K-means clustering

Point	Coordinates
A1	(2, 10)
A2	(2, 6)
A3	(11, 11)
A4	(6, 9)
A5	(6, 4)
A6	(1, 2)
A7	(5, 10)
A8	(4, 9)
A9	(10, 12)
A10	(7, 5)

Step 1:-

Finding the centroid

$$c_1 = A_2 \ (2, 6)$$

$$c_2 = A_7 \ (5, 10)$$

Step 2:-

By using the Distance formula we can find the Distance and finding the nearby cluster

Point	Distance from C_1	Distance from C_2	Assigned cluster
A_1	4	3	C_2
A_2	0	5	C_1
A_3	10.29	6.08	C_2
A_4	5	1.41	C_2
A_5	4.47	6.08	C_1
A_6	4.12	8.94	C_1
A_7	5	0	C_2
A_8	3.60	1.414	C_2
A_9	10	5.38	C_2
A_{10}	5.09	5.38	C_1

Step 3:-

By using Assigned cluster we can able to get new centroids

$$C_1 = A_2, A_5, A_6, A_{10} \qquad C_2 = A_1, A_3, A_4, A_7$$
$$A_8, A_9$$

$$x_1 = \frac{2+6+1+7}{4} \qquad y_1 = \frac{6+4+10+5}{4}$$

$$= 4 \qquad = 6.25 \qquad (x_2, y_2) = (4, 9.6)$$

step 4:-

By using new centroid we can also
to find the distance.

Point	C_1	C_2	A cluster
A_1	5.769	2.040	C_2
A_2	2.693	4.118	C_1
A_3	9.261	7.133	C_2
A_4	4	2.088	C_2
A_5	2	5.9	C_1
A_6	4	8.17	C_1
A_7	3	10.6	C_2
A_8	3	0.6	C_2
A_9	9	6.4	C_2
A_{10}	5	5.4	C_1

step 5:-

By using new centroid the Assigned
clustors have not changed by using

$$C_1 = (4, 6.25) \qquad C_2 = (4, 9.6)$$

is the final centroid

If Assigned clusters have any we have to repeat the steps 3 & 4 until the Assig clusters are same while comparing with Previous no.