week3_code

Notebook:	artificial intelligence		
Created:	18/11/10 17:26	**Updated:**	18/11/10 17:56
Author:	2440027575@qq.com		
URL:	http://dict.youdao.com/w/%E5%90%AF%E5%8F%91%E6%80%A7%E7%9A%84/#keyfrom=dict2.top		

partial codes in week_3 code assignment.

> written by *VincentX3*, Nov.10.18

CostFunctiont.m

```
Z=X*theta;

J = sum(-y.*log(sigmoid(Z))-(1-y).*log(1-sigmoid(Z)))./m;

grad = (X'*(sigmoid(Z)-y))./m;
```

Notice that i use sum() to repleace $\sum$, but obviously it isn't a brilliant choice.
So after review linear algebra, i learn to use `X'*X` to repleace it in below code snippet, which have same output but compute in different way.

CostFunctiontReg.m

```
hypothesis = sigmoid(X * theta);
reg = lambda / (2 * m) * (theta' * theta - theta(1)^2);
J = 1 / m * (-y' * log(hypothesis) - (1 - y') * log(1 - hypothesis)) + reg;

%compute theta zero without regularization
mask = ones(size(theta));
mask(1) = 0;

grad = 1 / m * X' * (hypothesis - y) + lambda / m * (theta .* mask);
```

Also by consulting other, i learn to use `mask` to partialy compute matrix. This method is really inspirational. The last thing i should metion is that in J(θ), the θzero also shouldn't been regularized. Because J(θ) is a real number, we can simply sub `theta(1)^2` without using a mask.

else

```
%predict.m
p=round(sigmoid(X * theta));
```

tips: matlab also have `logical()` function to convey martrix into logical one.

```
%sigmoid.m
g=1./(1+exp(-z));
```

> At last,try to change lambda to see the figure change.It's amazing that when lambda become zero, it can overfit in such a way.

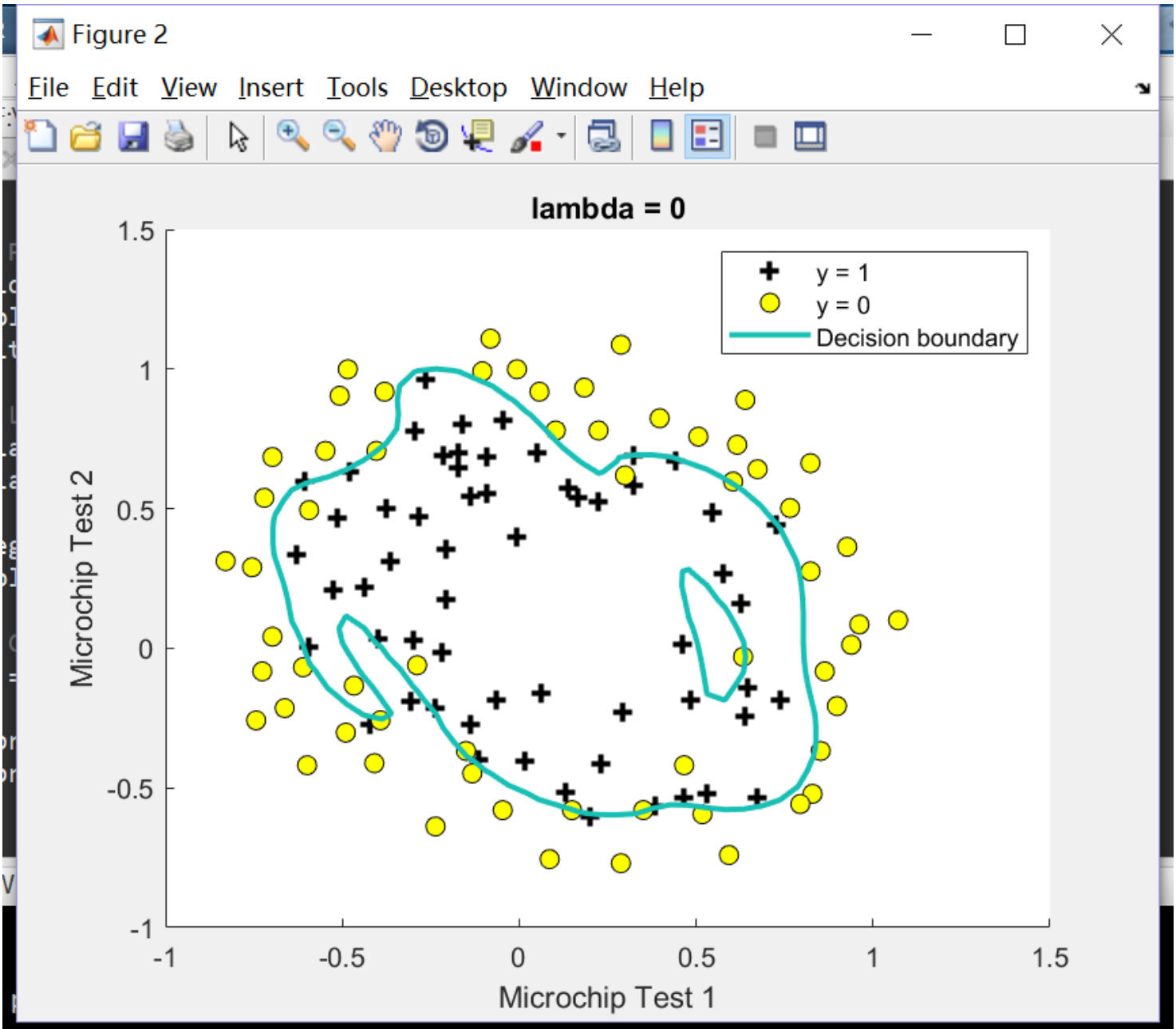


Figure 2
File Edit View Insert Tools Desktop Window Help
lambda = 0
y = 1
y = 0
Decision boundary
Microchip Test 2
Microchip Test 1
1.5
1
0.5
0
-0.5
-1
-1
-0.5
0
0.5
1
1.5

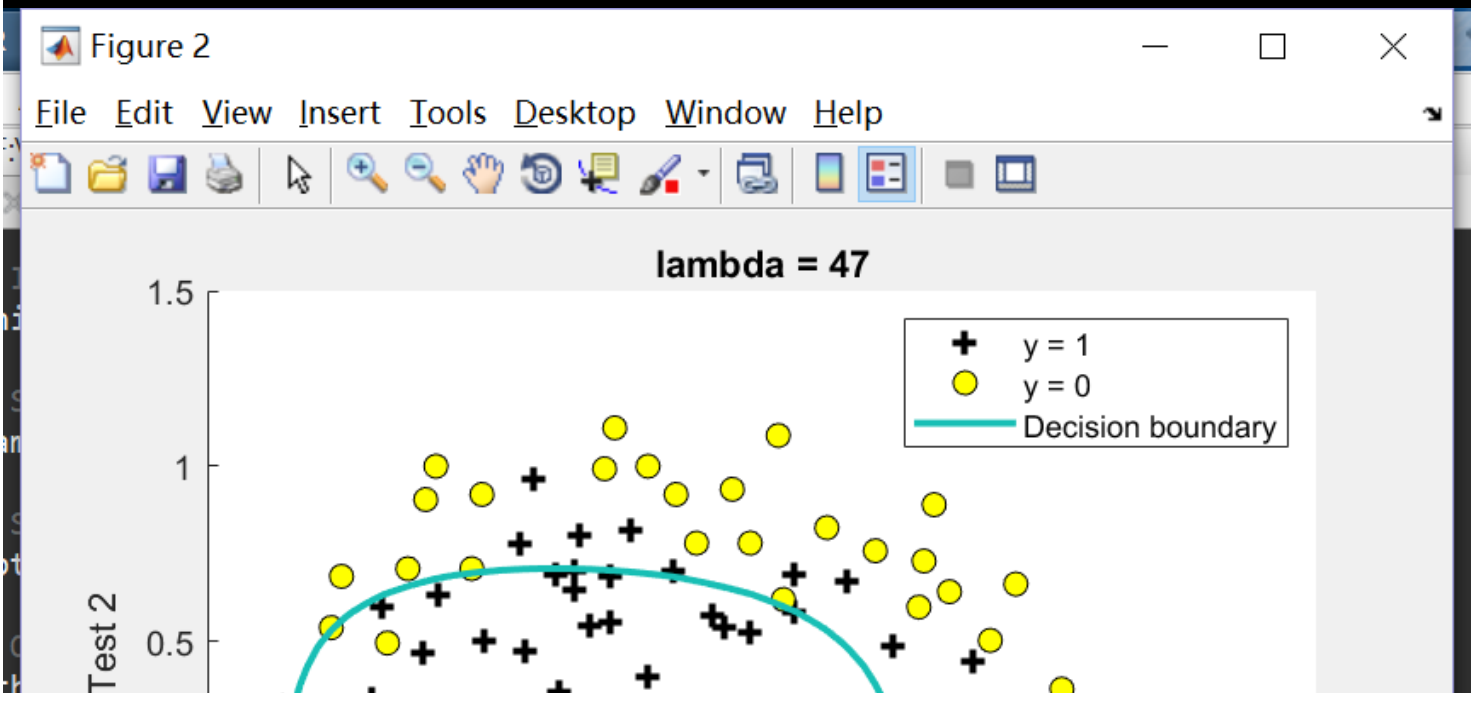
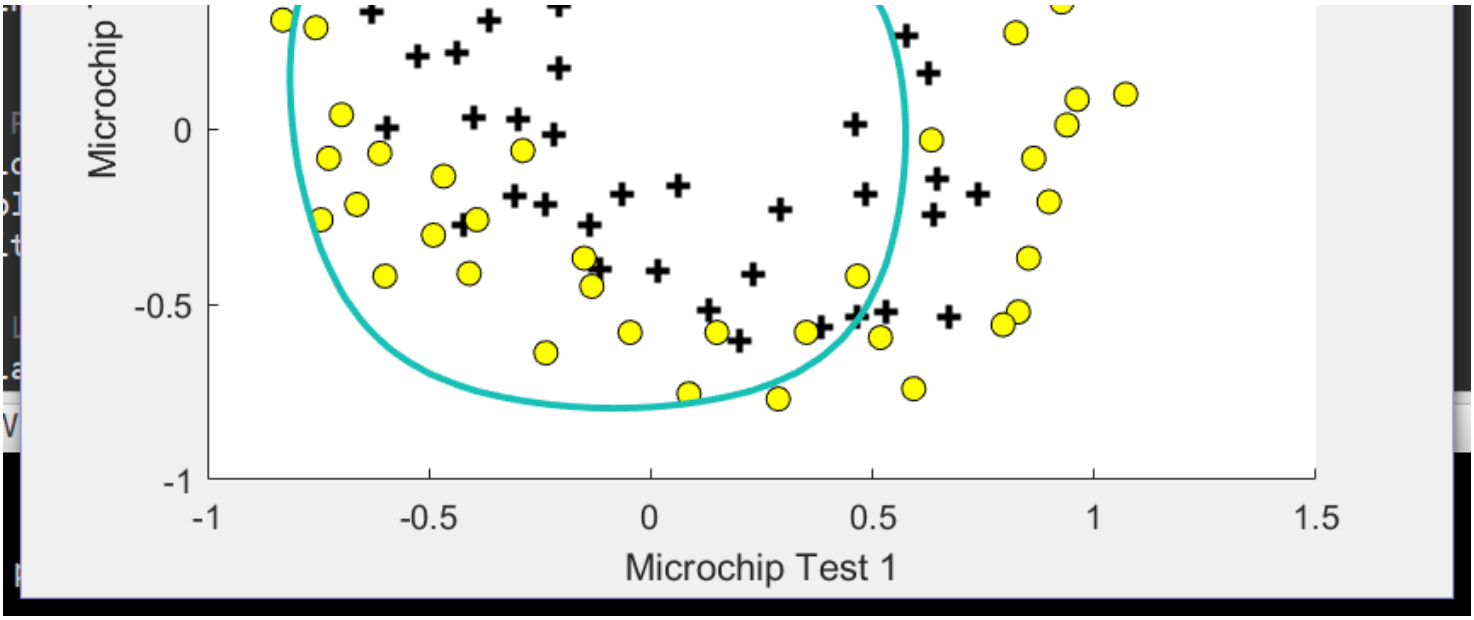


Figure 2
File Edit View Insert Tools Desktop Window Help
lambda = 47
y = 1
y = 0
Decision boundary
Test 2
1.5
1
0.5


Microchip
0
-0.5
-1
-1
-0.5
0
0.5
1
1.5
Microchip Test 1

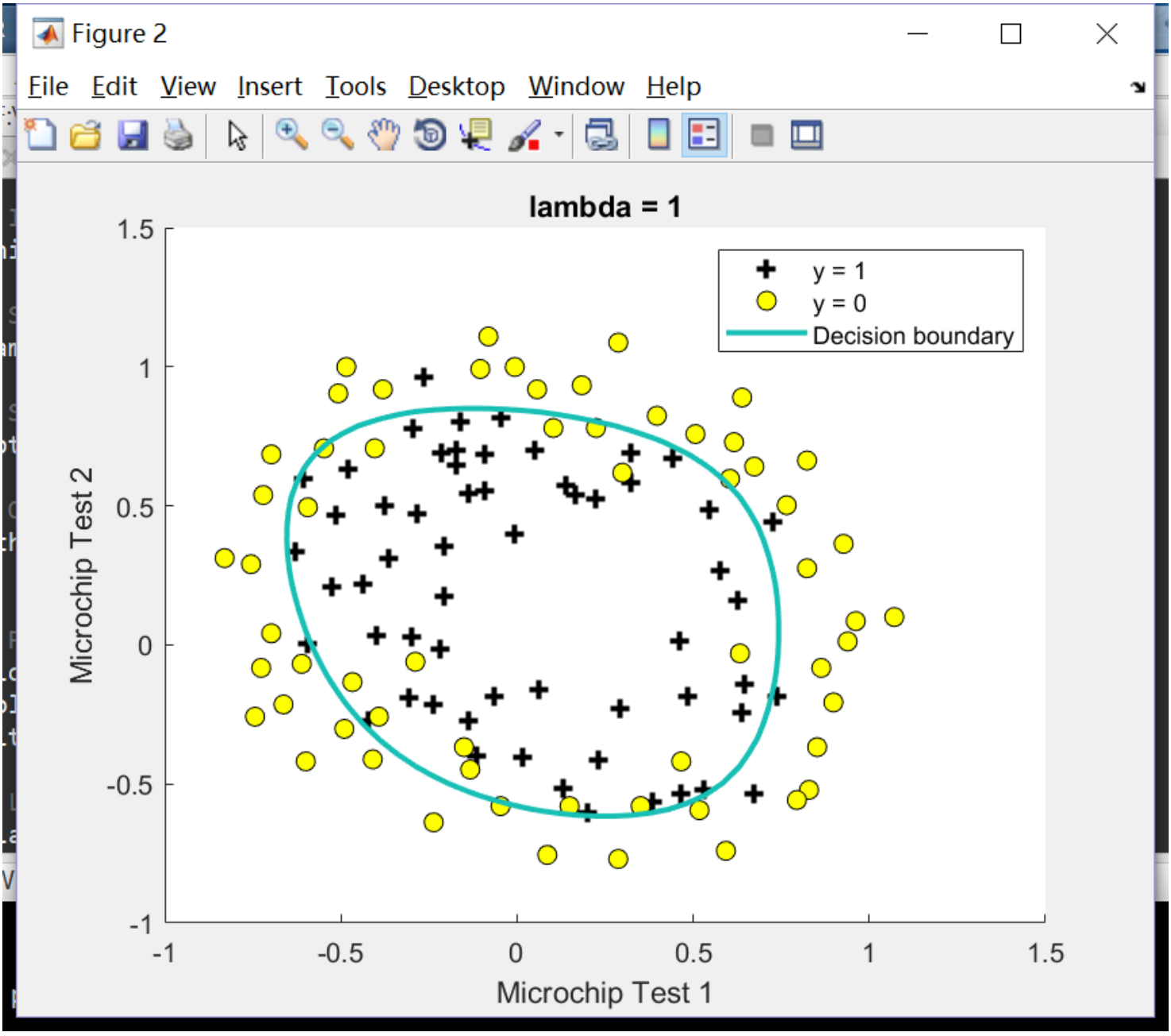


Figure 2
File Edit View Insert Tools Desktop Window Help
lambda = 1
y = 1
y = 0
Decision boundary
Microchip Test 2
1.5
1
0.5
0
-0.5
-1
-1
-0.5
0
0.5
1
1.5
Microchip Test 1