**PSG COLLEGE OF TECHNOLOGY**

**DEPARTMENT OF APPLIED MATHEMATICS AND COMPUTATIONAL SCIENCES**

**Python Programming Laboratory**

**Problem Sheet 2**

1. Write a program that prints the numbers from 1 to 100. But for multiples of three print “Fizz” instead of the number and for the multiples of five print “Buzz”. For numbers which are multiples of both three and five print “FizzBuzz”.
2. Write a function that calculates and returns the Euclidean distance between two points *u* and *v*, where *u* and *v* are both n-tuples (*x1*,x2, ….xn). For example, if *u*=(3,0) and *v*=(0,4), the function should return 5.
3. Write a function to consider two vectors and compute cosine of the angle between them and compare it with Euclidean distance.
4. A Pythagorean triple is an integer solution to the Pythagorean Theorem *a*2+*b*2=*c*2. The first Pythagorean triple is (3,4,5). Find all unique Pythagorean triples for the positive integers a, b and c less than 100.
5. Write a function to take a list of numbers and return a list of normalized numbers (0-1).
6. Write a function to print the inverse of a matrix.
7. Write a function check whether the given matrix is symmetric, stochastic. Check whether the rows/columns are orthogonal.
8. In cryptography, a *Caesar cipher* is a very simple encryption techniques in which each letter in the plain text is replaced by a letter some fixed number of positions down the alphabet. For example, with a shift of 3, A would be replaced by D, B would become E, and so on. The method is named after Julius Caesar, who used it to communicate with his generals. Write a function to implement *Caesar cipher.*
9. Write a function abs(x), that returns x of x>=0 and –x, if x<= 0. If x is complex, it should return
10. Determine how many digits a positive integer has by repeatedly dividing by (without keeping the remainder).
11. Assign a list to a reference a , containing a regular sequence of 5 - 8 elements, such that if you knew the first 3 elements you would be able to predict the rest. E.G: [3,6,9,12,15,21,24] .

Using a slice operation assign 2 elements from the middle of your sequence: e.g. 12 and 15 to another list called c .

Take a backup of your list a in b by assigning:   b=a  You might need to copy the backup in b back to a if you screw a up.

Using the del operator twice on indexed elements of list a, remove the 2 elements from the middle of a that you assigned into the list c. E.G if you had (blindly) used the above values your list might now look like: [3,6,9,21,24].

Using a slice assignment operation, restore the list a to its original sequence by inserting list c into the middle of list a.

1. Create a list made up of all the following 4 lower-case words, 1 word per list item: ["the","dead","parrot","sketch"]. Assign this list to a reference called: parrot . Write and save (as for1.py ) a short program using a for loop, which prints out each word in turn, with the first letter capitalised, together with the length of each word. Your output should look like this:

The 3

Dead 4

Parrot 6

Sketch 6