2019_2_mcpp_taller_4

August 29, 2019

1 Taller 4

Métodos Computacionales para Políticas Públicas - URosario

Entrega: viernes 30-ago-2019 11:59 PM

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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_matallana
- 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 True/False 1-10

1) Programmers rarely define their own functions. Rta: F

2) A function may only be called at one place in a program. Rta: F

3) Information can be passed into a function through parameters Rta: T

4) Every Python function returns some value. Rta: T. Aclaración: El libro menciona que en caso de que dentro de la función no se defina un return o algun print, la función retornaría "None". Este "none" no es visto por el usuario, ni es almacenado en alguna variable.

5) In Python, some parameters are passed by reference. Rta: F

6) In Python, a function can return only one value Rta: F

7) Python functions can never modify a parameter. Rta: T

8) One reason to use functions is to reduce code duplication. Rta: T

9.)Variables defined in a function are local to that function Rta: T

10) It's a bad idea to define new functions if it makes a program longer. Rta: F

1.4 Multiple choice

2. A Python function definition begins with

a) def
b) define
c) function
d) defun

Rta: a

3. A function can send output back to the program with a(n)

a) return b) print c) assignment d) SASE

Rta: a

6. In Python, actual parameters are passed to functions

a) by value b) by reference c) at random d) by networking

Rta: a

7. Which of the following is not a reason to use functions?

a) to reduce code duplication

b) to make a program more modular

c) to make a program more self-documenting

d) to demonstrate intellectual superiority

Rta: d

10. A function can modify the value of an actual parameter only if it's

a) mutable b) a list c) passed by reference d) a variable

Rta: a

1.5 Programming exercises

1.5.1 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 [4]: def principal():
            print("Old McDonald had a farm, Ee-igh, Ee-igh, Oh!")

        def parte_animal(animal,sonido):
            palabra_1="And on that farm he had a "+ animal+",Ee-igh, Ee-igh, Oh!"
            palabra_2="With a "+ sonido+","+sonido+ " here and a "+ sonido+","+sonido+" there"
            palabra_3="Here a "+ sonido+","+" there a "+ sonido+", everywhere a "+sonido+","+s
            print(palabra_1)
            print(palabra_2)
            print(palabra_3)

        def total(animales):
            principal()
            for i in range(0,len(animales)):
                parte_animal(animales[i][0],animales[i][1])
                principal()

        lista_a=[["caballo","brrrrr"],["vaca","moo"],["perro","wof"],["gato","miau"],["pollo",'
        total(lista_a)
```

```
Old McDonald had a farm, Ee-igh, Ee-igh, Oh!
And on that farm he had a caballo,Ee-igh, Ee-igh, Oh!
With a brrrrr,brrrrr here and a brrrrr,brrrrr there
Here a brrrrr, there a brrrrr, everywhere a brrrrr,brrrrr
Old McDonald had a farm, Ee-igh, Ee-igh, Oh!
And on that farm he had a vaca,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 McDonald had a farm, Ee-igh, Ee-igh, Oh!
And on that farm he had a perro,Ee-igh, Ee-igh, Oh!
With a wof,wof here and a wof,wof there
Here a wof, there a wof, everywhere a wof,wof
Old McDonald had a farm, Ee-igh, Ee-igh, Oh!
And on that farm he had a gato,Ee-igh, Ee-igh, Oh!
With a miau,miau here and a miau,miau there
Here a miau, there a miau, everywhere a miau,miau
Old McDonald had a farm, Ee-igh, Ee-igh, Oh!
And on that farm he had a pollo,Ee-igh, Ee-igh, Oh!
With a pio,pio here and a pio,pio there
Here a pio, there a pio, everywhere a pio,pio
Old McDonald had a farm, Ee-igh, Ee-igh, Oh!
```

1.5.2 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 [10]:
```python
# Variabl global
pi=3.14159265359

def sphereArea(radius):
    # Formula del área
    area = 4*pi*radius**2
    return area

def sphereVolume(radius):
    # Formula del volumen
    volumen = (4/3*pi*radius**3)
    return volumen

def principal():
    print("Calculamos el área y volumen de una esfera, con un radio que da el usuario"
    radio = float(input("Radio de la esfera"))
    vol = sphereVolume(radio)
    area = sphereArea(radio)
    print("Volumen de la esfera: "+ str(vol) +'\n'+ "Area de la esfera :"+ str(area))

principal()
```

```
Calculamos el área y volumen de una esfera, con un radio que da el usuario
Radio de la esfera2
Volumen de la esfera: 33.510321638293334
Area de la esfera :50.26548245744
```

1.5.3 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.

```
In [18]: def sumN(n):
             final=n+1
             tot=sum(range(0,final))
             return tot

         def sumNCubes(n):
             final=n+1
             lista=[]
             for i in range(0,final):
                 lista.append(i**3)
             tot=sum(lista)
             print("lista de cubos:",lista)
             return tot

         def prin(n):
             su = sumN(n)
             cubos = sumNCubes(n)
             print("La suma de todos los numeros hasta "+str(n)+" es:", su)
             print("La suma de todos los cubos hasta "+str(n)+" es: ", cubos)

         prin(7)
```

```
lista de cubos: [0, 1, 8, 27, 64, 125, 216, 343]
La suma de todos los numeros hasta 7 es: 28
La suma de todos los cubos hasta 7 es:  784
```

1.5.4 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 [22]: def squareEach(nums):
             for i in range(0,len(nums)):
                 nums[i] = nums[i]**2

         def principal(lista):
             print("lista:")
             print(lista)
             squareEach(lista)
             print("Lista modificada:")
             print(lista)

         lista=[2,3,4,5,6,7]
         principal(lista)
```

```
lista:
```

```
[2, 3, 4, 5, 6, 7]
Lista modificada:
[4, 9, 16, 25, 36, 49]
```

1.5.5 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 [25]: def sumList(nums):
             return sum(nums)

         def principal(lista):
             print("Lista: ",lista)
             print("La suma de la lista: ")
             suma=sumList(lista)
             print(suma)
             return suma

         lista=[1,2,3,4,5,6,7,8,9]
         a=principal(lista)
```

```
Lista:  [1, 2, 3, 4, 5, 6, 7, 8, 9]
La suma de la lista:
45
```

1.5.6 13. Write and test a function to meet this specification. toNumbers(strList) strList is a list of strings, each of which represents a number. Modi- fies each entry in the list by converting it to a number.

```
In [28]: def toNumbers(strList):
             for i in range(0,len(strList)):
                 strList[i] = int(strList[i])

         def principal(lista):
             print("Lista de numeros en string: ")
             print(lista)
             toNumbers(lista)
             print("Lista modificada: ")
             print(lista)

         lista=["1","2","3","4","5"]
         principal(lista)
```

```
Lista de numeros en string:
['1', '2', '3', '4', '5']
Lista modificada:
[1, 2, 3, 4, 5]
```