# Assignment 3

1. Solve the given minimization problem using Particle Swarm Optimization (PSO). (Illustrate problem solving with next two generations). **Assume $C_1 = 1$, $C_2 = 1$, $r_1 = \{0.4, 0.5, 0.3, 0.6\}$, $r_2 = \{0.2, 0.7, 0.8, 0.3\}$, $\omega = 0.5$, $a_1 = [1, 50]$, $a_2 = [10, 50]$**.

**Objective Function: $f(a_1, a_2) = 1 + (a_1 - 2) + (2a_2 - 3)$**

   a) Create N number of particles with each particle position and velocity considered as an initial population size for the given optimization problem (N = 4).
   b) Perform the computation with next two generations of searching. For each generation:
      1. Clearly write down the fitness value of the particles.
      2. Clearly write down the pbest and gbest of the particle in the population.
      3. Clearly write down the updated position and velocity of each particles in the population.
      4. Clearly write down the new fitness value of the particles in the population at the end of generation

2. Solve the given maximization problem using Flower Pollination Algorithm (FPA). (Illustrate problem solving with next two generations). **Assume switch probability $(p) = 0.7$, $L(\lambda) = 2$, $\gamma = 1.5$, $\varepsilon = 0.25$, $r = \{0.4, 0.5, 0.3, 0.6\}$, $a_1 = [1, 50]$, $a_2 = [10, 50]$**.

**Objective Function: $f(a_1, a_2) = 1 + (a_1 - 2) + (2a_2 - 3)$**

   c) Create N number of flowers considered as an initial population size for the given optimization problem (N = 4).
   d) Perform the computation with next two generations of searching. For each generation:
      1. Clearly write down the fitness value of the flowers.
      2. Clearly write down the best solution $g^*$ in the population.
      3. Clearly write down the updated values of each flower in the population.
      4. Clearly write down the updated best solution g* in the population at the end of generation.