

```
1 C:\Users\Sapan\Downloads\4p76Assign1\assign1\venv\Scripts\python.exe C:/Users/Sapan/
  Downloads/4p76Assign1/assign1/main.py
2 Enter 1 for Digits classification, Enter 2 for Cancer classification: 2
3 Enter number of tests to compare (only works on 3), if don't want to run tests just
  single run enter 1: 3
4 Give name to your Test for files: cancer_activation_function
5
6 Test no.: 0
7 Enter number of neurons for hidden layer: 3
8 Enter number of epochs: 8
9 Enter 1 for sigmoid or 2 for tanh activation function: 2
10 Enter learning rate: 0.5
11 Enter Momentum: 0.15
12 Running-----
13 Fold no.: 0
14 Accumulated sum error over epochs: [40.662578328072634, 15.342176021145784, 13.
  452238348866015, 12.259075537825959, 11.936642000859047, 11.78140588080389, 11.
  669664916621777, 11.57850920078794]
15
16 Correct classification validation set: 123
17
18 Correct classification test set: 200
19 end of fold
20
21 Running-----
22 Fold no.: 1
23 Accumulated sum error over epochs: [24.59715139639691, 12.467112448061227, 11.
  415608576124274, 10.901584126430297, 10.564692587600966, 10.320550467859137, 10.
  131024263922312, 9.974239688527728]
24
25 Correct classification validation set: 123
26
27 Correct classification test set: 200
28 end of fold
29
30 Running-----
31 Fold no.: 2
32 Accumulated sum error over epochs: [26.024223266273324, 16.22010901960401, 13.
  502220867801705, 11.970603467519362, 11.419884942741218, 11.224716280404584, 11.
  113009402178083, 11.02674608815382]
33
34 Correct classification validation set: 123
35
36 Correct classification test set: 200
37 end of fold
38
39 Running-----
40 Fold no.: 3
41 Accumulated sum error over epochs: [27.43814519617657, 14.918602285719109, 13.
  026442870491936, 11.992536454540204, 11.1125065933638, 10.575696266951953, 10.
  42040796471844, 10.381681057467958]
42
43 Correct classification validation set: 123
44
45 Correct classification test set: 200
46 end of fold
47
48 Fold test accuracies%: [100.0, 100.0, 100.0, 100.0]
49 Fold validation accuracies%: [100.0, 100.0, 100.0, 100.0]
50 Mean fold validation accuracies%: 100.0
51
52 Test no.: 1
53 Enter number of neurons for hidden layer: 7
```

```
54 Enter number of epochs: 20
55 Enter 1 for sigmoid or 2 for tanh activation function: 2
56 Enter learning rate: 1
57 Enter Momentum: 0.9
58 Running-----
59 Fold no.: 0
60 Accumulated sum error over epochs: [154.194931134617, 144.09905805729477, 161.
    4638725701084, 111.01777601742418, 253.18059432853028, 256.99588454655884, 256.
    9956482952511, 256.99538338559364, 256.9950842755904, 256.99474389715823, 256.
    99435309226027, 256.9938997791386, 256.9933676848571, 256.99273435596433, 256.
    9919679172024, 256.99102155098785, 256.9898235783784, 256.98825842245395, 256.
    986126890141, 256.9830536825771]
61
62 Correct classification validation set: 123
63
64 Correct classification test set: 200
65 end of fold
66
67 Running-----
68 Fold no.: 1
69 Accumulated sum error over epochs: [261.4836895587656, 257.9993107750336, 257.
    9993014758541, 257.9992919158387, 257.9992820837482, 257.9992719676839, 257.
    9992615550406, 257.99925083244995, 257.9992397857249, 257.9992283997949, 257.
    9992166586345, 257.99920454518775, 257.9991920412831, 257.99917912753995, 257.
    99916578326736, 257.9991519863501, 257.99913771312356, 257.9991229382351, 257.
    99910763449054, 257.99909177268336]
70
71 Correct classification validation set: 123
72
73 Correct classification test set: 200
74 end of fold
75
76 Running-----
77 Fold no.: 2
78 Accumulated sum error over epochs: [138.44692486509533, 44.3601282028679, 39.
    843681772029086, 47.596358250605505, 58.47318163305158, 35.77660131993092, 64.
    58783203320759, 75.05647448004542, 43.53020778538897, 36.80130176852688, 47.
    212282728971154, 67.35046557050221, 131.01790434132636, 115.44387074308395, 69.
    04541286288362, 123.78704816511288, 56.120451620773565, 65.9325389554821, 45.
    23544770702926, 34.99256787139669]
79
80 Correct classification validation set: 123
81
82 Correct classification test set: 200
83 end of fold
84
85 Running-----
86 Fold no.: 3
87 Accumulated sum error over epochs: [218.7118793137508, 109.03431836261686, 139.
    15361210259297, 99.51604309562263, 71.08364145448594, 92.70217302475719, 81.
    47753931655093, 164.66852621329642, 64.9626339575947, 93.07847731253659, 72.
    84198689210972, 131.16857369892261, 100.70472922115259, 80.5561793552226, 70.
    81932532218794, 80.75532226769647, 161.6135289457688, 114.93286377508308, 84.
    72896954918187, 69.12090819724948]
88
89 Correct classification validation set: 123
90
91 Correct classification test set: 200
92 end of fold
93
94 Fold test accuracies%: [100.0, 100.0, 100.0, 100.0]
95 Fold validation accuracies%: [100.0, 100.0, 100.0, 100.0]
96 Mean fold validation accuracies%: 100.0
```

```

97
98 Test no.: 2
99 Enter number of neurons for hidden layer: 1
100 Enter number of epochs: 8
101 Enter 1 for sigmoid or 2 for tanh activation function: 2
102 Enter learning rate: 0.9
103 Enter Momentum: 0.1
104 Running-----
105 Fold no.: 0
106 Accumulated sum error over epochs: [38.76400075979338, 21.119397482810882, 20.
    626327781532012, 19.614104795282703, 19.67219439422821, 20.155821600124003, 20.
    540967061260666, 20.81016991129154]
107
108 Correct classification validation set: 123
109
110 Correct classification test set: 200
111 end of fold
112
113 Running-----
114 Fold no.: 1
115 Accumulated sum error over epochs: [40.455776315078445, 22.316635565757938, 21.
    984518584457817, 21.73651154293799, 21.997323535229675, 21.264359179600763, 20.
    66667691300983, 20.369154688981702]
116
117 Correct classification validation set: 123
118
119 Correct classification test set: 200
120 end of fold
121
122 Running-----
123 Fold no.: 2
124 Accumulated sum error over epochs: [20.736093656680914, 14.396296721743834, 13.
    217825473020495, 12.63913457592643, 12.252951530556917, 11.980983257542393, 11.
    784078154907071, 11.627731833382434]
125
126 Correct classification validation set: 123
127
128 Correct classification test set: 200
129 end of fold
130
131 Running-----
132 Fold no.: 3
133 Accumulated sum error over epochs: [21.803932666467624, 18.380739410775284, 19.
    95256986752, 20.488340221953813, 20.812959583590374, 21.16392088921168, 21.
    16282543733997, 21.612631968808042]
134
135 Correct classification validation set: 123
136
137 Correct classification test set: 200
138 end of fold
139
140 Fold test accuracies%: [100.0, 100.0, 100.0, 100.0]
141 Fold validation accuracies%: [100.0, 100.0, 100.0, 100.0]
142 Mean fold validation accuracies%: 100.0
143
144 Test results:
145     test0  test1  test2
146 0  100.0  100.0  100.0
147 1  100.0  100.0  100.0
148 2  100.0  100.0  100.0
149 3  100.0  100.0  100.0
150 Test stats:
151     test0  test1  test2

```

```

152 count      4.0      4.0      4.0
153 mean     100.0    100.0    100.0
154 std        0.0      0.0      0.0
155 min     100.0    100.0    100.0
156 25%     100.0    100.0    100.0
157 50%     100.0    100.0    100.0
158 75%     100.0    100.0    100.0
159 max     100.0    100.0    100.0
160
161 Validation results:
162      test0  test1  test2
163 0  100.0  100.0  100.0
164 1  100.0  100.0  100.0
165 2  100.0  100.0  100.0
166 3  100.0  100.0  100.0
167 Valid stats:
168      test0  test1  test2
169 count      4.0      4.0      4.0
170 mean     100.0    100.0    100.0
171 std        0.0      0.0      0.0
172 min     100.0    100.0    100.0
173 25%     100.0    100.0    100.0
174 50%     100.0    100.0    100.0
175 75%     100.0    100.0    100.0
176 max     100.0    100.0    100.0
177
178 shapiro test for testing accuracies
179 test0 stats=1.0000, p=1.0000
180 test1 stats=1.0000, p=1.0000
181 test2 stats=1.0000, p=1.0000
182
183 shapiro test for validation accuracies
184 test0 stats=1.0000, p=1.0000
185 test1 stats=1.0000, p=1.0000
186 test2 stats=1.0000, p=1.0000
187
188 ANOVA test
189 C:\Users\Sapan\Downloads\4p76Assign1\assign1\venv\lib\site-packages\scipy\stats\
  morestats.py:1678: UserWarning: Input data for shapiro has range zero. The results may
  not be accurate.
190     warnings.warn("Input data for shapiro has range zero. The results ")
191
192      sum_sq    df      F      PR(>F)
193 df_test.iloc[:, 1]  4.000000e+04  1.0  3.713820e+31  9.744049e-48
194 df_test.iloc[:, 2]  4.000000e+04  1.0  3.713820e+31  9.744049e-48
195 Residual          3.231174e-27  3.0           NaN           NaN
196
197 t-tests:
198 Ttest_indResult(statistic=nan, pvalue=nan)
199 Ttest_indResult(statistic=nan, pvalue=nan)
200 Ttest_indResult(statistic=nan, pvalue=nan)
201
202 No statistically better mean
203
204 Process finished with exit code 0

```