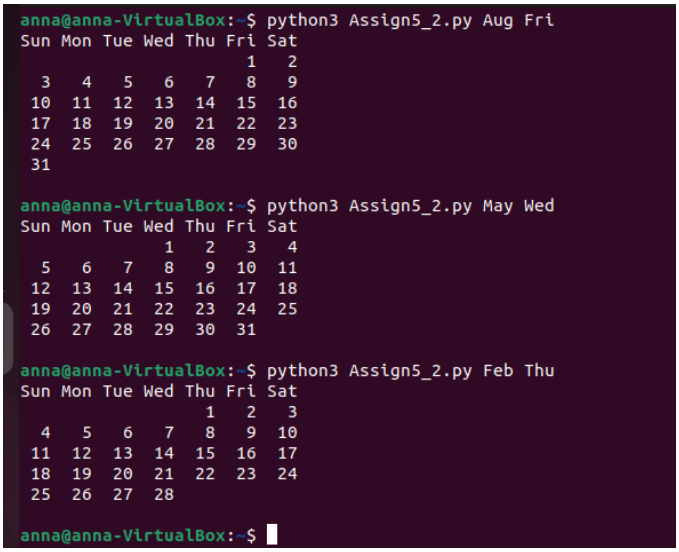
```
anna@anna-VirtualBox:~$ python3 Assign5_1.py
Now 1
is 1
the 3
time 1
for 1
all 1
good 1
men 1
to 2
come 1
aid 1
of 1
country 1
anna@anna-VirtualBox:~$
```

Question 2:

```
#!/usr/bin/python3
#Author: adube@my.athens.edu
#Purpose: Calendar
import sys

def printCal(month, day):
        months = ["Jan","Feb","Mar","Apr","May","Jun","Jul","Aug","Sep","Oct","Nov","Dec"]
        monthDays = [31,28,31,30,31,30,31,31,30,31,30,31]
        weekDays = ["Sun","Mon","Tue","Wed","Thu","Fri","Sat"]
        numOfDays = 0
        count = 0

        if month not in months:
                usage()
        if day not in weekDays:
                usage()
```

```
for m in months:
        if m == month:
                numOfDays = monthDays[count]
        count += 1

print(*weekDays)

num1 = 0
count2 = 0
wdc = 0
foundStart = 0;

for i in range(0, 40):
        if i < 7 and count2 == 0:
                if day != weekDays[i]:
                        print(end="    ")
                else:
                        foundStart = 1;
        if foundStart == 1:
                num1 = count2 + 1
                if num1 < 10:
                        print(" ",num1,end="")
                else:
                        print(end=" ")
                        print(num1,end="")
                print(end=" ")
                count2 += 1

        if i % 7 == 0:
```

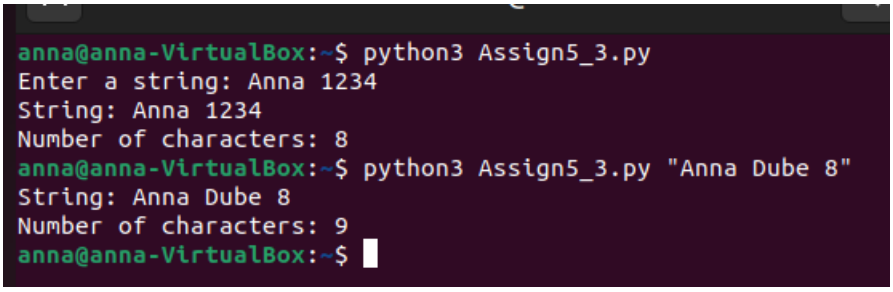
```
                wdc = 0
            if weekDays[wdc] == "Sat":
                print(end="\n")
            wdc += 1
            if count2 == numOfDays:
                break
        print("\n")

def usage():
        print("usage: file.py month day of week\n")
        print("example: file.py Mar Tue\n")
        quit()

def main(argv):
        if len(argv) != 3:
            usage()
        month = argv[1]
        day = argv[2]
        printCal(month, day)

if __name__=="__main__":
        main(sys.argv)
```



Question 3:

```
#!/usr/bin/python3
#Author: adube@my.athens.edu
#Purpose: count the number of characters in a string
import sys


def countChars(str):
        numOfChars = 0
        temp = str
        for i in temp:
                t = i.split()
                numOfChars += len(t)
        return numOfChars


def main(argv):
        myString = ""
        if len(argv) < 2:
                myString = input("Enter a string: ")
```

```
        else:
                myString = argv[1]
        result = countChars(myString)
        print("String:",myString)
        print("Number of characters:",result)

if __name__=="__main__":
        main(sys.argv)
```



Question 4:

```
#!/usr/bin/python3
#Author: adube@my.athens.edu
#Purpose: mutate DNA string
import random

def mutateDNA(dnaString):
        mutateBase = generateString(1)
        randIndex = random.randint(0, len(dnaString)-1)
        dnaString = dnaString[:randIndex] + mutateBase + dnaString[randIndex+1:]
        return dnaString

def frequencyTable(dnaStr):
        n = max([len(dna) for dna in dnaStr])
        frequency_matrix = {
```

```
                'A': [0] * n,
                'C': [0] * n,
                'G': [0] * n,
                'T': [0] * n
        }
        for dna in dnaStr:
                for index, base in enumerate(dna):
                        frequency_matrix[base][index] += 1
        return frequency_matrix

def generateString(N, alphabet='ACGT'):
        alphabet = list('ATGC')
        dna = [random.choice(alphabet) for i in range(N)]
        dna = ''.join(dna)
        return dna

def main():
        bases = 1000
        dnaString = generateString(bases)
        m = frequencyTable(dnaString)
        print ("Frequency Table Before Mutation\n", m)

        for i in range(0,100):
                dnaString = mutateDNA(dnaString)

        m = frequencyTable(dnaString)
        print ("Frequency Table After Mutation\n", m)

if __name__ == "__main__":
```

main()

```
anna@anna-VirtualBox:~$ python3 Assign5_4.py
Frequency Table Before Mutation
 {'A': [249], 'C': [256], 'G': [243], 'T': [252]}
Frequency Table After Mutation
 {'A': [247], 'C': [264], 'G': [233], 'T': [256]}
anna@anna-VirtualBox:~$
```

Sources:

https://www.geeksforgeeks.org/find-frequency-of-each-word-in-a-string-in-python/

https://www.geeksforgeeks.org/python-program-to-count-the-number-of-characters-in-a-string/

https://tutorial.eyehunts.com/python/python-replace-character-in-a-string-by-index-example-code/#:~:text=A%20simple%20way%20to%20replace%20a%20character%20in,and%20replace%20the%20character%20at%20index%3D5%20with%20X

https://stackoverflow.com/questions/60966594/how-to-count-characters-in-a-string-in-python