

Python Exercises

Numbers and Inputs:

1. Go back to your solution from ex_print_and_var question 3 and use the input operator to let the user define the inputs for the text.
2. Create a calculator:
 - a. Make a program called my_sum.py. Use the “input” operation in python, and let the user specify two input, sum them together, and print the result. Double check that the math is correct.
hint: make sure that the type of the values is float before adding them together.
 - b. Do the same as above and make 3 more programs, my_subtract.py, my_multiply.py and my_divide.py.
 - c. Make another program called my_throw.py which takes input by the user: an angle (in degrees), velocity (in km/h) and throw height (in meter).

Calculate and print the following information:

- i. The throw angle using radians
 $\alpha = \text{math.radians}(\theta)$
where θ is the throw angle in degrees.
- ii. The throw velocity in meter/second

$$v_0 = \frac{v_{\text{km/h}}}{3.6}$$

where $v_{\text{km/h}}$ is the velocity in km/h.

- iii. The throw velocity in the horizontal direction (in m/s), given by

$$v_{0x} = v_0 \cdot \cos(\alpha)$$

where v_0 and α is given above.

- iv. The throw velocity in the vertical direction, given by

$$v_{0y} = v_0 \cdot \sin(\alpha)$$

where v_0 and α is given above.

v. The ball airtime, given by:

$$t = \frac{v_{0y} + \sqrt{v_{0y}^2 + 2 \cdot g \cdot h_0}}{g}$$

where $g=9.81$, and h_0 is the throw height.

vi. The throw distance, given by:

$$R = v_{0x} \cdot t$$

- d. Test if everything is calculated correctly, using an angle of 30 degrees, velocity of 50km/h and a standing height of 2m which should print the results:
Throw angle in radians [alpha]: 0.5235987755982988
Throw velocity in m/s [v_0]: 13.888888888888889
Throw velocity in the horizontal direction [v_x]: 12.02813060811720
Throw velocity in the vertical direction [v_y]: 6.9444444444444443
Airtime [t]: 1.6612368395982768
Throw distance [R]: 19.981573677703928
- e. Change print format such that only 2 decimals are shown.
- f. It's a common knowledge that throwing a ball at 45degrees angle gives the longest throw. But is that also true when you are standing up ($h_0>0$)? Try $h_0=2$, is the longest throw also at 45degrees, a little bit less or a little bit more?
3. Go back to "ex1_print_and_var" question 4.
Define 3 variables:
current_number, total_numb, bar_length.
These variables should define the bar print.
Change the code such that only one line is printed.
Example:
say bar_length is set to 10, current_number is 50 and total_numb is 100
then the code should print
|====> |
where the bar is half way, and the total length of the bar is 10 characters.