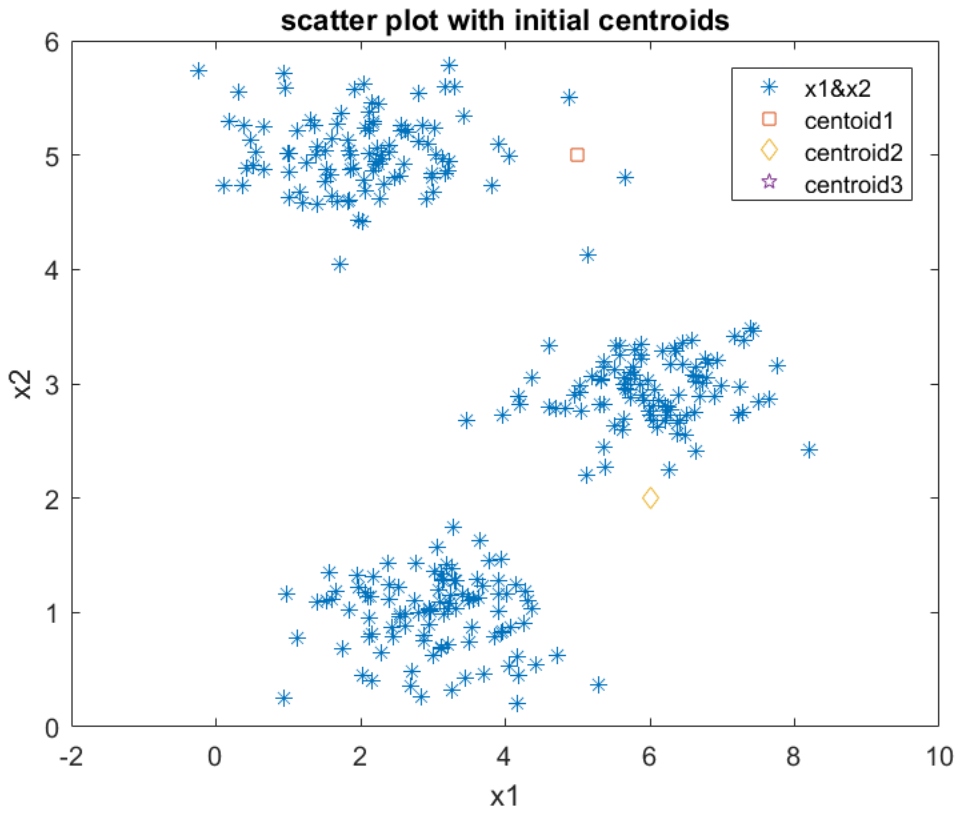
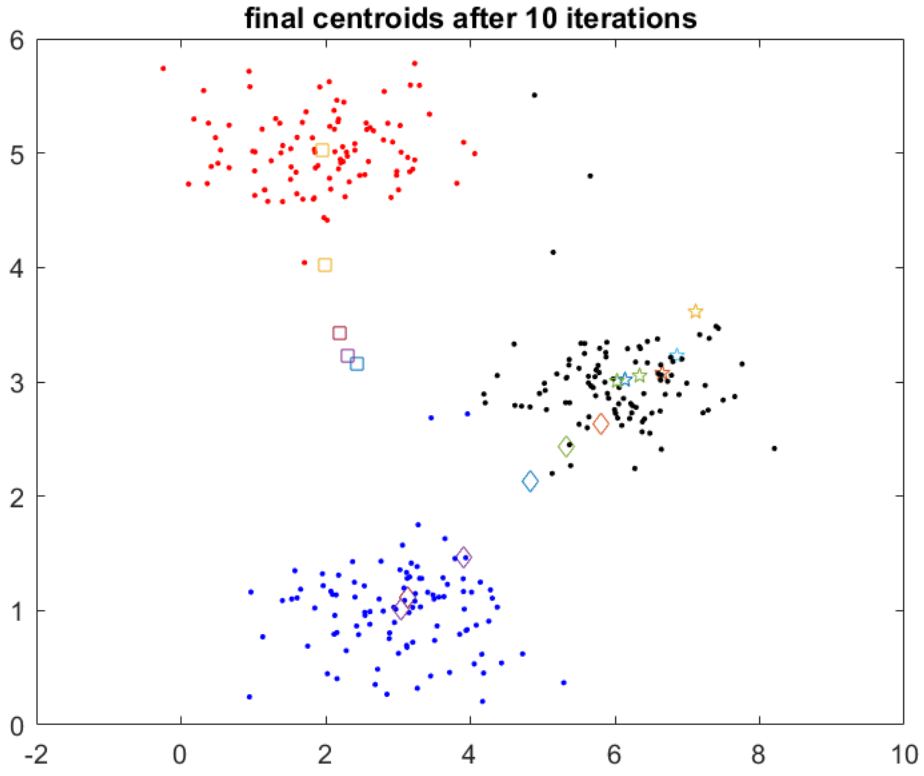
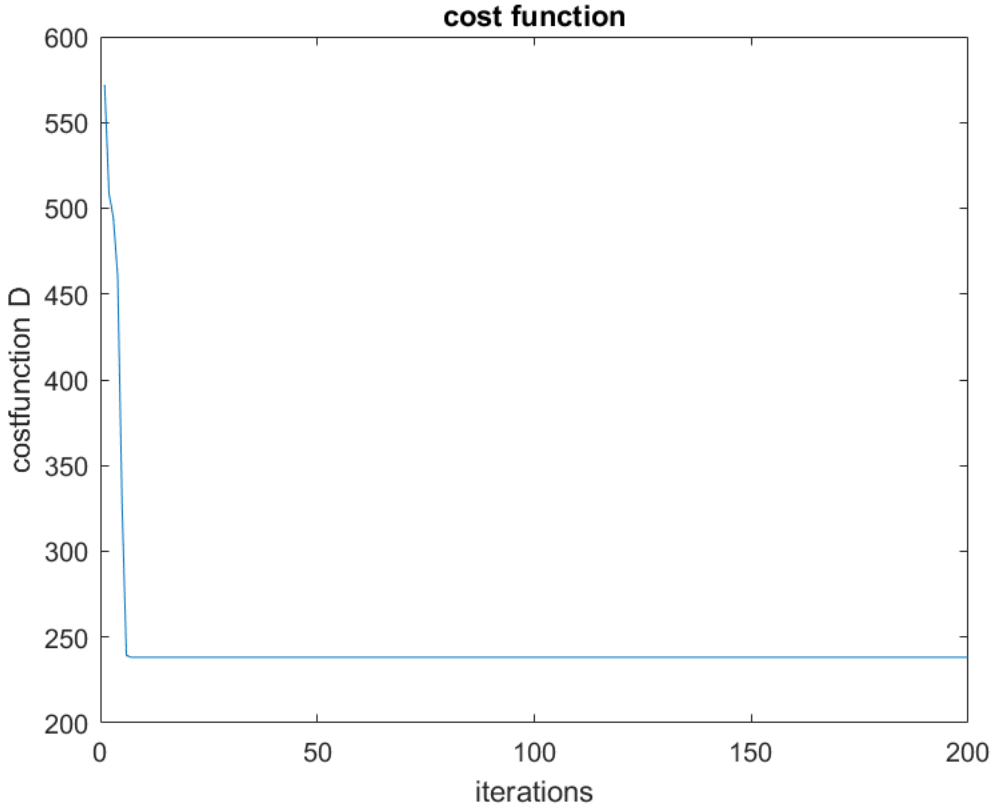
```
clc
close all
clear all
load('KmeansDat');
x1=X(:,1);
x2=X(:,2);
x=[x1 x2];
m=length(X);
iterations=200;
u=[3 3;6 2;8 5];
figure();
plot(x1,x2,'*',5,5,'s',6,2,'d',8,5,'p');
xlabel('x1');
ylabel('x2');
legend('x1&x2','centoid1','centroid2','centroid3');
title('scatter plot with initial centroids');
figure();
for i=1:iterations
    t=1;
    s=1;
    r=1;
    for j=1:m
        A=[sqrt((x(j,:)-u(1,:))*(x(j,:)-u(1,:))') sqrt((x(j,:)-
u(2,:))*(x(j,:)-u(2,:))') sqrt((x(j,:)-u(3,:))*(x(j,:)-u(3,:))')];
        d(j)=sum(A);
        [val, ind]=min(A);
        c(j)=ind;
        if c(j)==1
            l(r,:)=x(j,:);
            r=r+1;
            d(j)=A(c(j));
        elseif c(j)==2
            q(s,:)=x(j,:);
            s=s+1;
            d(j)=A(c(j));
        elseif c(j)==3
            n(t,:)=x(j,:);
            t=t+1;
            d(j)=A(c(j));
            end
        end
        u(1,:)=(1/length(l))*sum(l);
        u(2,:)=(1/length(q))*sum(q);
        u(3,:)=(1/length(n))*sum(n);
        D(i)=sum(d);
        title('final centroids after 10 iterations');
        plot(l(:,1),l(:,2),'r.')
        hold on
        plot(q(:,1),q(:,2),'b.')
        hold on
        plot(n(:,1),n(:,2),'k.');
        hold on
```

```
        plot(u(1,1),u(1,2),'s')
        plot(u(2,1),u(2,2),'d')
        plot(u(3,1),u(3,2),'p')
        clear q;
        clear l;
        clear n;
end
figure()
plot(1:iterations,D);
xlabel('iterations');
ylabel('costfunction D');
title('cost function');
disp('the final centroid points are');
disp(u);
```

```
the final centroid points are
    1.9540    5.0256
    3.0437    1.0154
    6.0337    3.0005
```




final centroids after 10 iterations
6
5
4
3
2
1
0
-2
0
2
4
6
8
10

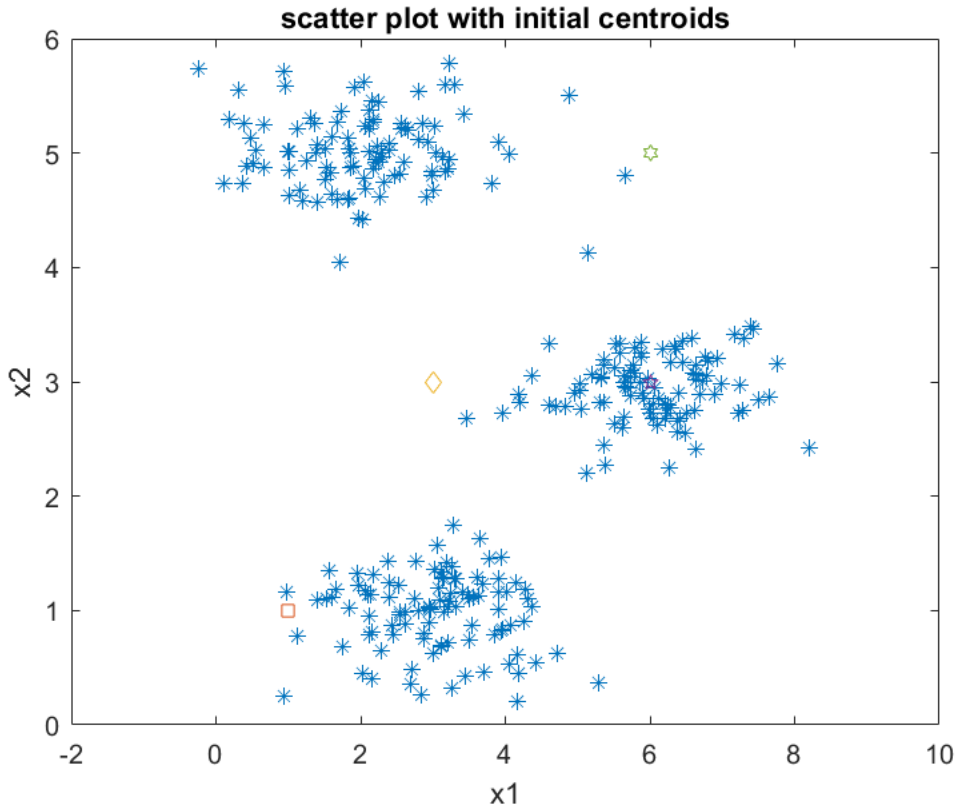

cost function
600
550
500
450
400
350
300
250
200
costfunction D
0
50
100
150
200
iterations

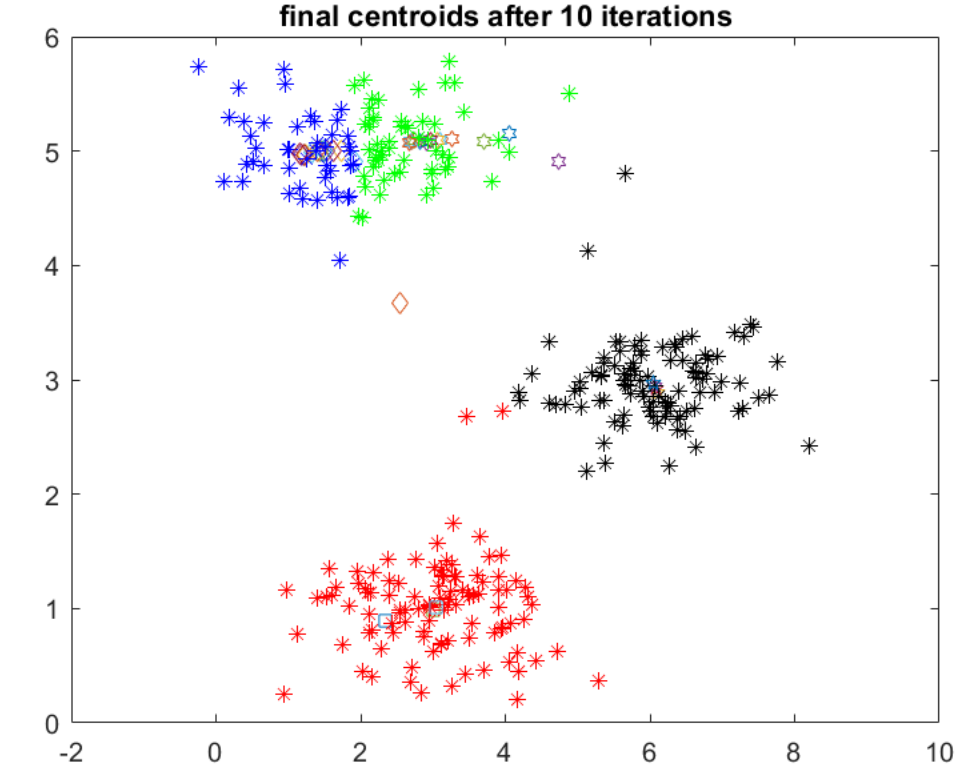
with four clusters

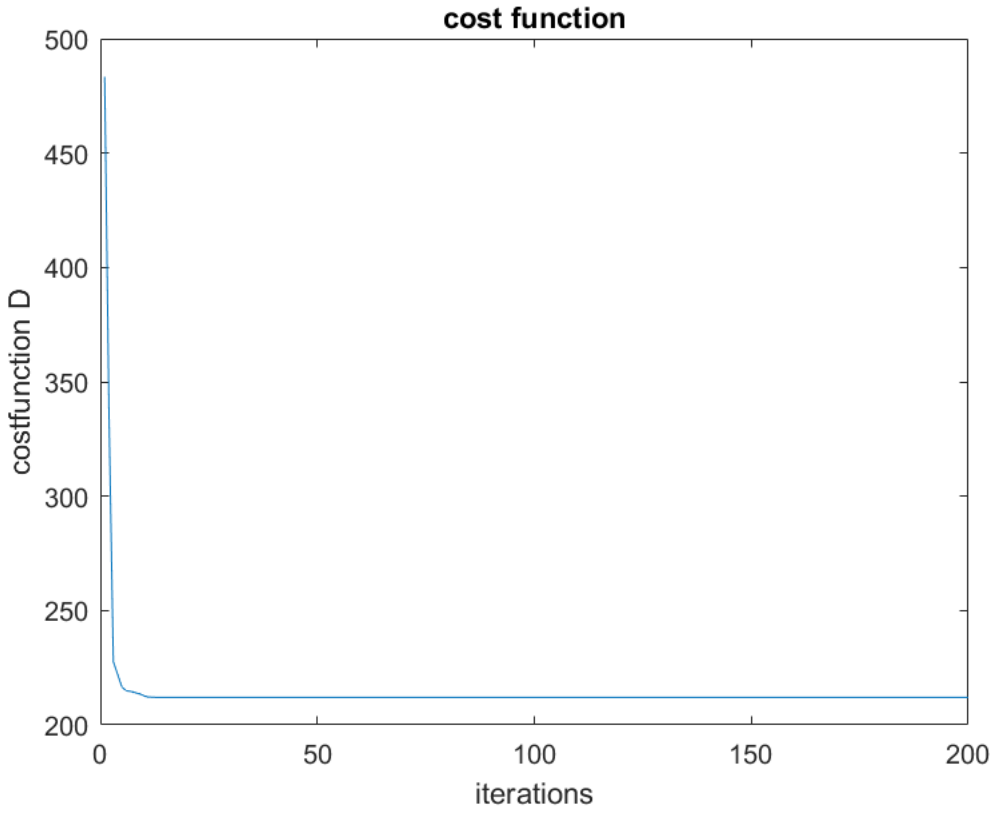
```
clc
close all
clear all
load('KmeansDat');
x1=X(:,1);
x2=X(:,2);
x=[x1 x2];
m=length(X);
iterations=200;
u=[1 1;3 3;6 3;6 5];
figure();
plot(x1,x2,'*',1,1,'s',3,3,'d',6,3,'p',6,5,'h');
xlabel('x1');
ylabel('x2');

title('scatter plot with initial centroids');
figure();
for i=1:iterations
    t=1;
    s=1;
    r=1;
    z=1;
    for j=1:m
        A=[sqrt((x(j,:)-u(1,:))*(x(j,:)-u(1,:))') sqrt((x(j,:)-
u(2,:))*(x(j,:)-u(2,:))') sqrt((x(j,:)-u(3,:))*(x(j,:)-u(3,:))')
 sqrt((x(j,:)-u(4,:))*(x(j,:)-u(4,:))')];
        d(j)=sum(A);
        [val, ind]=min(A);
        c(j)=ind;
        if c(j)==1
            l(r,:)=x(j,:);
            r=r+1;
            d(j)=A(c(j));
        elseif c(j)==2
            q(s,:)=x(j,:);
            s=s+1;
            d(j)=A(c(j));
        elseif c(j)==3
            n(t,:)=x(j,:);
            t=t+1;
            d(j)=A(c(j));
        else
            h(z,:)=x(j,:);
            z=z+1;
            d(j)=A(c(j));

        end
    end
        u(1,:)=(1/length(l))*sum(l);
        u(2,:)=(1/length(q))*sum(q);
        u(3,:)=(1/length(n))*sum(n);
```

```
        u(4,:)=(1/length(h))*sum(h);
        D(i)=sum(d);
        title('final centroids after 10 iterations');
        plot(l(:,1),l(:,2),'r*')
        hold on
        plot(q(:,1),q(:,2),'b*')
        hold on
        plot(n(:,1),n(:,2),'k*');
        hold on
        plot(h(:,1),h(:,2),'g*');
        hold on
        plot(u(1,1),u(1,2),'s');
        plot(u(2,1),u(2,2),'d');
        plot(u(3,1),u(3,2),'p');
        plot(u(4,1),u(4,2),'h');
        clear q;
        clear l;
        clear n;
        clear h;
end
figure()
plot(1:iterations,D);
xlabel('iterations');
ylabel('costfunction D');
title('cost function');
disp('the final centroid points are');
disp(u);
```

```
the final centroid points are
    3.0437    1.0154
    1.1593    4.9815
    6.0452    2.9752
    2.6706    5.0712
```


scatter plot with initial centroids
x2
x1
6
5
4
3
2
1
0
-2
0
2
4
6
8
10


final centroids after 10 iterations
6
5
4
3
2
1
0
-2
0
2
4
6
8
10



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