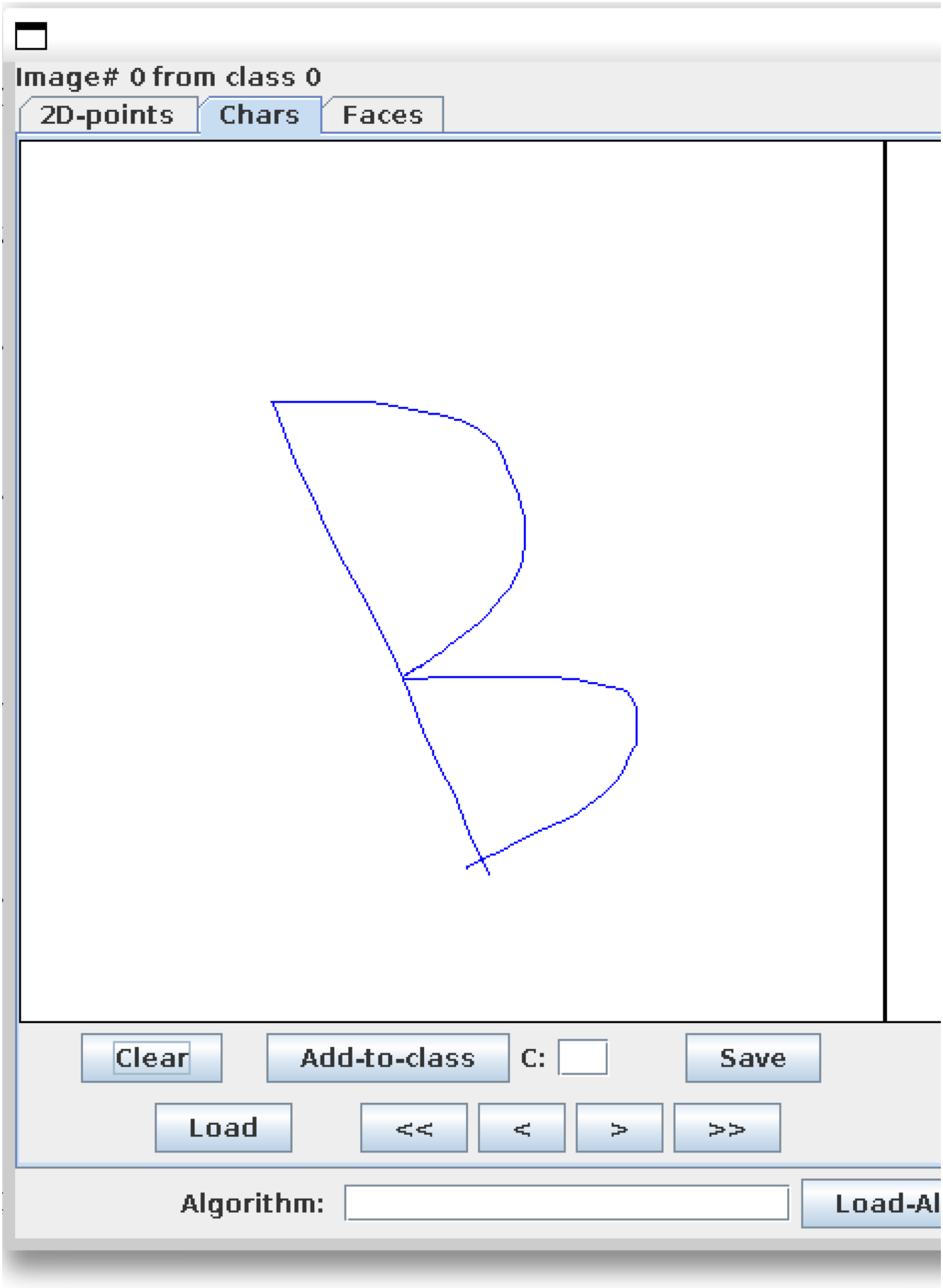
Exercise 1

Yes, google

Exercise 2

- It's harder because the split-uniform dataset overlaps



- The first guy have more varitey

Exercise 3

The screen output has 5 point in each class corresponding to the train set

Exercise 4

- We can use either pixel of the char or vector(start end point of a line segment) of the char
- g.drawLine (x1,y1, x2,y2);
- The char with more curves will create more line segments. Like B or C.

Exercise 5

- The size of the image by the color depth.
- No, they are not the same. it depends on the image size.

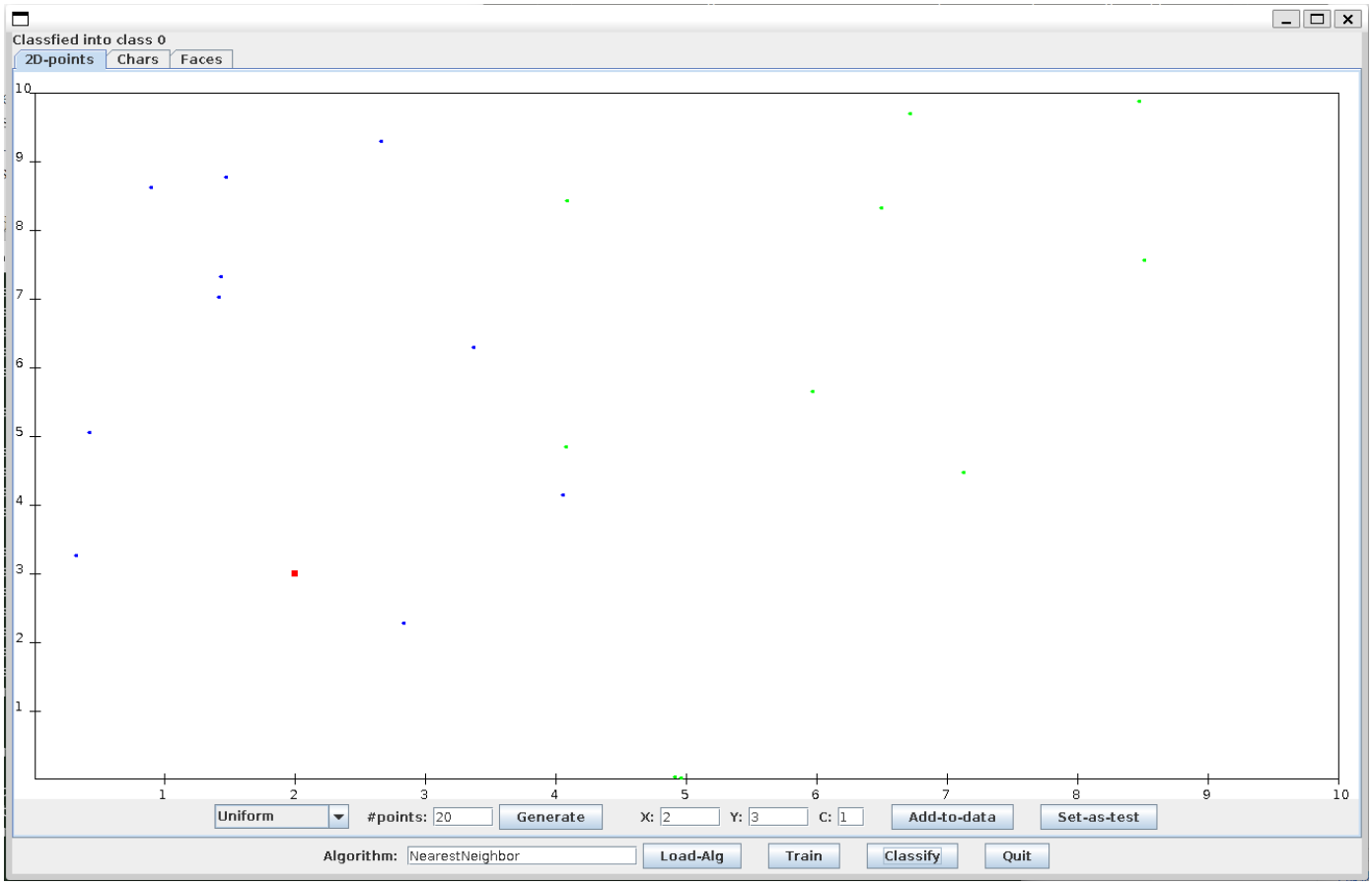
Exercise 6

The arm problem

Exercise 7

- The third input dimension
- The first value of third input dimension
- The label corresponding to the third input dimension

Exercise 8



- If I create a point with different class near a wrong class point, the classifier will go wrong.
- Distance is meaningless in char problem

Exercise 9

train time: M*M

run time: M

A priority queue is best for storing nearest neighbor.

A 2d hash map representing approx location of each point is best for calculation.

Exercise 10

1,000,000 * 0.1 M = 100G Calculations

MSE between two images can represent it's distance

Exercise 11

0.24

After change, Pr[Error]=0.135

Maybe there are a lot of class 0 samples to be tested. So changing answer to class 0 when distance is equal will increase the correctness.

Exercise 12

class0: 0.397

class1: 0.603

Exercise 13

Pr[X=3|C=0]= 0.091

Pr[X=3|C=1]= 0.609

- because this two number is the value of prob X3 in C=0. All prob value of X in C=0 add up to 1
- More likely to come from class1

Exercise 14:

```
Pr[X=0|C=1]=0
Pr[X=1|C=1]=0.05
Pr[X=2|C=1]=0.1
Pr[X=3|C=1]=0.6
Pr[X=4|C=1]=0.1
Pr[X=5|C=1]=0.15
```

Exercise 15:

Pr[E]=0.13099

Exercise 16:

Pr[E3]=0.09967510726420475

After change to 0.9

Pr[E3]=0.5937170010559663

Exercise 17:

- PR =0.4

Pr[X=x|C=0]Pr[C=0] = 0.04

Pr[X=x|C=1]Pr[C=1] = 0.36

- Pr = 0.9

Pr[X=x|C=0]Pr[C=0] = 0.09

Pr[X=x|C=1]Pr[C=1] = 0.06

Exercise 18:

When data is not 1d, like class 0 are in a circle. And outside the circle are all class 1

Exercise 19:

It is decided by different wi but not a single wi

Exercise 20:

We can apply derivative on each wi so it's differentiable

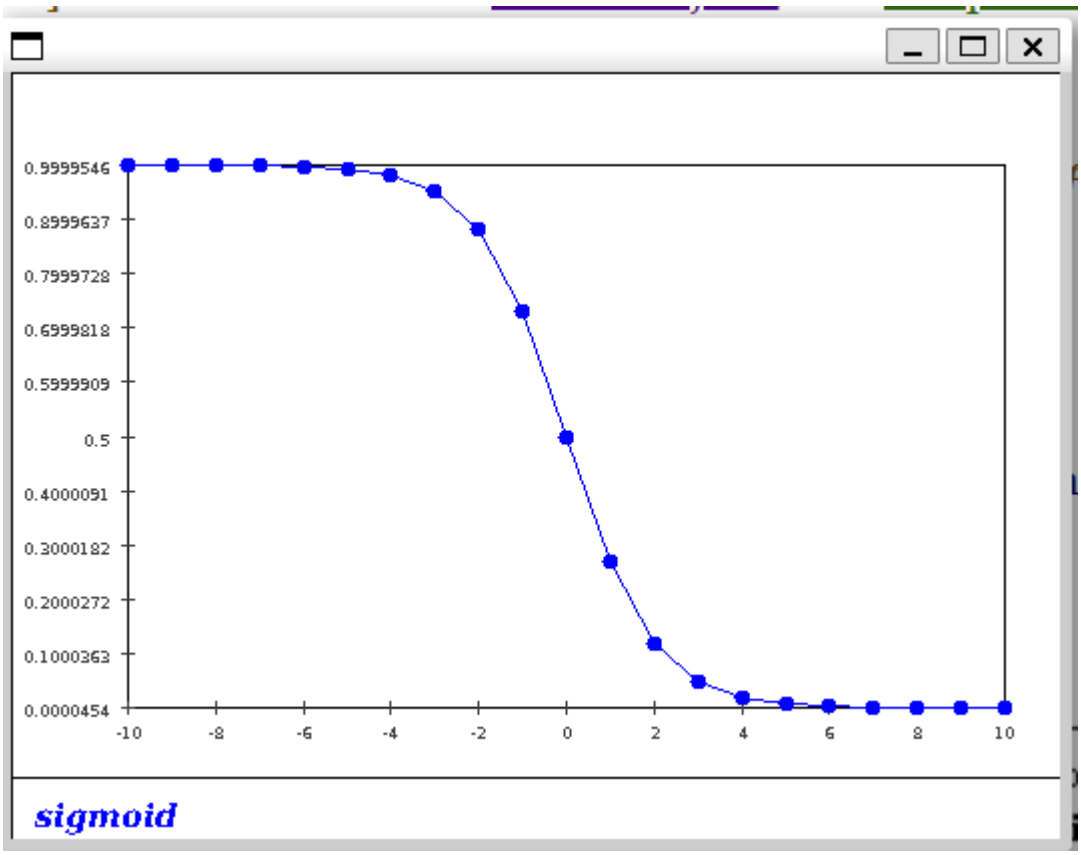
Exercise 21:

- Result doens't changes much

Exercise 22:

To check if the new trained parameter is better or worse than the previous ones.

Exercise 23:



We can compress the x axies of the sigmoid to something like $f(s) = \frac{1}{1+e^{-10s}}$

Exercise 25:

x1+x2<2

x1+x2>0

x1\x2	0	1
0	0	1
1	1	0

Exercise 26:

If the points are generated by x axies, then y axies could be ignored.