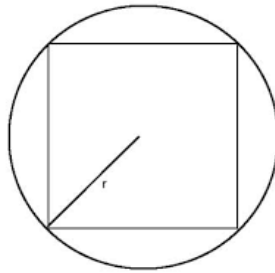


1. (a) What is meant by correlation between two parameters ? Given a set of values $\{(B, X) = (b_i, x_i); (i=1,2,3...n)\}$ write down the expression of covariance of B and X . 1+1
(b) Write a Python function to generate the histogram profile of a Poissonian sample of size $N=1000$. 4
2. (a) Explain what is meant by simulation of random walk in one dimension. 2
(b) Write a Python program to simulate the tossing of a coin. 4
3. Write an algorithm to obtain the nature of variation of the R.M.S. value of displacement of a number of random walks in one dimension. 6
4. Consider a system of 10000 radioactive nuclei at time $t=0$. Write an algorithm to generate the variations of the number of decay and the decay rate with time. 6
5. Consider a square perfectly enclosed in a circle of radius r (see figure below).



Write an algorithm to compute the area of the square by the method of “Stone throwing”. 6