1 Introducing Python - solutions to exercises

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1.1 Printing on screen

Create a function named `show_address` that will display your name and your mailing address. The function does not need to take any additional info or return anything. Therefore you may just call it like `show_address()` and it should print on screen something like:

```
your name
street name and suburb
postcode and city
country
```

The function will have empty parameter list and will not have the `return` statement.

In [1]:
```
def show_address():
    print('Jon Snow')
    print('Mystery Road, IceTree')
    print('1235, Pentos')
    print('Westeros')
```

In [2]:
```
show_address()
```

```
Jon Snow
Mystery Road, IceTree
1235, Pentos
Westeros
```

1.1.1 Adding flexibility

Modify your previous solution so that `show_address` accepts additional information, the name of the person to print the address. For example, when you call it `show_address('James Cook')` it will print out James Cook name followed by your address.

In [3]:
```
def show_address(name,street,suburb,postcode,city,country):
    print(name)
    print(street,suburb)
    print(postcode,city)
    print(country)
```

In [4]:
```
show_address('Jack Snell', 'West Ave.', 'Kingswood', '3231', 'Silver City', 'Greenland')
```

```
Jack Snell
West Ave. Kingswood
3231 Silver City
Greenland
```

In [5]:
```
show_address('Andy Shark', 'South Ave.', 'Woodside', '1231', 'Iced City', 'Redland')
```

```
Andy Shark
South Ave. Woodside
1231 Iced City
Redland
```

1.2 Finding the area of a rectangle

Write a function `find_area` that asks the user to enter the width and length of a rectangular room. Once these values have been read, your program should compute and display the area of the room. The length and the width will be entered as floating-point numbers. Include units in your prompt and output message. Calling the function by name `find_area()` should produce the message like:

```
The area of your room is 24.4 square metres.
```

Of course, the actual number will differ for your room.

In [6]:
```
def find_area():
    # Read the width and height of the room floor
    width = float(input('Enter width of the room: '))
    height = float(input('Enter height of the room: '))

    #apply formula (known from school) for area of a reactangle
    area = width * height

    #print out/display the output
    print('The area of the room is %.1f square metres.' %area)
```

In [7]:
```
find_area()
```

```
Enter width of the room:  3
Enter height of the room:  4.3

The area of the room is 12.9 square metres.
```

In [8]:
```
def find_area(name):
    width = float(input('Enter width of the room: '))
    height = float(input('Enter height of the room: '))
    area = width * height
    print('The area of your room %s is %.1f square metres.' %(name,area))
```

In [9]:
```
find_area('Julie')
```

```
Enter width of the room:  2.8
Enter height of the room:  2.4

The area of your room Julie is 6.7 square metres.
```

1.2.1 Adding flexibility

Modify your previous solution to find the volume of a room and not asking the user for input. Instead, the required input will be passed to the function through arguments. Call the function `find_volume` . It will accept four pieces of additional information: person's name, floor_width, floor_height, and room_height. For example, when you call it `find_volume('Julie', 5, 3.21, 2.7)` it will print out:

```
The volume of your room Julie is 43.36 cubic metres.
```

Note that you do not need to read the required information using `input` function.

In [10]:
```
def find_volume(name,floor_width, floor_height, room_height):
    volume = floor_width * floor_height*room_height
    print('The volume of your room %s is %.1f cubic metres.' %(name,volume))
```

In [11]:
```
find_volume('Julie', 5, 3.21, 2.7)
```

```
The volume of your room Julie is 43.3 cubic metres.
```

1.3 Free fall

Given the height from which the object is dropped in metres, write a function named `free_fall_speed` that determines how quickly an object is travelling when it hits the ground. Assume the object's initial speed is v_0 and the acceleration due to gravity is constant $a = 9.8m/s^2$ (as you recall from school). You can use the formula $v = \sqrt{v_0^2 + 2ad}$ to compute the final velocity, v , when the initial speed, v_0 , and distance, d, are known. You may either ask the user for input of v_0 and d or pass this info to the function when you call it, like `free_fall_speed(10, 20)` . For practice you may as well provide both implementations. Print out the answer with 3 decimal places. To calculate the square root use the `import` statement to enable `sqrt` function

```
from math import sqrt
```

In [12]:
```
def free_fall_speed(ini_speed, distance):
    from math import sqrt

    # Define a constant for the acceleration due to gravity in m/s**2
    GRAVITY = 9.8

    # Compute the final velocity
    vf = sqrt(ini_speed**2 + 2 * GRAVITY * distance)

    # Display the result
    print("It will hit the ground at %.2f m/s." % vf)
```

In [13]:
```
free_fall_speed(10,20)
```

```
It will hit the ground at 22.18 m/s.
```

alternatively, you could ask for user for all (or some) input values:

In [14]:
```
def free_fall_speed2(ini_speed):
    from math import sqrt

    # Define a constant for the acceleration due to gravity in m/s**2
    GRAVITY = 9.8

    # Read the height from which the object is dropped
    distance = float(input("Enter height (in meters): "))

    # Compute the final velocity
    vf = sqrt(ini_speed**2 + 2 * GRAVITY * distance)

    # Display the result
    print("It will hit the ground at %.2f m/s." % vf)
```

In [15]:
```
free_fall_speed2(10)
```

```
Enter height (in meters):  2.7
```

```
It will hit the ground at 12.37 m/s.
```

1.4 Basic Arithmetic

Create a function that reads two integers, x and y, from the user. It should compute and display the sum $x + y$, difference $x - y$, product $x * y$, quotient x/y and the power x^y.

In [16]:
```
def arithmetic():
    # Read the input values from the user
    x = int(input('Enter the value of x: '))
    y = int(input('Enter the value of y: '))
    # Compute and display the sum, difference, product, quotient and power
    print(x, '+', y, 'is', x + y)
    print(x, '-', y, 'is', x - y)
    print(x, '*', y, 'is', x * y)
    print(x, '/', y, 'is', x / y)
    print(x, '**', y, 'is', x**y)
```

In [17]:
```
arithmetic()
```

```
Enter the value of x:  112
Enter the value of y:  7

112 + 7 is 119
112 - 7 is 105
112 * 7 is 784
112 / 7 is 16.0
112 ** 7 is 221068140740608
```