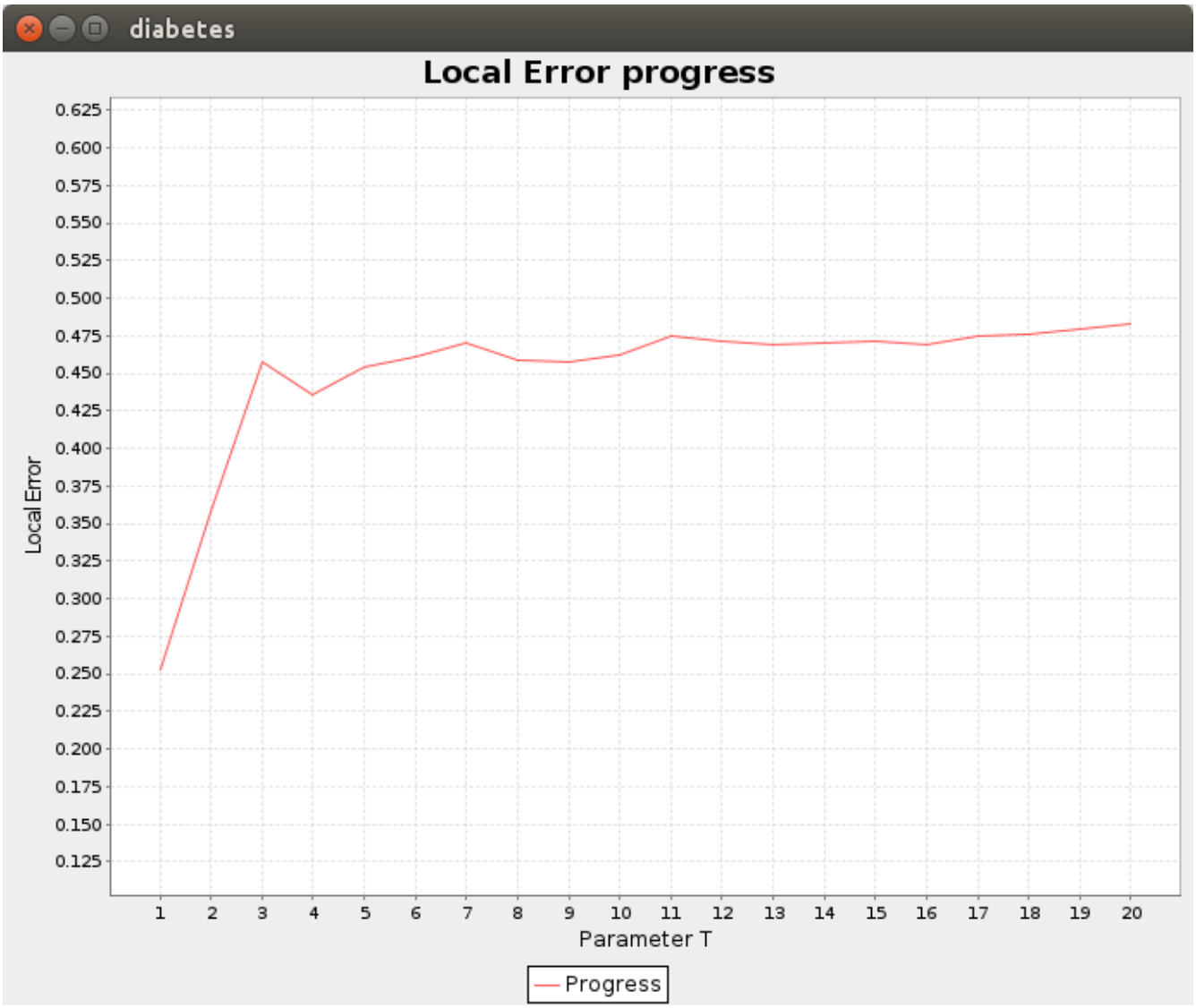
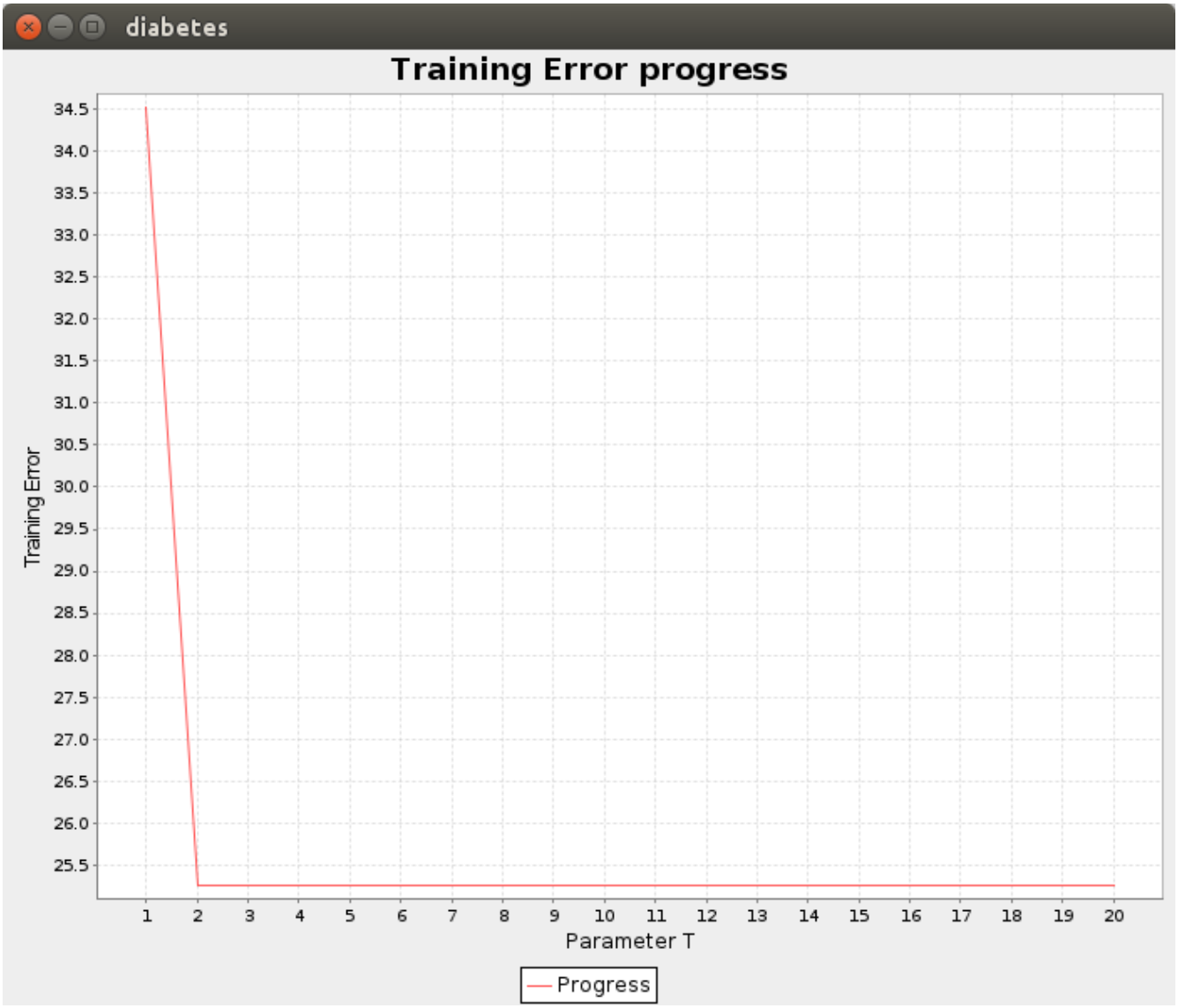
Shreyas Mahimkar : Assignment 7

1) Boosting with Optimal Decision Stumps

A) Diabetes




diabetes
Training Error progress
Training Error
34.5
34.0
33.5
33.0
32.5
32.0
31.5
31.0
30.5
30.0
29.5
29.0
28.5
28.0
27.5
27.0
26.5
26.0
25.5
1
2
3
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5
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17
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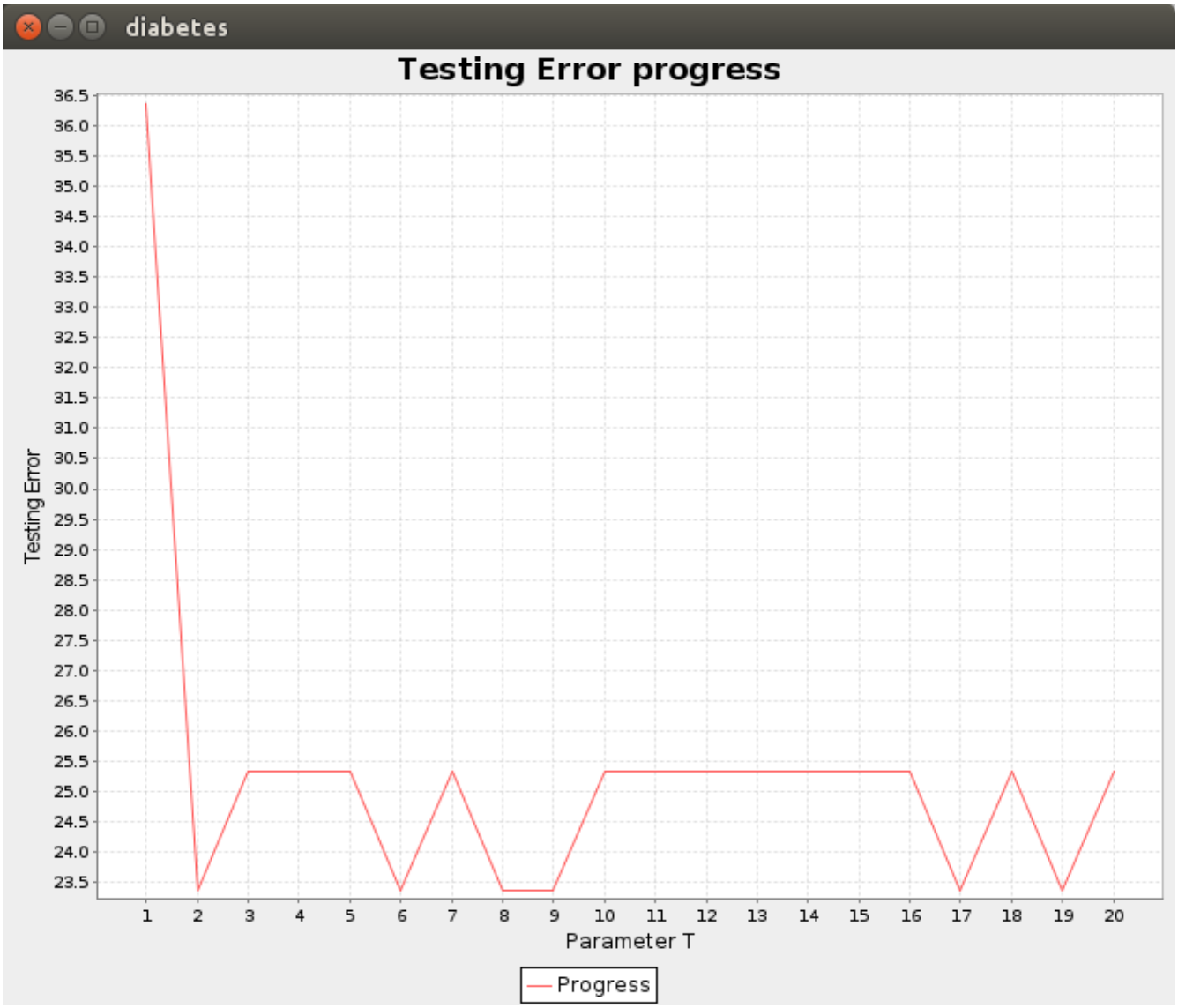
19
20
Parameter T
Progress


diabetes
Testing Error progress
Testing Error
36.5
36.0
35.5
35.0
34.5
34.0
33.5
33.0
32.5
32.0
31.5
31.0
30.5
30.0
29.5
29.0
28.5
28.0
27.5
27.0
26.5
26.0
25.5
25.0
24.5
24.0
23.5
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17
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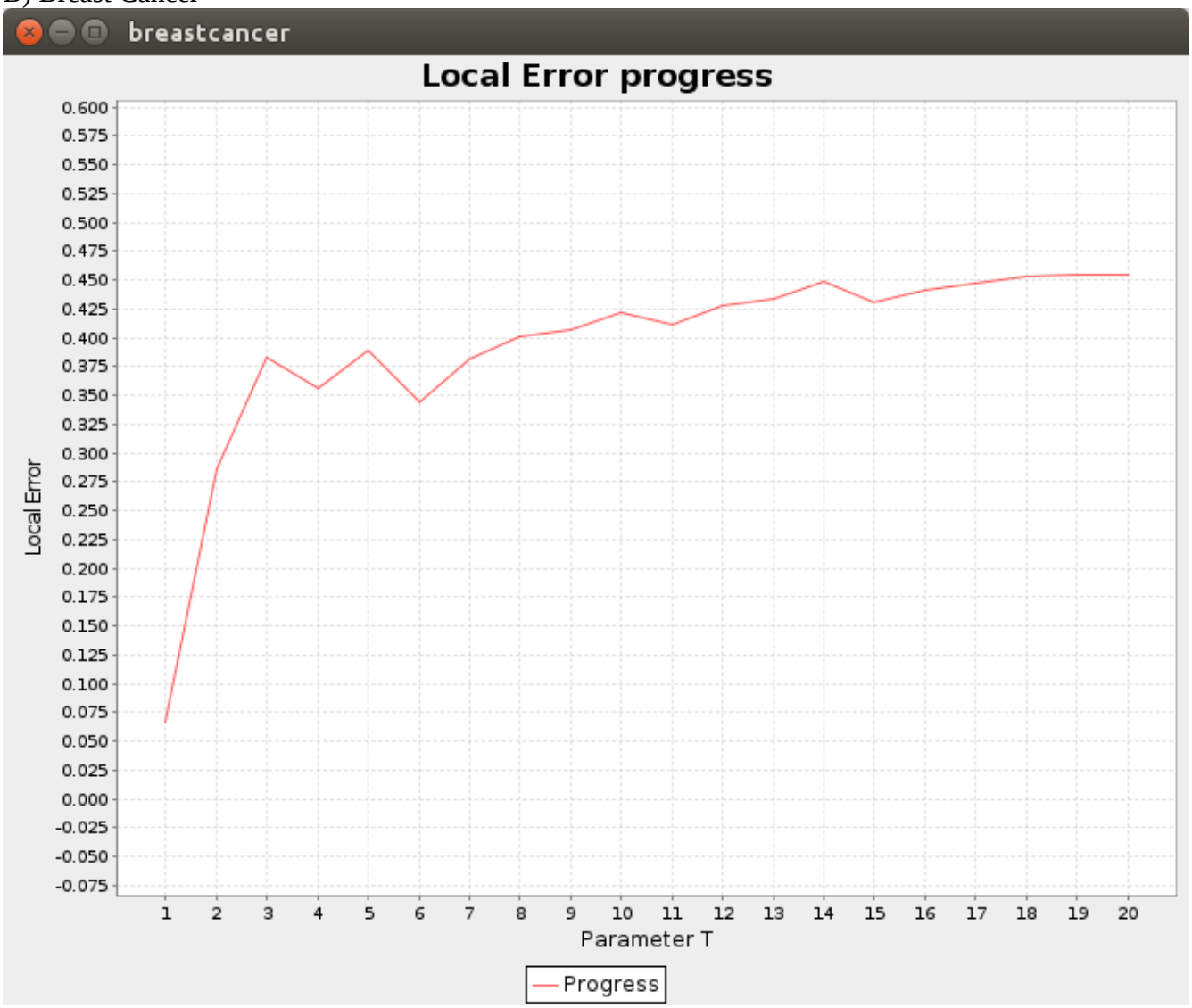
19
20
Parameter T
Progress

B) Breast Cancer



breastcancer
Training Error progress
Training Error
36
35
34
33
32
31
30
29
28
27
26
25
24
23
22
21
20
19
18
17
16
15
14
13
12
11
10
9
8
7
1
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11
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16
17
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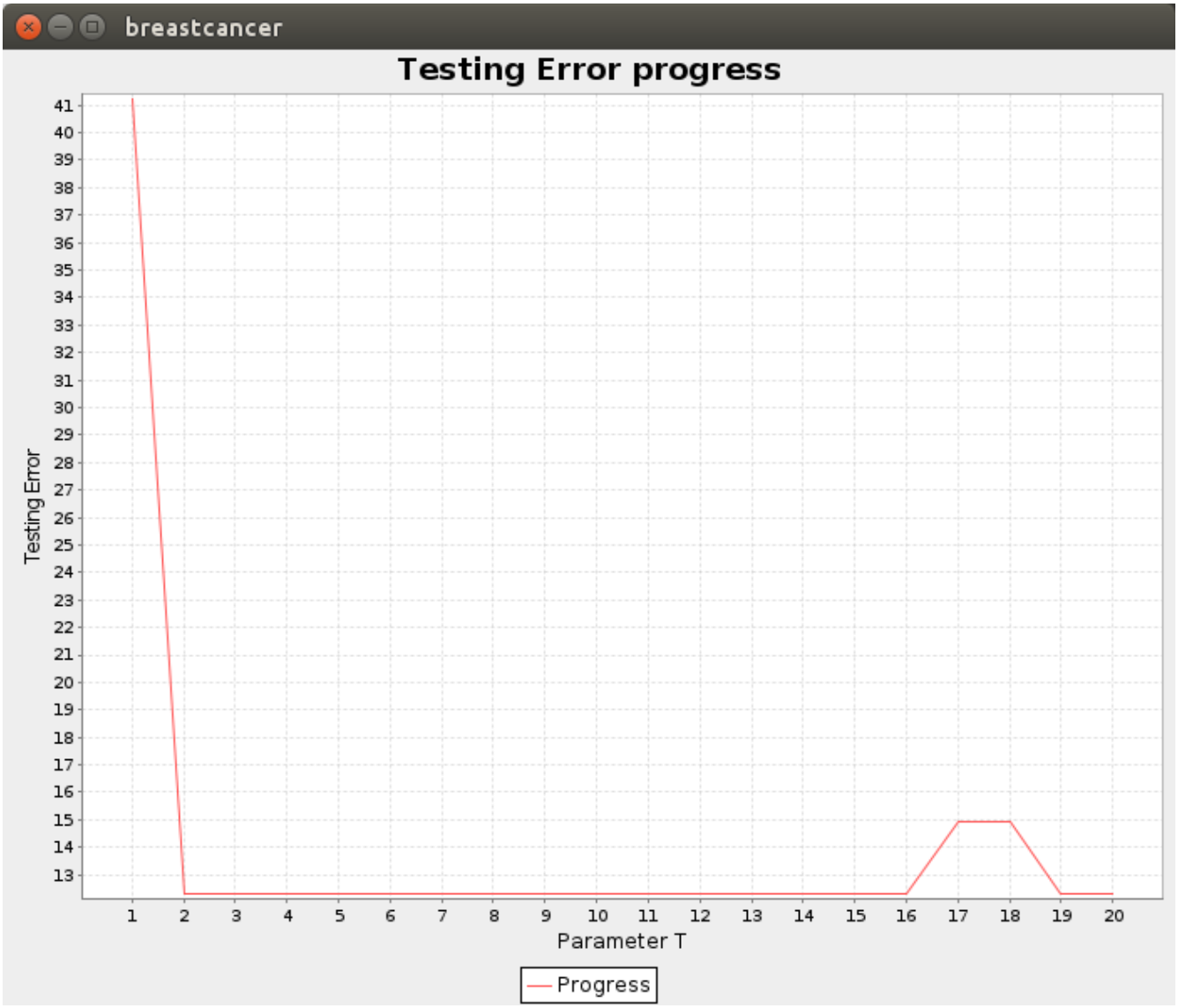
19
20
Parameter T
Progress


breastcancer
Testing Error progress
Testing Error
41
40
39
38
37
36
35
34
33
32
31
30
29
28
27
26
25
24
23
22
21
20
19
18
17
16
15
14
13
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9
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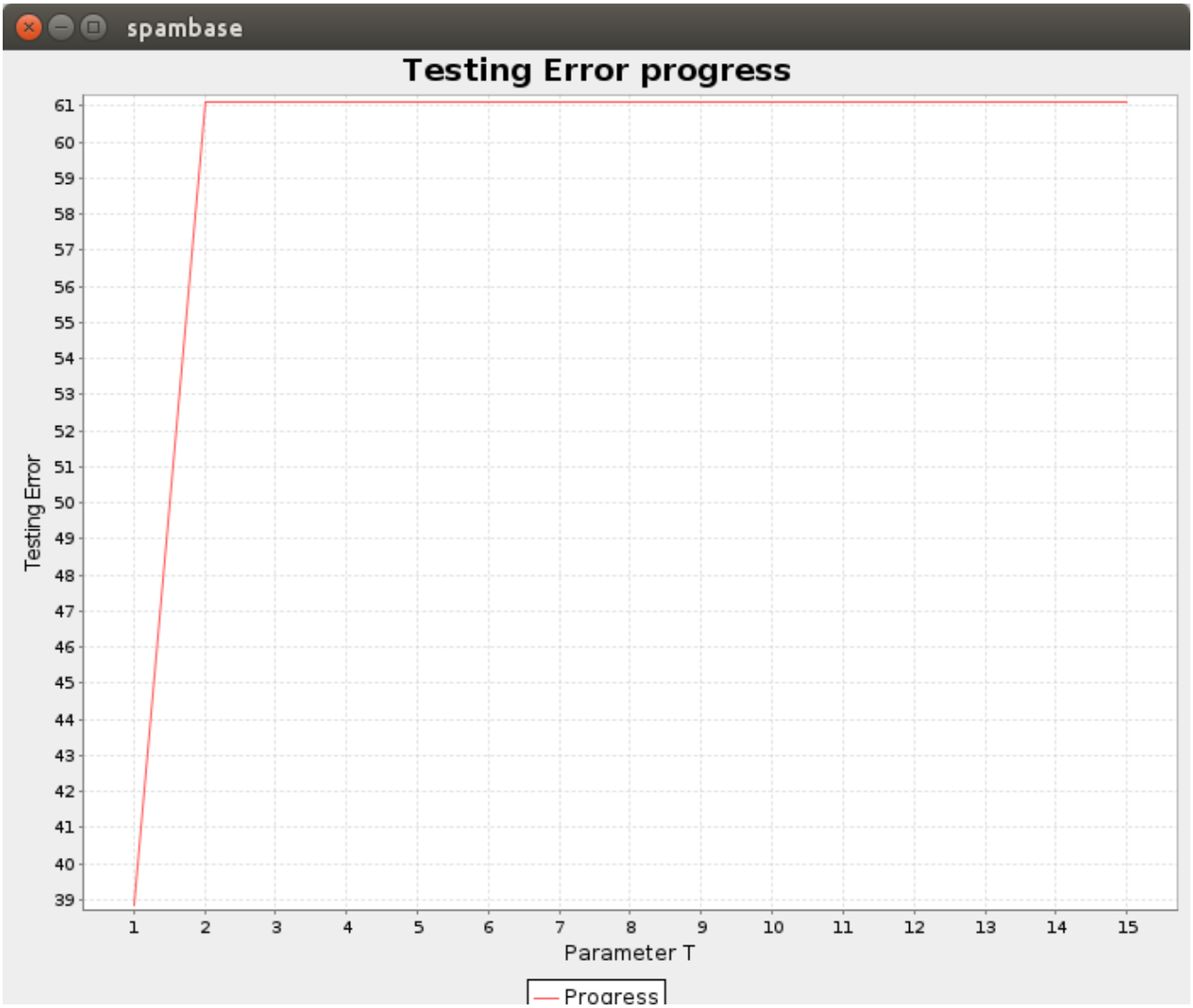
11
12
13
14
15
16
17
18
19
20
Parameter T
Progress

C) Spambase

spambase
Local Error progress
Local Error
0.625
0.600
0.575
0.550
0.525
0.500
0.475
0.450
0.425
0.400
0.375
0.350
0.325
0.300
0.275
0.250
0.225
0.200
0.175
0.150
0.125
0.100
0.075
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
Parameter T
Progress

spambase
Training Error progress
Training Error
39
38
37
36
35
34
33
32
31
30
29
28
27
26
25
24
23
22
21
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
Parameter T
Progress


spambase
Testing Error progress
Testing Error
61
60
59
58
57
56
55
54
53
52
51
50
49
48
47
46
45
44
43
42
41
40
39
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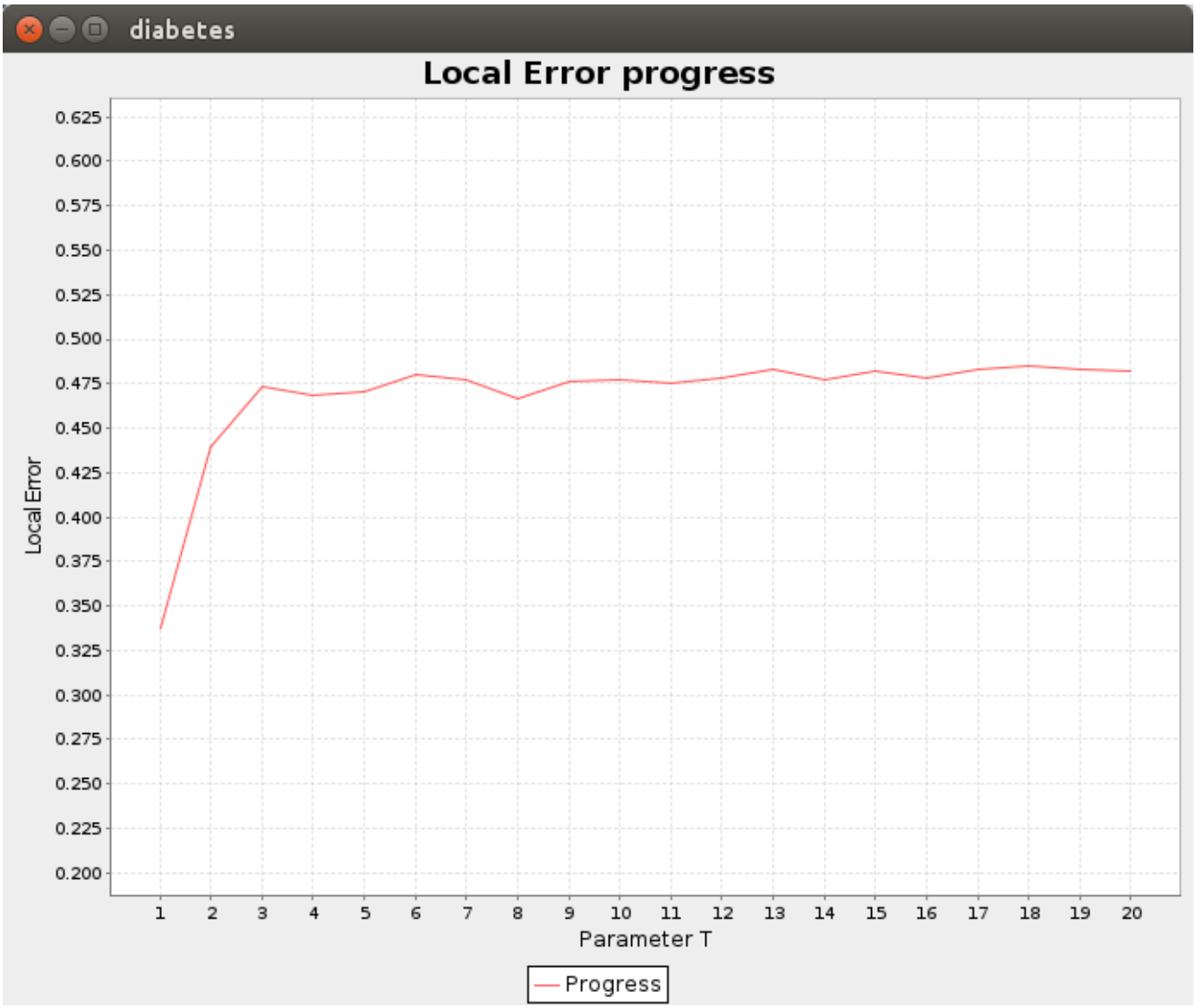
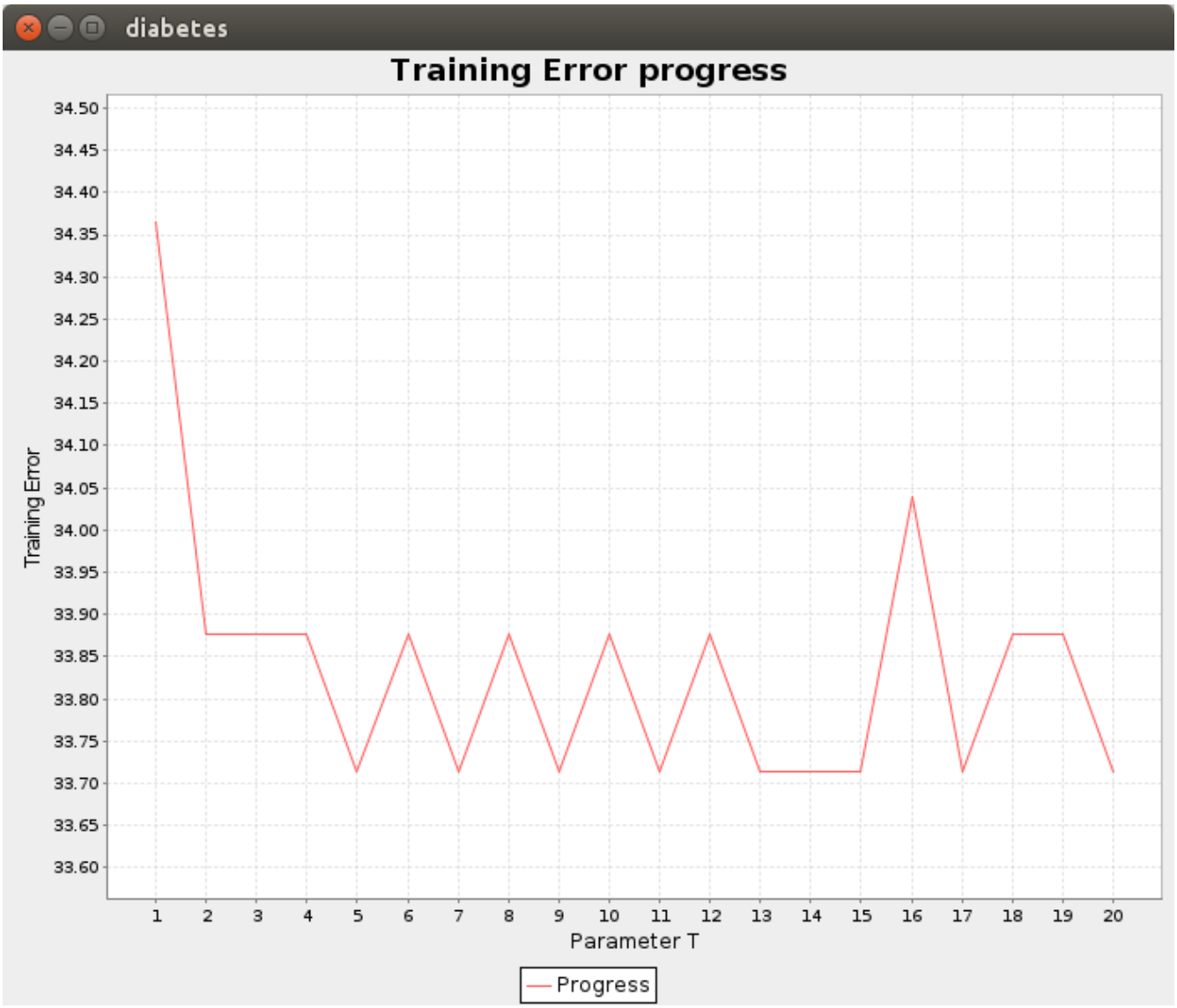
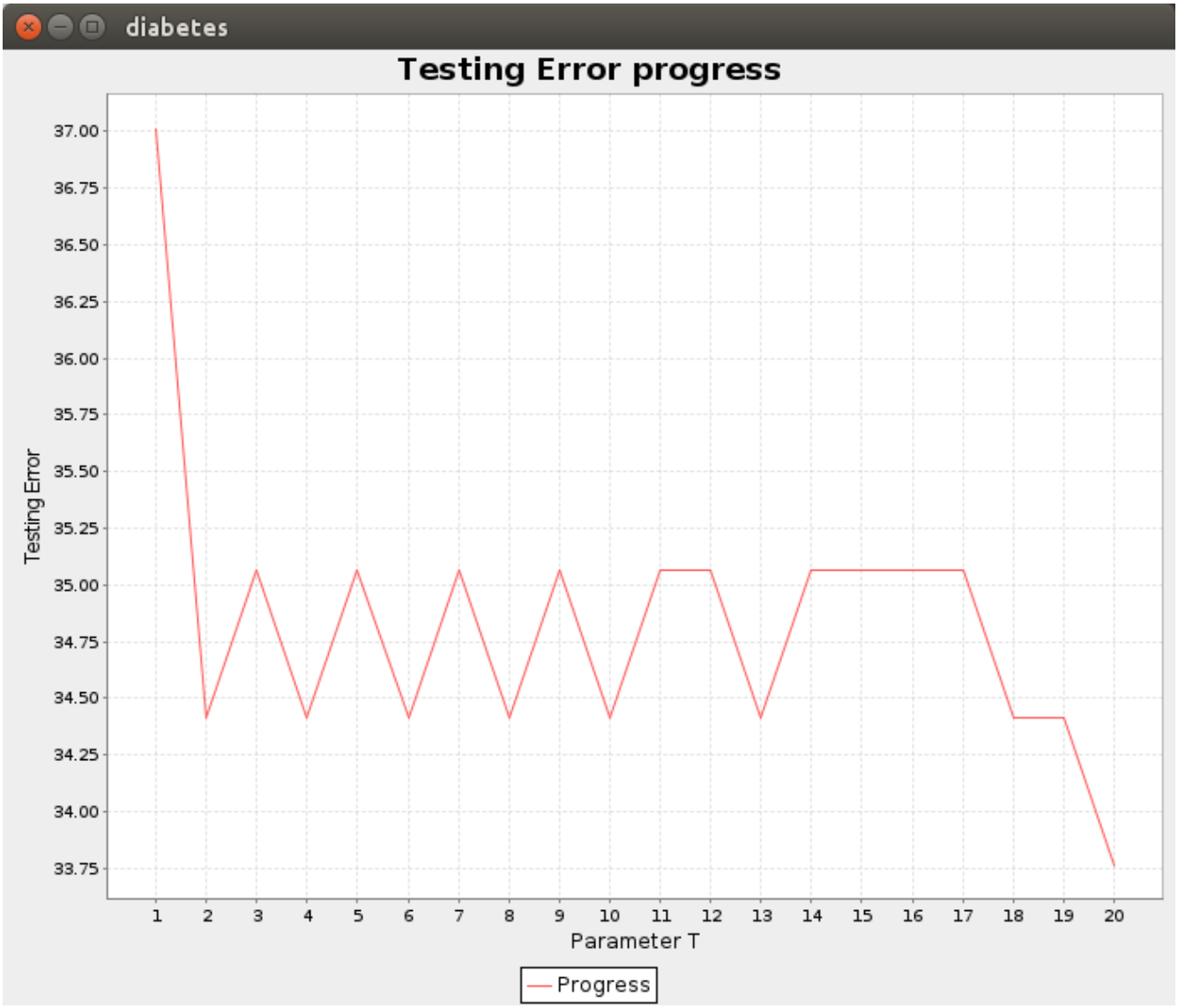
12
13
14
15
Parameter T
Progress

2) Boosting with Random Decision Stumps

A) Diabetes




diabetes
Training Error progress
34.50
34.45
34.40
34.35
34.30
34.25
34.20
34.15
34.10
34.05
34.00
33.95
33.90
33.85
33.80
33.75
33.70
33.65
33.60
Training Error
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
Parameter T
Progress


diabetes
Testing Error progress
Testing Error
37.00
36.75
36.50
36.25
36.00
35.75
35.50
35.25
35.00
34.75
34.50
34.25
34.00
33.75
1
2
3
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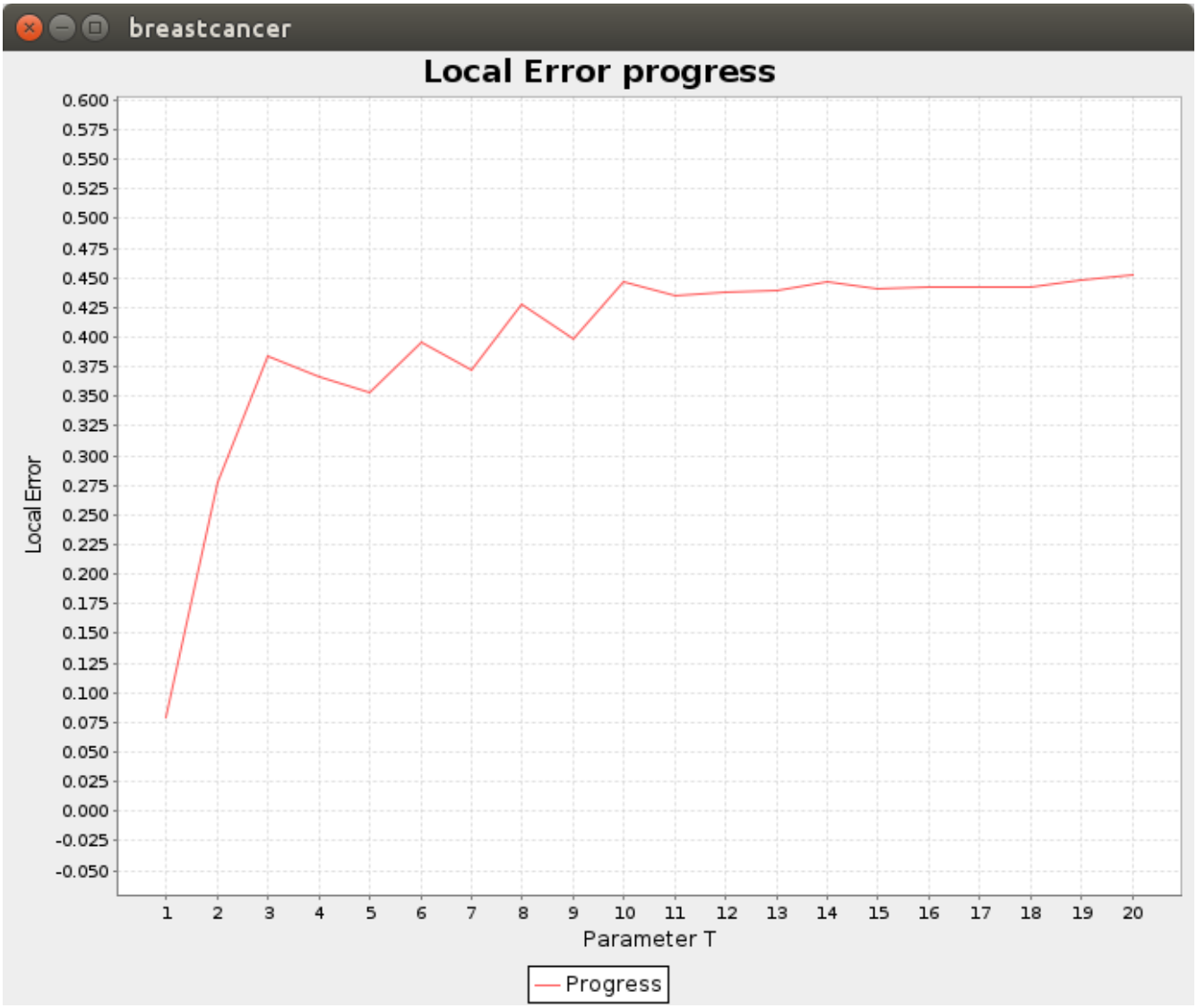
17
18
19
20
Parameter T
Progress

B) Breast Cancer



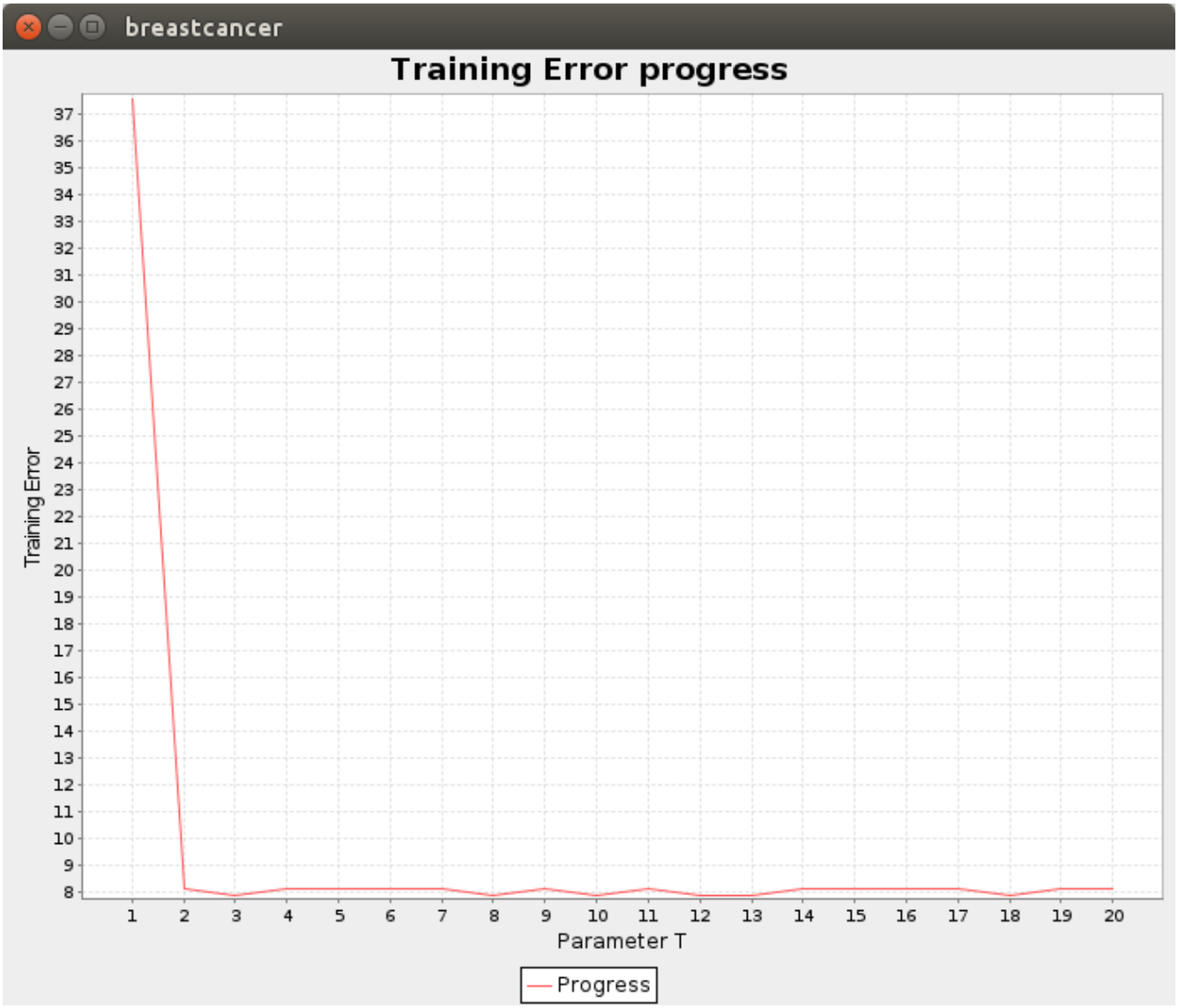
Setting Parameter T in Algorithm-1

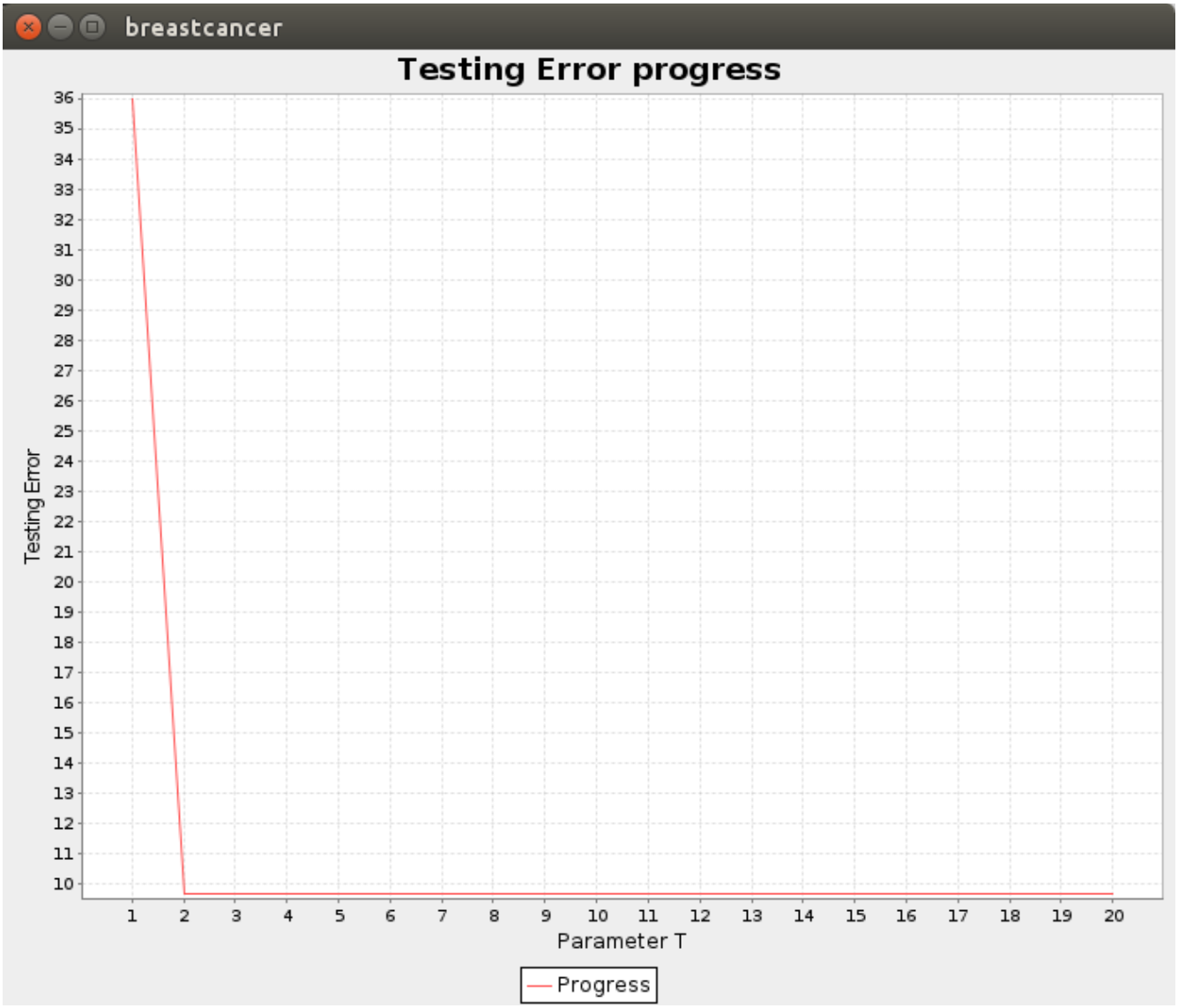
PseudoCode ::

```
let the best performance = 0
continuos_performance = 0
For t=1 ;; t=t+1
        Strong Classifier = Train Weak Classifiers
        performance = Test Strong classifier on training data
        if performance == best performance
                continuos_performance ++
        else
                continuos_performance = 0

        if performance > best performance{
                best performance = performance
                best parameter T = t
        }
        // If you find the continuos performance same 3 times  consicutively break
        if continuos_performance == 3
                break;
```

You get the best parameter T at the end of the loop


breastcancer
Training Error progress
Training Error
Parameter T
Progress


breastcancer
Testing Error progress
Testing Error
36
35
34
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29
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26
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24
23
22
21
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19
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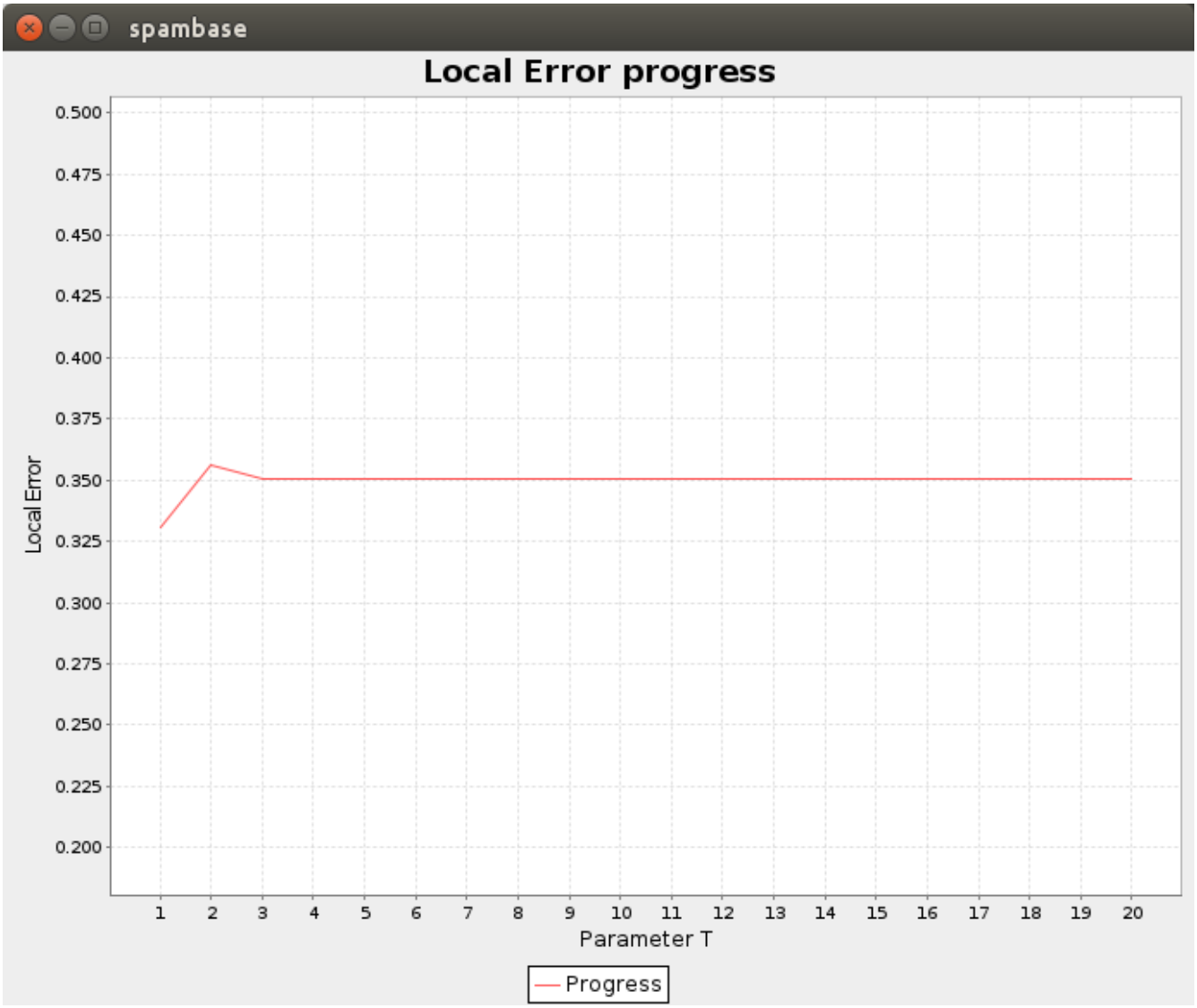
Parameter T
Progress

C) Spambase


spambase
Local Error progress
0.500
0.475
0.450
0.425
0.400
0.375
0.350
0.325
0.300
0.275
0.250
0.225
0.200
Local Error
1
2
3
4
5
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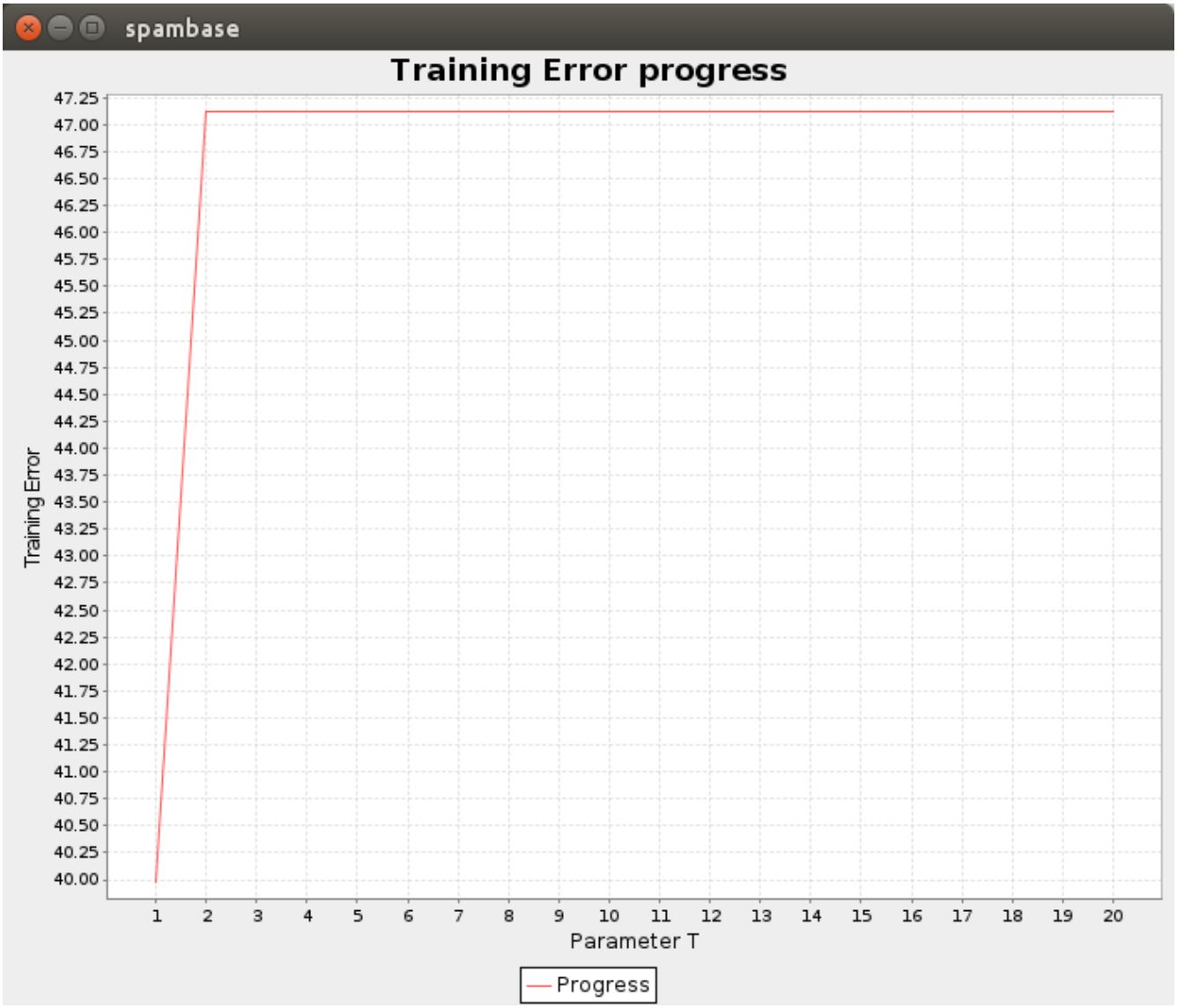
15
16
17
18
19
20
Parameter T
Progress


spambase
Training Error progress
Training Error
47.25
47.00
46.75
46.50
46.25
46.00
45.75
45.50
45.25
45.00
44.75
44.50
44.25
44.00
43.75
43.50
43.25
43.00
42.75
42.50
42.25
42.00
41.75
41.50
41.25
41.00
40.75
40.50
40.25
40.00
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11
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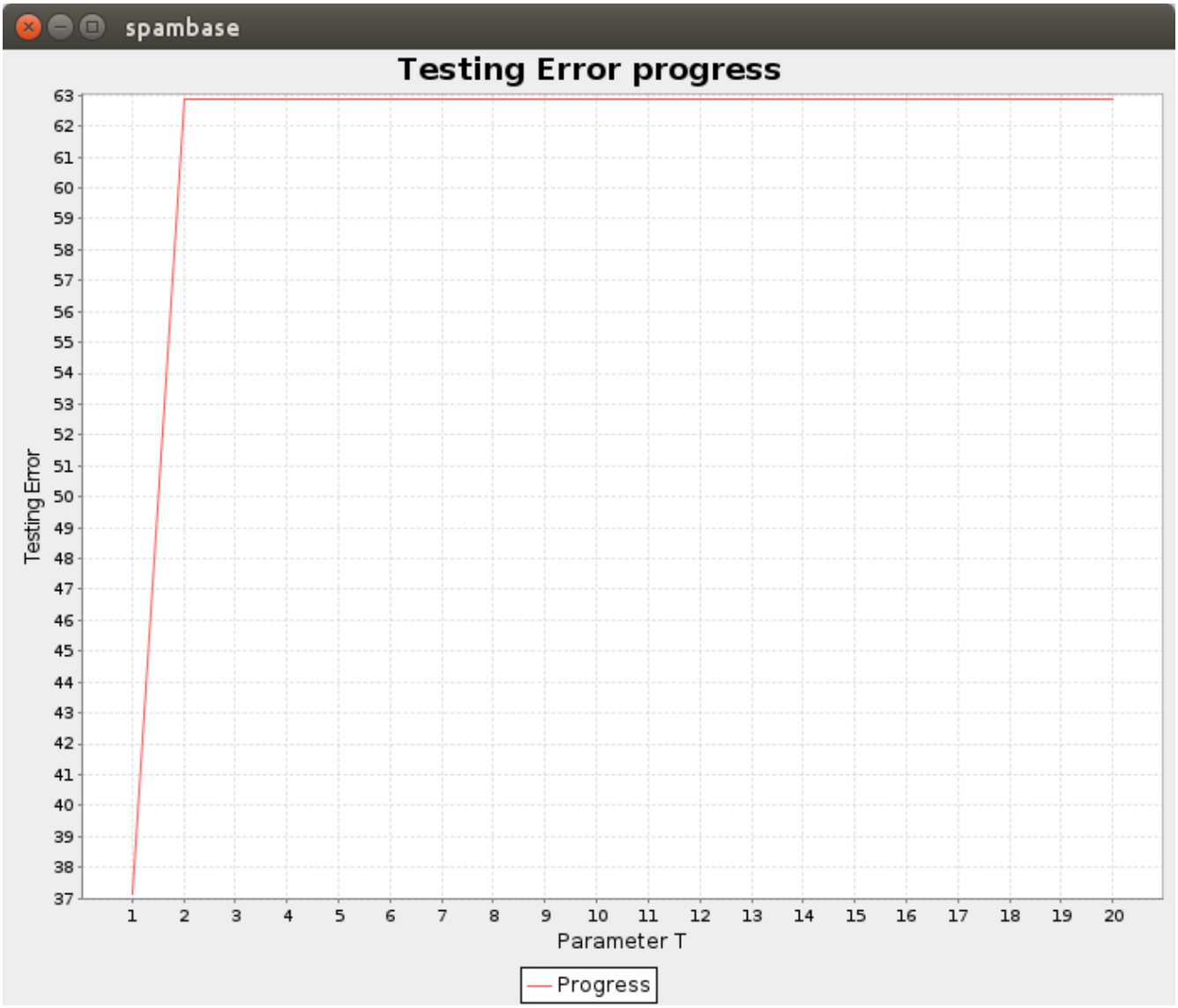
14
15
16
17
18
19
20
Parameter T
Progress


spambase
Testing Error progress
Testing Error
63
62
61
60
59
58
57
56
55
54
53
52
51
50
49
48
47
46
45
44
43
42
41
40
39
38
37
1
2
3
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10
11
12
13
14
15
16
17
18
19
20
Parameter T
Progress