Data Science
Lab Exercise (Week 1)

1. Go through Python tutorial https://docs.python.org/3/tutorial/. Specially focus on List /
   Input Output

2. Determinant D of a quadratic equation is defined as $b^2 - 4ac$. Write a program in python
   that takes three inputs a, b, and c from the user. Then calculate Determinant D and print
   it. Then find the real roots according to following three cases.

   a. If D is positive, then print the following two real roots
   $$x_1 = \frac{-b + \sqrt{b^2 - 4ac}}{2a}$$
   $$x_2 = \frac{-b - \sqrt{b^2 - 4ac}}{2a}$$

   b. If D is 0, then print only one real root, $\frac{-b}{2a}$

   If D is negative, then print "Only complex roots!"

3. Write a python function, called **smaller**, that computes the number of elements in an array
   of integers **x** of size **s** that are strictly less than a given number **n**.

   Example:
   x = {13, 56, 21, 45, 20, 43, 12, 43, 6}
   smaller(x, 9, 21) returns 4 (13< 21, 20 < 21, 12<21, 6<21)
   smaller(x, 9, 20) returns 3 (13< 20, 12<20, 6 < 20)

4. With a given list [12,24,35,24,88,120,155,88,120,155], write a program to print this list
   after removing all duplicate values with original order reserved.

   Hints:

   Use set() to store a number of values without duplicate.

5. With two given lists [1,3,6,78,35,55] and [12,24,35,24,88,120,155], write a program to
   make a list whose elements are intersection of the above given lists.

   Hints:

   Use set() and "&=" to do set intersection operation.

6. calculate the body mass index (BMI) of two variables input by the user:

   where BMI = weight / height ^{2}

7. Create a variable growth_multiplier, equal to 1.3. Create a variable, sales, equal to the amount of money you earn in a years. Print out the value of sales after 7 years.

8. Now that we know how to work with numbers and strings, let's write a program that might actually be useful! Let's say you want to find out how much you weigh in stone. A concise program can make short work of this task. Since a stone is 14 pounds, and there are about 2.2 pounds in a kilogram, the following formula should do the trick:

$$M_{stone} = \frac{m_{kg} \times 2.2}{14}$$

9. Build the list so that the list first contains the name of each room as a string and then its area in square meter. In other words, add the string " hall 11.3", "kitchen 6", bedroom 12.5"

10. Create a list Score that contains the GPA of a student in 6 semesters. Create 3 such students and add them in new list call Students with the name of the student with it as well.