**Assignment – II**

**(k-mer Analysis, Dotplots)**

**Deadline: 2nd Apr**

1. Simulate observations having the binomial distribution with p = 0.25 and *n* = 1000. What is the probability of observing at least 240 A’s in such a sequence? [Hint: Obtain 10,000 simulations and compute the number of A’s in each run]. Compare your result with the normal approximation to binomial distribution.
2. Suppose X has a binomial distribution with p = 0.3 and *n* = 10. Compute P(X=0), P(X=2), E(X) and Var(X).
3. Briefly discuss the applications of k-mer analysis.
4. Show a dotplot of the following two sequences and give the conserved region:

(Make a n x m table and put ‘.’ or ‘x’ for match)

GGCTGCAACTAGCTC

GGGTAAGCTTGC

1. Obtain the self-dotplot of the following sequence to identify repeat region:

TGGCACACTCACACCACACAGACAGTTA

1. Find self-complementary regions in the following RNA sequence:

AUGUGGCAUGCCAGG