

IDC101 (Introduction to Computation) :

Lab session 5

For all the problems given here, you will have to use function construct.

0. Write a program to compute the average of ten numbers using function. (For reference, see the given sample programs).
1. Write a program using function syntax in python and calculate the value of a factorial for a given user input.
2. Change the code in the above program to calculate the value of trigonometric functions from the series expansion definition, and return the value of the trigonometric function with an accuracy of 0.00001. Use function to do this problem.
3. Write a program to convert from Celcius to Fahrenheit. Take the user input for temperature and also take the user input for converting from C into F or the other way around. Use function to do this problem.
4. Let x list of values from 0 to 4 pi. Create this list. Now, compute the values $y = \sqrt{2.3x^2 + x}$ using function.
5. Use matplotlib.pyplot functionality to plot y as a function of x that was computed in problem 4.
6. Create a list of 100 numbers using the formula $y = \sin(x) - 2\sqrt{x^3}$. Generate your own list for x . This about what kind of x should be generated. Plot your result. Use a function to compute the value of sine function. Use another function to compute the value of y .
7. Write a Python function to create and print a list where the values are square of numbers between 1 and 30 (both included).
8. Write a Python function that takes a number as a parameter and check the number is prime or not.
9. Write a Python function that takes a list and returns a new list with unique elements of the first list.

10. Write a program that asks the user how many Fibonacci numbers to generate and then generates them. Take this opportunity to think about how you can use functions. Make sure to ask the user to enter the number of numbers in the sequence to generate.

11. Write a program to solve a general quadratic equation using function. Use the standard (and well known) solutions of quadratic equations and write them as python functions. Think about what input is needed and what possible outputs can be expected. Take care of all possible solutions including complex quantities.

12. Using matplotlib, plot the function $\exp(-x)$ and then independently generate a list and compute $\exp(-x)$. Now, plot both the results on the same graph. The generated list should be plotted as a dots, while the function to be plotted must be a continuous curve.