problem 1.

```
data = readtable('bank.csv');
trainX = table2array(data(1:2000, ["age", "balance
    "]));
trainY = ones(2000,1);
for i =1:2000
    if string(data{i,"y"})=="no"
        trainY(i,1)=-1;
    else
        trainY(i,1)=1;
    end
end
[train_num,dim]=size(trainX);
w=ones(1,dim+1);
h=zeros(train_num,1);
x=[ones(train_num,1) trainX];
while 1
    for i =1:20
        h(i,:)=sign(x(i,:)*w');
        if h(i,:)~=trainY(i,:)
        w=w+trainY(i,:)*x(i,:);
        w
        end
    end
    if h==trainY
        break
    end
end
scatter(trainX(:, 1), trainX(:,2), [], trainY)
colormap([1 0 0; 0 0 1])
saveas(gcf,'scatter.png')
```

• After we revise the code, because PLA learning method is linearly separable, we can't use only 2 explanatory variables to calssify the data.

• We found that in the *while* loop, if we set $i = 20$, the output will be infinity loop. Based on this solution, we draw a scatter plot of the data.

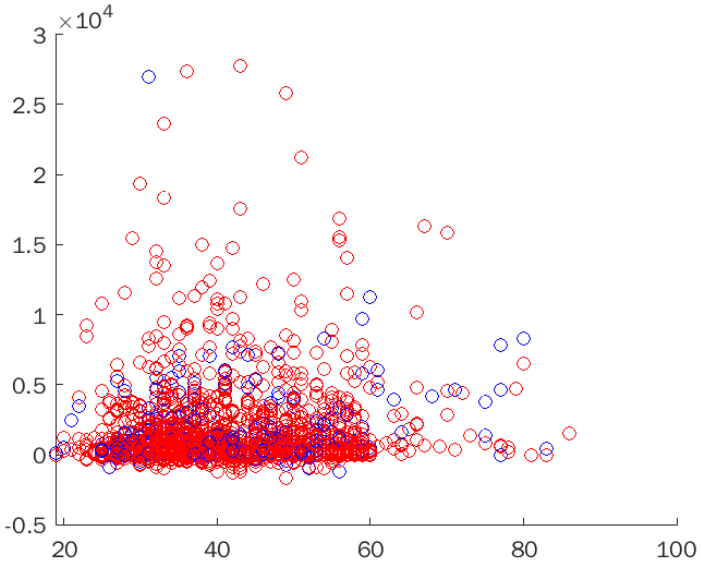

Figure 1: scatter plot of first 2000 data of bank

- the blue circle denotes 'Yes'
- the red circle denotes 'No'