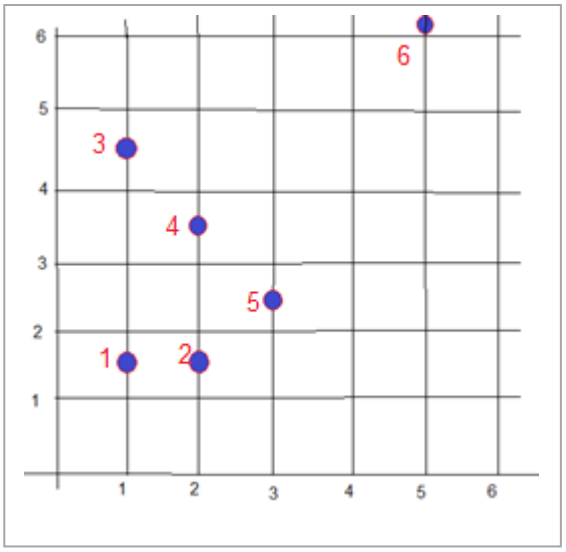
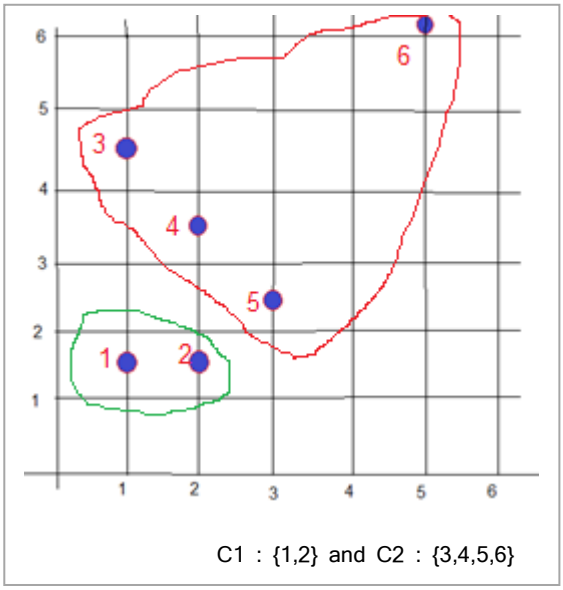
Consider the following instances [in the two-dimensional form]

Instance	X	Y
1	1.0	1.5
2	1.0	4.5
3	2.0	1.5
4	2.0	3.5
5	3.0	2.5
6	5.0	6.1



1. If the Instances are to be partitioned into 2 clusters then take K=2.
2. Next , chose two points at random representing initial cluster centres:
   Instance 1 and 3 are chosen as cluster centres; i.e.
   C1:= (1.0, 1.5) and C2:= (2.0, 1.5) are chosen as the initial centroid
3. **Evaluate distance between point i and j using Euclidean distance method**
   $D(i - j) = \{ (Xi - Xj)^2 + (Yi - Yj)^2 \}^{1/2}$
   - **Initial cluster centres C1: (1.0, 1.5) C2: (2.0, 1.5)**
     - **For Instance '1'**
       Distance between Cluster centre, C1(1.0, 1.5) and Instance1 (1, 1.5) is;
       $D(C1 - 1) = \{(1 - 1)^2 + (1.5 - 1.5)^2\}^{1/2} = 0.00$
       Distance between Cluster centre C2(2.0, 1.5) and Instance1 (1, 1.5) is;
       $D(C2 - 1) = \{(2 - 1)^2 + (1.5 - 1.5)^2\}^{1/2} = 1.00$
       Since D (C1-1) < D(C2-1) i.e. Instance1 is nearest from C1 than C2. So, the Instance '1' falls in cluster C1
     - **For Instance '2'** ***(1.0,4.5) from C1(1.0, 1.5) and C2(2.0, 1.5)***
       `D (C1 – 2) = 3.00; D (C2 –2) = 3.16`
       Since D (C1-2) < D(C2-2) the Instance '2' falls in cluster C1
     - **For Instance '3'** ***(2.0,1.5) from C1(1.0, 1.5) and C2(2.0, 1.5)***
       D (C1 - 3) = 1.00; D (C2 -3) = 0.00
       Since D (C2-3) < D(C1-3) the Instance '3' falls in cluster C2
     - **For Instance '4'** ***(2.0,3.5) from C1(1.0, 1.5) and C2(2.0, 1.5)***
       D(C1 - 4) = 2.24; D(C2 -4) = 2.00
       Since D(C2-4) < D(C1-4) the Instance '4' falls in cluster C2
     - **For Instance '5'** ***(3.0,2.5) from C1(1.0, 1.5) and C2(2.0, 1.5)***
       D(C1 - 5) = 2.24; D(C2 -5) = 1.41
       Since D(C2-5)< D(C1-5) the Instance '5' falls in cluster C2
     - **For Instance '6'** ***(5.0,6.0) from C1(1.0, 1.5) and C2(2.0, 1.5)***
       D(C1 - 6) = 6.02; D(C2 -6) = 5.41
       Since D(C2-6) < D(C1-6) the Instance '6' falls in cluster C2
   - **Then the cluster C1 and C2 contain the following Instances respectively**
     C1 : {1,2} => {(1.0,1.5) , (1.0,4.5)}
     C2 : {3,4,5,6} => {(2.0,1.5) , (2.0,3.5) , (3.0,2.5) , (5.0,6.0)}



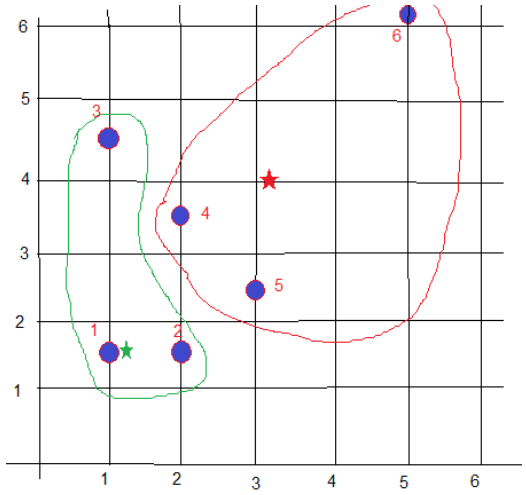
4. **Recomputing cluster centers [taking the mean]**
   a. for C1:
      XC1 = (1.0+1.0)/2 = 1.0
      YC1 = (1.5+4.5)/2 = 3.0
   b. For C2:
      XC2 = (2.0+2.0+3.0+5.0)/4 = 3.0
      YC2 = (1.5+3.5+2.5+6.0)/4 = 3.375
      Thus the new cluster centers are C1(1.0,3.0) and C2(3.0,3.375)
5. As the cluster centers have changed the algorithm performs another iteration
   - New cluster centers C1(1.0,3.0) and C2(3.0,3.375)
     - D(C1 - 1) = 1.50 D(C2 -1) = 2.74 Instance '1' falls in C1
     - D(C1 - 2) = 1.50 D(C2 -2) = 2.29 Instance '2' falls in C1
     - D(C1 - 3) = 1.80 D(C2 -3) = 2.13 Instance '3' falls in C1
     - D(C1 - 4) = 1.12 D(C2 -4) = 1.01 Instance '4' falls in C2
     - D(C1 - 5) = 2.06 D(C2 -5) = 0.88 Instance '5' will be in C2
     - D(C1 - 6) = 5.00 D(C2 -6) = 3.30 Instance '6' will be in C2

- Then the cluster C1 and C2 contain the following Instances respectively
  C1 : {1,2.3}
  C2 : {4.5.6}

6. computing new cluster centers [taking the mean]
   For C1: XC1 = (1.0+1.0+2.0)/3 = 1.33 YC1 = (1.5+4.5+1.5)/3 = 2.50
   For C2: XC2 = (2.0+3.0+5.0)/3 = 3.33 YC2 = (3.5+2.5+6.0)/3 = 4.00

   Thus the new cluster centers are C1(1.33,2.50) and C2(3.33,4.3.00)
   As the cluster centers have changed the algorithm performs another iteration

   [repeat the process until there is no change in cluster centers or no Instance change its cluster]



C1 : {1,2,3} and C2 : {4,5,6}