

2019_1_mcpp_taller_4_mateo_lancheros

March 1, 2019

1 Taller 4

Métodos Computacionales para Políticas Públicas - UROSARIO

Entrega: viernes 1-mar-2019 11:59 PM

César Mateo Lancheros Cañón cesar.lancheros@urosario.edu.co

1.1 Instrucciones:

- Guarde una copia de este *Jupyter Notebook* en su computador, idealmente en una carpeta destinada al material del curso.
- Modifique el nombre del archivo del *notebook*, agregando al final un guión inferior y su nombre y apellido, separados estos últimos por otro guión inferior. Por ejemplo, mi *notebook* se llamaría: mcpp_taller4_santiago_mataallana
- Marque el *notebook* con su nombre y e-mail en el bloque verde arriba. Reemplace el texto "[Su nombre acá]" con su nombre y apellido. Similar para su e-mail.
- Desarrolle la totalidad del taller sobre este *notebook*, insertando las celdas que sea necesario debajo de cada pregunta. Haga buen uso de las celdas para código y de las celdas tipo *markdown* según el caso.
- Recuerde salvar periódicamente sus avances.
- Cuando termine el taller:
 1. Descárguelo en PDF.
 2. Suba los dos archivos (.pdf y .ipynb) a su repositorio en GitHub antes de la fecha y hora límites.

(Todos los ejercicios tienen el mismo valor.)

1.2 Zelle, Exercises 6.8 (p. 159):

- True/False: 1-10
- Multiple choice: 2, 3, 6, 7, 10
- Programming Exercises: 1, 3, 4, 11, 12, 13

1.3 6.8 Exercises

1.3.1 True/False

1. False
2. False
3. True
4. True
5. False
6. False
7. False
8. True
9. True
10. False

1.3.2 Multiple Choice

2. A
3. A
4. A
5. D
6. A

1.3.3 Programming Exercises

1. Write a program to print the lyrics of the song “Old MacDonald.” Your program should print the lyrics for five different animals, similar to the example verse below.

```
In [1]: def cancion(animal, sonido):  
        print("Old MacDonald had a farm, Ee-igh, Ee-igh, Oh!")  
        print("And on that farm he had a", animal + ", Ee-igh, Ee-igh, Oh!")  
        print("With a", sonido + ",",sonido + " here and a", sonido + ",",sonido + " there")  
        print("Here a", sonido + ", there a", sonido + ", everywhere a", sonido + ",", soni  
        print("Old MacDonald had a farm, Ee-igh, Ee-igh, Oh!")
```

```
In [2]: cancion("cow","moo")  
        cancion("pig", "oink")  
        cancion("duck", "quak")  
        cancion("dog", "wouw")  
        cancion("sheep", "bah")
```

```
Old MacDonald had a farm, Ee-igh, Ee-igh, Oh!  
And on that farm he had a cow, Ee-igh, Ee-igh, Oh!  
With a moo, moo here and a moo, moo there.  
Here a moo, there a moo, everywhere a moo, moo.  
Old MacDonald had a farm, Ee-igh, Ee-igh, Oh!  
Old MacDonald had a farm, Ee-igh, Ee-igh, Oh!  
And on that farm he had a pig, Ee-igh, Ee-igh, Oh!  
With a oink, oink here and a oink, oink there.  
Here a oink, there a oink, everywhere a oink, oink.
```

Old MacDonald had a farm, Ee-igh, Ee-igh, Oh!
 Old MacDonald had a farm, Ee-igh, Ee-igh, Oh!
 And on that farm he had a duck, Ee-igh, Ee-igh, Oh!
 With a quak, quak here and a quak, quak there.
 Here a quak, there a quak, everywhere a quak, quak.
 Old MacDonald had a farm, Ee-igh, Ee-igh, Oh!
 Old MacDonald had a farm, Ee-igh, Ee-igh, Oh!
 And on that farm he had a dog, Ee-igh, Ee-igh, Oh!
 With a wouw, wouw here and a wouw, wouw there.
 Here a wouw, there a wouw, everywhere a wouw, wouw.
 Old MacDonald had a farm, Ee-igh, Ee-igh, Oh!
 Old MacDonald had a farm, Ee-igh, Ee-igh, Oh!
 And on that farm he had a sheep, Ee-igh, Ee-igh, Oh!
 With a bah, bah here and a bah, bah there.
 Here a bah, there a bah, everywhere a bah, bah.
 Old MacDonald had a farm, Ee-igh, Ee-igh, Oh!

3. Write definitions for these functions:

sphereArea(radius) Returns the surface area of a sphere having the given radius.

sphereVolume(radius) Returns the volume of a sphere having the given radius.

Use your functions to solve Programming Exercise 1 from Chapter 3.

```
In [3]: pi = 3.1416
```

```
def area(r):
    a = 4 * pi * (r**2)
    print(a)
def volumen(r):
    v = 3%4 * pi * (r**3)
    print(v)
```

```
In [4]: area(7)
        volumen(32)
```

```
615.7536
```

```
308831.8464
```

4. Write definitions for the following two functions:

sumN(n) returns the sum of the first n natural numbers.

sumNCubes(n) returns the sum of the cubes of the first n natural numbers.

Then use these functions in a program that prompts a user for n and prints out the sum of the first n natural numbers and the sum of the cubes of the first n natural numbers.

```
In [10]: def main():
          print("Imprimir la suma de los n primeros números naturales, y de sus cubos")
```

```

n = int(input("Ingresar un número natural: "))
nSum = sumN(n)
nCubedSum = sumNCubes(n)
print("La suma de los {0} primeros números naturales es {1}. La suma de los cubos

def sumN(n):
    total = 0
    for i in range(n):
        total += i + 1
    return(total)

def sumNCubes(n):
    total = 0
    for i in range(n):
        total += ((i + 1)**3)
    return(total)

main()

```

Imprimir la suma de los n primeros números naturales, y de sus cubos

Ingresar un número natural: 5

La suma de los 5 primeros números naturales es 15. La suma de los cubos es 225

11. Write and test a function to meet this specification.

squareEach(nums) nums is a list of numbers. Modifies the list by squaring each entry.

```

In [11]: nums = [4, 9, 12, 20, 69]
def squareEach(x):
    squares = []
    squares.extend([i**2 for i in x])
    print(squares)

squareEach(nums)

[16, 81, 144, 400, 4761]

```

12. Write and test a function to meet this specification.

sumList(nums) nums is a list of numbers. Returns the sum of the numbers in the list.

```

In [15]: def sumList(x):
    resultado = 0
    i = 0
    while i < len(x):
        resultado = resultado + x[i]
        i += 1
    print(resultado)

sumList(nums)

```

13. Write and test a function to meet this specification.

toNumbers(strList) strList is a list of strings, each of which represents a number. Modifies each entry in the list by converting it to a number.

```
In [16]: strList = ["9", "17", "12", "3", "8"]
```

```
def toNumbers(x):  
    y = []  
    y.extend([int(i) for i in x])  
    print(y)
```

```
toNumbers(strList)
```

```
[9, 17, 12, 3, 8]
```
