

```

load data.mat

%Input Data plot
figure
plot(data(1,:),data(2,:), 'b. ')

number_of_clusters = 2;
centroid_index = randi(length(data),number_of_clusters,1);
centroids = data(:,centroid_index);

while 1
    for j=1:length(data)
        magnitude = sum((centroids - repmat(data(:,j), 1, 2)).^2);
        [y, index] = min(magnitude);
        temp(j) = index;
    end
    Previous_centroids = centroids;
    for j=1:length(data)
        for k = 1:2
            samples = data(:,temp==k);
            centroids(:,k) = mean(samples,2);
        end
    end
    % Exit of the infinite loop is when there are no more updates
    if Previous_centroids == centroids
        break;
    end
end

X = sprintf('The centroids are: (%f, %f) and (%f, %f)',centroids(1,1),centroids(2,1),centroids(1,2),centroids(2,2));
disp(X)

figure
plot(data(1,temp==1),data(2,temp==1), 'r. ')
hold on
plot(data(1,temp==2),data(2,temp==2), 'b. ')
xlabel('X1')
ylabel('X2')
title('K-Means Clustering')

data_cluster_1= [3,3;centroids(1,1),centroids(2,1)];
data_cluster_2= [3,3;centroids(1,2),centroids(2,2)];

d1 = pdist(data_cluster_1,'euclidean');
d2 = pdist(data_cluster_2,'euclidean');

if (d1<d2)
    result = sprintf('The data (3,3) belongs to cluster with centroid: (%f, %f) - Cluster_Color = Red',centroids(1,1),centroids(2,1));
    disp(result)
else
    result = sprintf('The data (3,3) belongs to cluster with centroid: (%f, %f) - Cluster_Color = Blue',centroids(1,2),centroids(2,2));
    disp(result)
end

```

The centroids are: (5.133442, 5.261360) and (0.116186, 0.026701)
 The data (3,3) belongs to cluster with centroid: (5.133442, 5.261360) - Cluster_Color = Red

