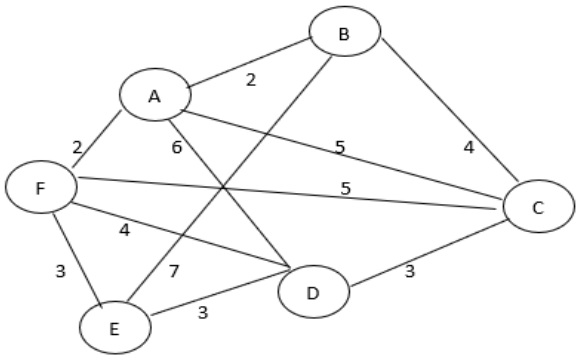
Assignment 1

1. Define Nature-Inspired Computing. Explain four different categories of natural system that are inspired from nature. Discuss four characteristics of nature that does not exist in traditional computing.

2. Solve the given Travelling and Salesman Problem (TSP) using Genetic Algorithms. (Illustrate problem solving with next two generations)



   Create an initial population size (N = 5) for the candidate TSP solutions. Define the fitness function to minimize the travelling cost.
   a. Apply rank based selection technique to select the parent for crossover.
   b. Apply partially mapped crossover technique to generate offsprings.
   c. Apply reversing/inversion mutation technique to mutate two genes of chromosome.

3. Solve the N-Queens problem using Genetic Algorithms. (Illustrate problem-solving with next two generations)
   Create an initial population size (N = 5) for the candidate solutions. Define the fitness function to minimize the attacking queens.
   a) Apply the roulette wheel selection technique to select the parent for crossover.
   b) Apply three parent crossover technique to generate offsprings.
   c) Apply scramble mutation technique to mutate two genes of chromosome.

4. Solve the 8-puzzle problem using Genetic Algorithms. (Illustrate problem solving with next two generations)
   Create an initial population size (N = 5) for the candidate solutions. Define the fitness function to minimize the misplaced tiles.
   a) Apply the rank based selection technique to select the parent for crossover.
   b) Apply three cycle crossover technique to generate offsprings.
   c) Apply swap mutation technique to mutate two genes of chromosome.