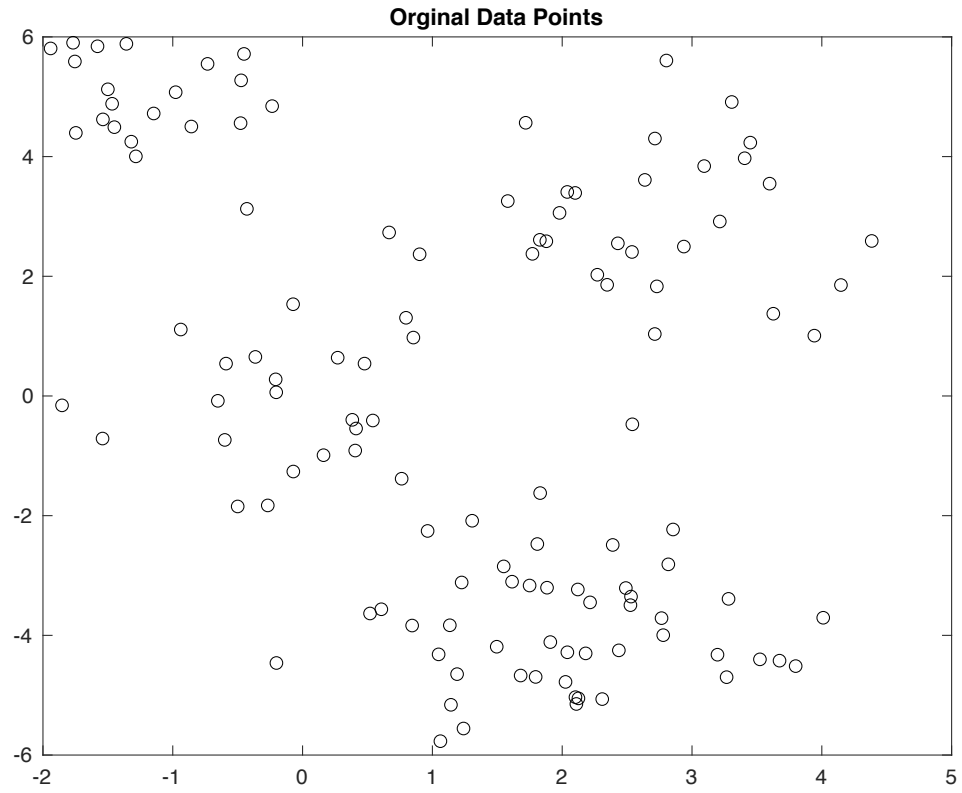
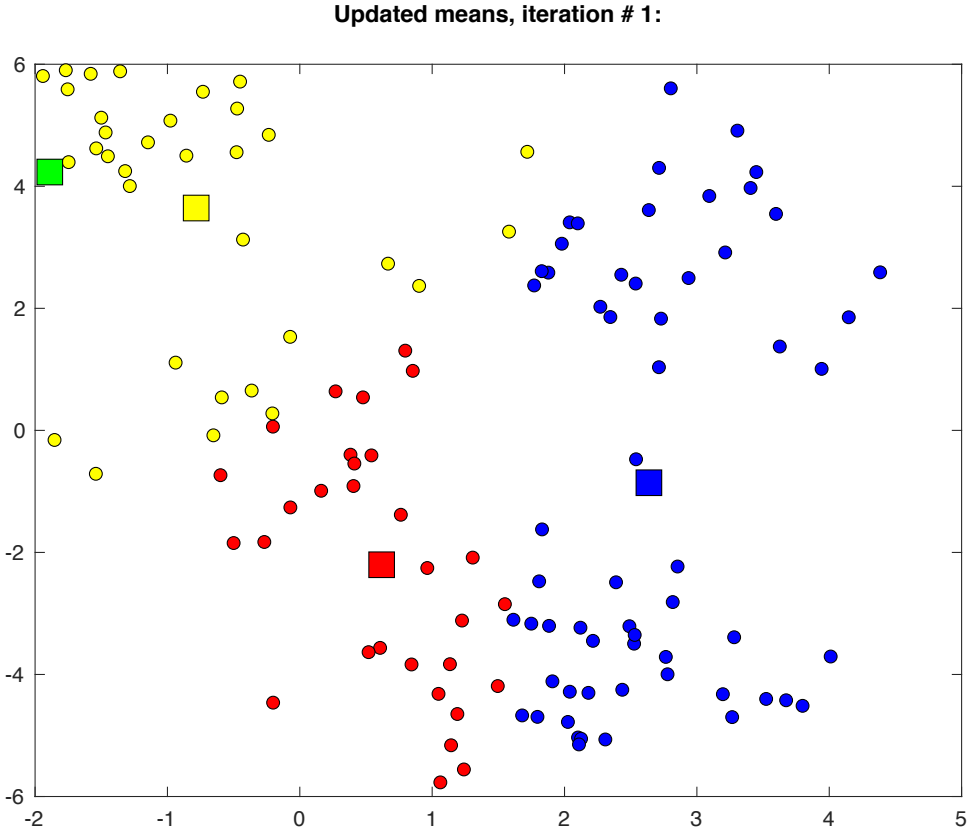
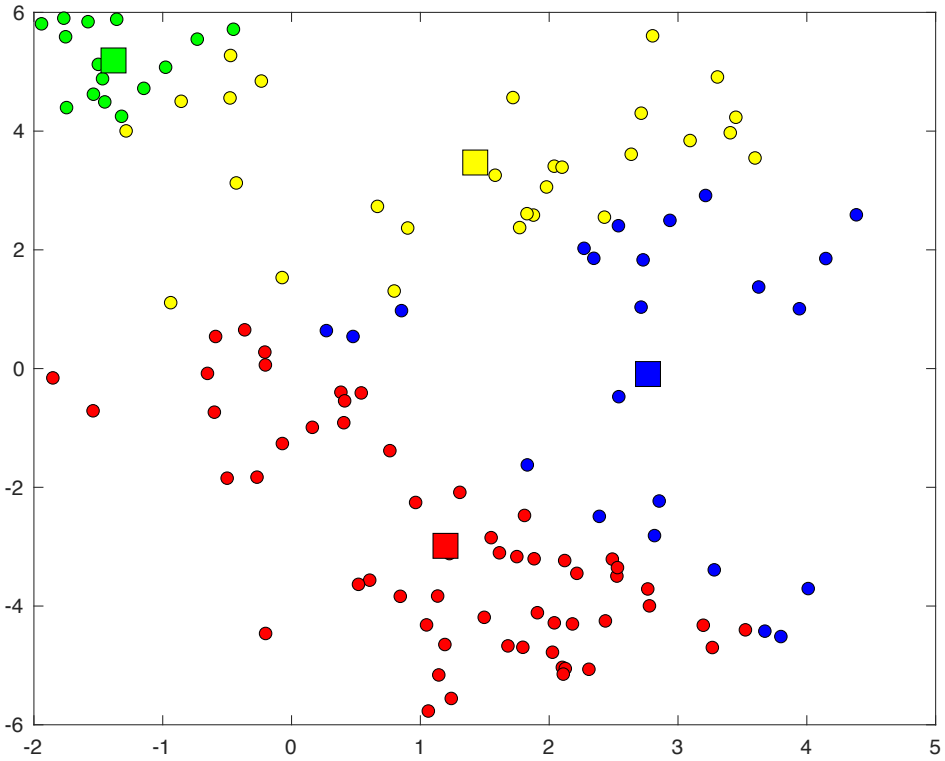
```
%% PROJECT 6.m
% Tuan Nguyen
% Machine Learning
% Implementation of K-means clustering
clear all;close all;

%% Load the data
load ./data/g_data

%% Plot the original data
figure(1); hold off
plot(X(:, 1), X(:, 2), 'ko');
title('Orginal Data Points');
pause(4);
%% Randomly initialize the means
K = 4; % The number of clusters
cluster_means = rand(K, 2)*10-5;

%% Iteratively update the means and assignments
converged = 0;
iter = 1;
N = size(X, 1);
cluster_assignments = zeros(N, K);
di = zeros(N, K);
cols = {'r','g','b', 'y'};
while ~converged
  % Update assignments
  for k = 1 : K
    di(:, k) = sum((X - repmat(cluster_means(k, :), N, 1)).^2, 2);
  end
  old_assignments = cluster_assignments;
  cluster_assignments = (di == repmat(min(di,[], 2), 1, K));
```

```
  if sum(sum(old_assignments ~= cluster_assignments)) == 0
    converged = 1;
  end
  % Plot the assigned data
  figure(1); hold off
  for k = 1 : K
    plot(X(cluster_assignments(:, k), 1), X(cluster_assignments(:, k), 2),...
      'ko','markerfacecolor', cols{k} );
    hold on
  end
  ti = sprintf('Updated means, iteration # %d:\n', iter);
  title(ti);
  % Update means
  for k = 1 : K
    if sum(cluster_assignments(:, k)) == 0
      % This cluster is empty, randomise it
      cluster_means(k, :) = rand(1, 2)*10-5;
    else
      cluster_means(k, :) = mean(X(cluster_assignments(:, k), :), 1);
    end
  end
  % Plot the means
  figure(1)
  for k = 1 : K
    plot(cluster_means(k, 1), cluster_means(k, 2), 'ks','markersize', 15,...
      'markerfacecolor', cols{k});
  end
  iter = iter + 1;

  pause(4);
end
```

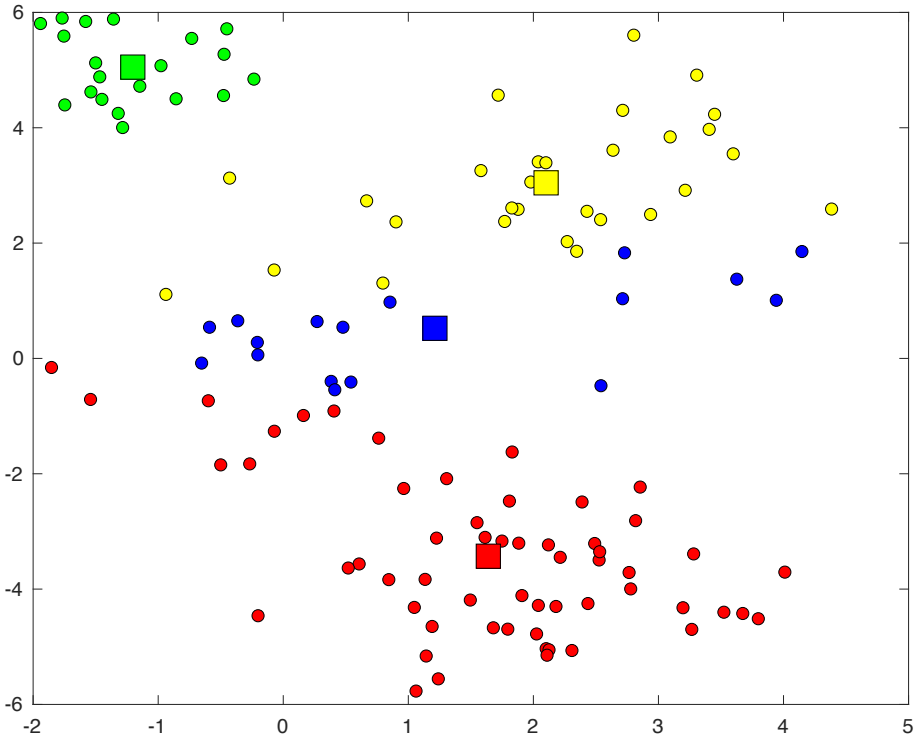

Orginal Data Points
6
4
2
0
-2
-4
-6
-2
-1
0
1
2
3
4
5


Updated means, iteration # 1:
6
4
2
0
-2
-4
-6
-2
-1
0
1
2
3
4
5

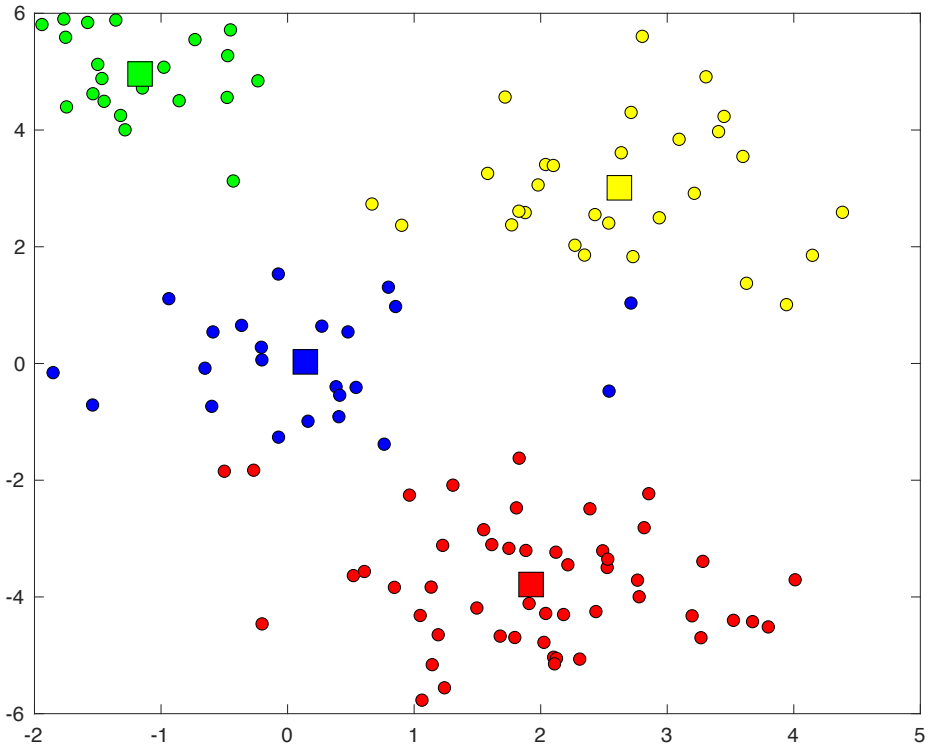
Updated means, iteration # 2:



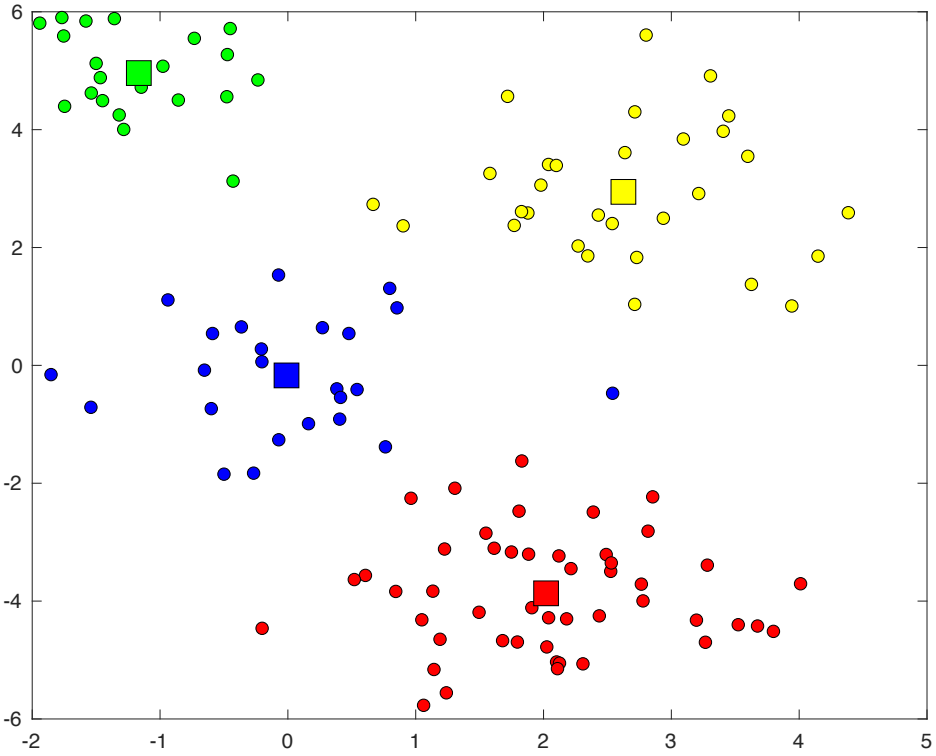
Updated means, iteration # 3:

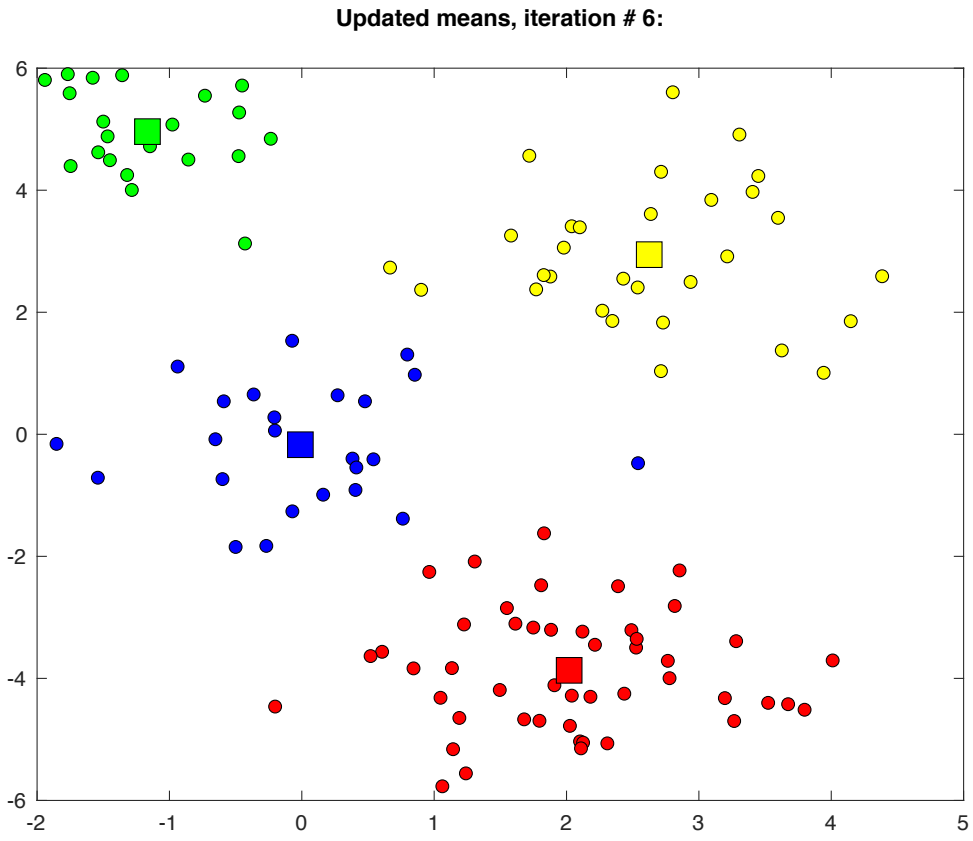


Updated means, iteration # 4:



Updated means, iteration # 5:




Updated means, iteration # 6:
6
4
2
0
-2
-4
-6
-2
-1
0
1
2
3
4
5