Name of run, name of algorithm	Parameters of algorithm Value	Test/Training Split	Precision/Class	Value	Confusion Matrix		
name of ran, name of algorium.	r arameters or argentum.	rood rraming opin	T TOOLOTO IN CIACO	Tulus			
NN Best Result from B) with 10x	Hidden Nodes 125	10-fold X-validation	Precision for Class "1"	0.808169	1		
Multi Class Neural Network	Learning Rate 0.054096	3	Precision for Class "2"	0.918656	10 - 21 1 1 8	1 9 157	
	Learning Iterations 363		Precision for Class "3"	0.742143	9 2	55 6	
	Initial learning weights diameter 0.1		Precision for Class "4"	0.919689		7 102	
	Momentum 0.5		Precision for Class "5"	0.807857			
Excercise: 4)b) "Scaling"	Normalization Min-Max		Precision for Class "6"	0.897916	7_ 2 1 8	222 4	
	Shuffle examples FALSE		Precision for Class "7"	0.932791	6- 3 14 3 305	15 1	
Best found combination of scaling methods:	Random Number Seed 42		Precision for Class "8"	0.932102	9 5 4 3 43	1 3	
Normalization techniques used:			Precision for Class "9"	0.851742	99		
MinMax: LB, AC, UC, ASTV, MSTV, ALTV, M	MLTV, DL, DP, Width, Min, Max, Mode, Nmax, Nzeroes, Mean, Tend	ency, Median	Precision for Class "10"	0.794738			
LogNormal: Variance, DS_DR			meanPrecision	0.86058	3- 13 1 32 1		
TanH: FM			stdPrecision	0.065236	2 14 539 1 10 6 16	1	
					1 326 10 17 13 2	5 3 29	
					3 3 N 5 6	1 8 9 10	
					Class		
					CidSS		
Training/Took andity 50/ / 050/							
Training/Test split: 5% / 95%		5% / 95%	Run 1 Micro-avg. precision		Run 2 Micro-avg. precision	0.603783 Run 3 Micro-avg. precision	0.671976
Multi Class Neural Network	Learning Rate 0.054096		Run 1 Macro-avg. precision	0.649982	Run 2 Macro-avg. precision	0.648341 Run 3 Macro-avg. precision	0.643175
	Learning Iterations 363		Pre	redicted Class	Predicted Class		Predicted Class
	Initial learning weights diameter 0.1		1 2 3 4	\$ 6 > 8 9 10	1 2 3 4 5 6 2 8	9 10 1 2 3 9	5 6 > 8 9 10
	Momentum 0.5						
Excercise: 4)C) "Training / Test set splits"	Normalization Min-Max		1 58.3% 12.8% 4.4%	7.2% 0.8% 2.5% 13.9% —	1 85.2% 4.2% 3.6% 1.1% 0.3% 0.6%	0.3% 4.8% 1 76.0% 10.4%	1.6% 1.4% 6.8% 3.8%
Ziconoloci iyoy iranimig iroci oot opino	Shuffle examples FALSE		2 4.9% 85.9% 3.5% 0.2%	1.8% 2.7% 0.7% 0.2%	2 15.9% 70.8% 0.6% 0.4% 10.7% 1.3%	0.4% 2 10.4% 74.5% 4	6% 3.3% 6.2% 0.5% 0.4%
	Random Number Seed 42		3 54.3% 4.3% 32.6%	8.7%	3 42.6% 14.9% 38.3% 4.3%	3 34.0% 56.0% 2.0%	8.0%
				_			
Normalization used as above			4 82.3% 8.9%	8.9%	4 1.3% 51.2% 3.8% 43.8%	4 30.3%	.4% 1.3% 25.0%
			<u>उ</u> 5 23.1% 13.8% 1.5%	47.7% 1.5% 3.1% 9.2%	Ö 5 66.7% 18.8% 1.4% 4.3% 1.4% 1.4%	1.4% 4.3% SS 68.6% 10.0%	9% 14.3% 1.4% 2.9%
			6 2.6% 5.1% 0.6% 0.6%	83.1% 6.1% 1.9%	6 3.8% 1.3% 91.7% 2.9% 0.	% 44TF 6 7.0% 0	3% 78.3% 13.4% 1.0%
			7 4.6%	0.8% 32.6% 60.3% 1.7%	7 16.8% 43.9% 35.7% 3.	7 7.1% 0.4% 0	4% 7.1% 72.4% 12.6%
			, 4.00		8 1.0% 2.9% 15.4% 80		
			8	1.0% 19.6% 79.4%		8 1.0% 1.0%	6.9% 5.9% 85.3%
			9 26.9% 1.5%	1.5% 4.5% 22.4% 43.3%	9 65.7% 6.0%	9.0% 19.4% 9 4.7%	1.6% 4.7% 57.8% 31.3%
			10 31.6% 2.6%	8.9% 2.6% 54.2%	10 75.7% 2.7% 0.5% 1.6%	19.5% 10 42.6%	14.2% 43.2%
Training/Test split: 15% / 85%	Hidden Nodes 125	15% / 85%	Run 1 Micro-avg. precision	0.796997	Run 2 Micro-avg. precision	0.799778 Run 3 Micro-avg. precision	0.782536
Multi Class Neural Network	Learning Rate 0.054096		Run 1 Macro-avg. precision	0.767398	Run 2 Macro-avg. precision	0.750672 Run 3 Macro-avg. precision	0.723784
	Learning Iterations 363		Pr	redicted Class	Predicted Class		Predicted Class –
	Initial learning weights diameter 0.1		1 3 3 4	5 6 > 8 9 10	1 2 3 4 5 6 7 6	9 10 1 2 3 4	s 6 > 8 9 to
Excercise: 4)C) "Training / Test set splits"	Momentum 0.5 Normalization Min-Max		1 82.2% 4.6% 1.5%	1.8% 0.3% 0.9% 8.6% —	1 74.3% 4.6% 2.8% 4.0% 1.9%	12.4% 1 64.6% 4.9% 6.4%	1.5% 0.3% 0.6% 4.6% 17.1%
Excercise. 4)C) Training / Test set spirts	Shuffle examples FALSE		2 2.5% 89.3% 0.2% 0.6%	1.9% 4.7% 0.6% 0.2%	2 2.5% 90.4% 0.2% 3.3% 0.6% 2.5% 0.4%	0.2% 2 1.6% 89.8% 4.79	0.4% 2.6% 0.2% 0.6%
	Random Number Seed 42		3 70.5% 4.5% 11.4%	13.6%	3 46.5% 7.0% 41.9% 4.7%		
	Random Number Occu		3 10.3% 4.3% 11.4%	13.076		3 29.5% 6.8% 56.8%	6.8%
Normalization used as above			4 28.8% 66.7%	1.5% 3.0%	4 36.6% 63.4%	4 20.0% 80.0	
			SSE 33.3% 13.3%	36.7%	(C) 5 21.3% 16.4% 50.8% 1.6%	3.3% 6.6% U 5 26.6% 23.4% 1.6%	37.5% 1.6% 9.4%
			e 6 0.7% 7.4%	84.1% 7.1% 0.7%	6 1.4% 7.1% 0.7% 85.4% 5.0%	0.4% 6 7.3%	86.4% 5.9% 0.3%
					7 1.9% 0.5% 2.8% 94.0%	0.9% 7 4.2% 0.5%	9.3% 83.7% 2.3%
			7 3.7%	2.3% 92.1% 1.4% 0.5%			_
			8	9.8% 89.1% 1.1%	7.9%	8	9.8% 10.9% 79.3%
			9 4.7%	3.1% 43.8% 48.4%	9 3.3% 4.9%	1.6% 41.0% 49.2% 9	3.7% 44.4% 51.9%
					10 20.0% 5.5%	6.1% 68.5% 10 11.4% 1.9%	2.5% 0.6% 2.5% 81.0%
			10 24.2% 0.6%	3.6% 0.6% 70.9%			

Training/Test split: 25% / 75%	Hidden Nodes	125 25% / 75%	Run 1 Micro-avg. precision	0.801387 Run 2 Micro-avg. precision	0.781211 Run 3 Micro-avg. precision	0.80517
Multi Class Neural Network	Learning Rate	0.054096	Run 1 Macro-avg. precision	0.758399 Run 2 Macro-avg. precision	0.738575 Run 3 Macro-avg. precision	0.735617
	Learning Iterations	363	Predicted Class			Predicted Class
	Initial learning weights diameter	0.1	1 2 3 9 5 6	8 9 10	1 2 3 9	s 6 > 8 9 1 ₀
	Momentum	0.5				
Excercise: 4)C) "Training / Test set splits"	Normalization	Min-Max	1 82.2% 4.6% 1.5% 1.8% 0.3%		1 86.9% 1.4% 3.1%	1.4% 0.3% 0.3% 1.7% 4.8%
Execusion 4/0/ Training / Test set spits	Shuffle examples	FALSE	2 2.5% 89.3% 0.2% 0.6% 1.9% 4.7%	0.6% 0.2%	2 5.3% 81.6% 0.2% 7	1.1% 2.1% 3.0% 0.5% 0.2%
	Random Number Seed	42	3 70.5% 4.5% 11.4%	13.6%	3 50.0% 2.5% 35.0%	12.5%
	Transon Transor Cod			12.0%		
Normalization used as above			4 28.8% 66.7% 1.5% 3.0%		4 3.4%	5.6%
			5 33.3% 13.3% 36.7%	16.7%	∑ 5 28.3%	66.0% 1.9% 3.8%
			6 0.7% 7.4% 84.1%	7.1% 0.7%	₹ 6 1.2% 2.4% 0	.4% 89.8% 5.9% 0.4%
			7 3.7% 2.3%	92.1% 1.4% 0.5%	7 3.3%	5.6% 87.2% 3.9%
			8	9.8% 89.1%	8	2.3% 5.7% 90.9% 1.1%
			9 4.7%	3.1% 43.8% 48.4%	9	2.3% 9.1% 52.3% 36.4%
			10 24.2% 0.6% 3.6%	0.6% 70.9%	10 33.1%	4.2% 9.9% 52.8%
Training/Test split: 35% / 65%	Hidden Nodes	125 35% / 65%	Run 1 Micro-avg. precision	0.822545 Run 2 Micro-avg. precision	0.808727 Run 3 Micro-avg. precision	0.820364
Multi Class Neural Network	Learning Rate	0.054096	Run 1 Macro-avg. precision	0.803835 Run 2 Macro-avg. precision	0.800677 Run 3 Macro-avg. precision	0.795512
	Learning Iterations	363	Predicted Class	Predicted Cl		Predicted Class
	Initial learning weights diameter	0.1	1 2 3 4 5 6	8 9 1 ₀ 2 2 3 4 5 6		5 6 > 8 9 10
	Momentum	0.5				
Excercise: 4)C) "Training / Test set splits"	Normalization	Min-Max	1 88.0% 2.6% 4.0% 0.7% 0.4%	1.5% 1 88.4% 3.3% 1.2% 1.2%	1.7% 0.4% 3.7% 1 82.9% 3.6% 2.4%	0.4% 0.8% 2.0% 7.9%
Execuse: 4/0) Training / Test set spits	Shuffle examples	FALSE	2 3.6% 87.4% 1.7% 4.3% 2.4%	0.5% 2 3.5% 90.0% 1.9% 0.3%	3.8% 0.3% 2 3.2% 92.1%	1.8% 0.5% 1.1%
	Random Number Seed	42	3 51.4% 2.7% 43.2%	2.7% 3 73.3% 3.3% 16.7%	6.7%	2.8%
	Traingen rest		4 18.3% 80.0% 1.7%		4 16.7% 7	9.2%
Normalization used as above			S S		1.7%	
			<u>0</u> 5 46.3% 1.9% 3.7% 37.0%	11.1% — Se	7.7% 8 36.7% 22.4%	24.5%
			6 0.8% 4.3% 0.4% 85.3%	7.8% 1.6% UV 6 0.9% 6.0% 0.9% 0.5%	6 0.4% 9.4%	86.2% 3.1% 0.9%
			7 1.6% 5.2%	1.6% 7 5.5%	11.0% 81.6% 1.8%	3.8% 82.7% 9.6%
			8	7.0% 93.0%	8	1.4% 98.6%
				8 1.6% 4.9% 52.5% 31.1%	11.6% 88.4%	10.5% 55.3% 34.2%
				9 10.9%	52.2% 37.0% 10 16.7%	0.8% 3.3% 79.2%
			10 44.1%	5.6% 49.0% 10 35.0% 2.9%	1.4% 60.7%	3.370 73.270
T :: (T) 11 AEQ/ / EEQ/						
Training/Test split: 45% / 55%	Hidden Nodes	125 45% / 55%	Run 1 Micro-avg. precision	0.836629 Run 2 Micro-avg. precision	0.822872 Run 3 Micro-avg. precision	0.83147
Multi Class Neural Network						
	Learning Rate	0.054096	Run 1 Macro-avg. precision	0.806466 Run 2 Macro-avg. precision	0.774976 Run 3 Macro-avg. precision	0.800611
	Learning Rate Learning Iterations	0.054096 363	Predicted Class	Predicted 0	0.774976 Run 3 Macro-avg. precision	Predicted Class
	Learning Iterations	363		Predicted 0	0.774976 Run 3 Macro-avg. precision	
	Learning Iterations Initial learning weights diameter	363 0.1	Predicted Class	Predicted (0.774976 Run 3 Macro-avg. precision	Predicted Class
	Learning Iterations Initial learning weights diameter Momentum	363 0.1 0.5	Predicted Class	Predicted 0	0.774976 Run 3 Macro-avg. precision	Predicted Class 9
	Learning Iterations Initial learning weights diameter Momentum Normalization	0.1 0.5 Min-Max	Predicted Class	Predicted (0.774976 Run 3 Macro-avg. precision	Predicted Class 9
	Learning Iterations Initial learning weights diameter Momentum	363 0.1 0.5	Predicted Class 7 7.5% 7.1% 3.3% 1.4% 1.4% 0	Predicted 0 2 2 3 4 5 13.7% 1 82.5% 3.4% 4.4% 0.3% 2 1.6% 92.9% 0.3% 2.3% 0.6%	0.774976 Run 3 Macro-avg. precision Llass 6	Predicted Class 9
	Learning Iterations Initial learning weights diameter Momentum Normalization Shuffle examples	363 0.1 0.5 Min-Max FALSE	Predicted Class 7	Predicted 0 1 3.7% 1 82.5% 3.4% 4.4% 3.9% 0.3% 2 1.6% 92.9% 0.3% 2.3% 0.6% 3 56.0% 4.0% 32.0%	0.774976 Run 3 Macro-avg. precision 0.5%	Predicted Class 9
Excercise: 4)C) "Training / Test set splits"	Learning Iterations Initial learning weights diameter Momentum Normalization Shuffle examples	363 0.1 0.5 Min-Max FALSE	Predicted Class 7	Predicted 0 1 82.5% 3.4% 4.4% 3.9% 0.3% 2 1.6% 92.9% 0.3% 2.3% 0.6% 3 56.0% 4.0% 32.0%	0.774976 Run 3 Macro-avg. precision 0.5%	Predicted Class 9
Excercise: 4)C) "Training / Test set splits"	Learning Iterations Initial learning weights diameter Momentum Normalization Shuffle examples	363 0.1 0.5 Min-Max FALSE	Predicted Class 7	Predicted 0 1 3.7% 1 82.5% 3.4% 4.4% 3.9% 0.3% 2 1.6% 92.9% 0.3% 2.3% 0.6% 3 56.0% 4.0% 32.0%	0.774976 Run 3 Macro-avg. precision 0.5%	Predicted Class 9
Excercise: 4)C) "Training / Test set splits"	Learning Iterations Initial learning weights diameter Momentum Normalization Shuffle examples	363 0.1 0.5 Min-Max FALSE	Predicted Class 7	Predicted 0 1 82.5% 3.4% 4.4% 3.9% 0.3% 2 1.6% 92.9% 0.3% 2.3% 0.6% 3 56.0% 4.0% 32.0% 4 40.4% 59.6% 20.6% 0.3% 59.6%	0.774976 Run 3 Macro-avg. precision 0.5%	Predicted Class
Excercise: 4)C) "Training / Test set splits"	Learning Iterations Initial learning weights diameter Momentum Normalization Shuffle examples	363 0.1 0.5 Min-Max FALSE	Predicted Class 1 72.5% 7.1% 3.3% 1.4% 1.4% 0 2 2.0% 93.2% 0.3% 1.3% 0.3% 2.6% 3 50.0% 15.4% 34.6% 4 19.5% 80.5% 17.6% 5.9% 10% 6.2% 90.2% 2	Predicted 0 1 82.5% 3.4% 4.4% 3.9% 0.3% 2 1.6% 92.9% 0.3% 2.3% 0.6% 3 56.0% 4.0% 32.0% 4 40.4% 59.6% 20.6% 59 5 10.0% 6.7% 80.0% 6% 0.7% 0.7%	0.774976 Run 3 Macro-avg. precision 1358	Predicted Class 9
Excercise: 4)C) "Training / Test set splits" Normalization used as above	Learning Iterations Initial learning weights diameter Momentum Normalization Shuffle examples	363 0.1 0.5 Min-Max FALSE	Predicted Class 7.5 6 > 1.4% 1.4% 0 2.0% 93.2% 0.3% 1.3% 0.3% 2.6% 3.50.0% 15.4% 34.6% 4.19.5% 80.5% 55.9% 7.1,6% 5.9% 90.2% 2 7.3,6% 8.0% 8	Predicted 0 1 82.5% 3.4% 4.4% 3.9% 0.3% 2 1.6% 92.9% 0.3% 2.3% 0.6% 3 56.0% 4.0% 32.0% 4 40.4% 59.6% 20.6% 59 5 10.0% 6.7% 80.0% 6% 0.7% 0.7%	0.774976 Run 3 Macro-avg. precision 0.5%	Predicted Class 9
Excercise: 4)C) "Training / Test set splits"	Learning Iterations Initial learning weights diameter Momentum Normalization Shuffle examples	363 0.1 0.5 Min-Max FALSE	Predicted Class 7	Predicted 0 13.7% 1 82.5% 3.4% 4.4% 3.9% 2 1.6% 92.9% 0.3% 2.3% 0.6% 3 56.0% 4.0% 32.0% 4 40.4% 59.6% 20.6% 5% 20.6% 7 0.7% 80.0% 80.0%	0.774976 Run 3 Macro-avg. precision 1358	Predicted Class y
Excercise: 4)C) "Training / Test set splits"	Learning Iterations Initial learning weights diameter Momentum Normalization Shuffle examples	363 0.1 0.5 Min-Max FALSE	Predicted Class 7.5 6 > 1.4% 1.4% 0 2.0% 93.2% 0.3% 1.3% 0.3% 2.6% 3.50.0% 15.4% 34.6% 4.19.5% 80.5% 55.9% 17.6% 5.9% 10% 6.2% 90.2% 2 7.3.6% 8.0% 8	Predicted 0 3.9% 13.7% 1 82.5% 3.4% 4.4% 3.9% 2 1.6% 92.9% 0.3% 2.3% 0.6% 3 56.0% 4.0% 32.0% 4 40.4% 59.6% 20.6% 7.8% 0.6% 1.1% 0.0% 0.7% 0.7%	0.774976 Run 3 Macro-avg. precision 1358	Predicted Class y
Excercise: 4)C) "Training / Test set splits"	Learning Iterations Initial learning weights diameter Momentum Normalization Shuffle examples	363 0.1 0.5 Min-Max FALSE	Predicted Class 7	Predicted 0 13.7% 1 82.5% 3.4% 4.4% 3.9% 1.6% 92.9% 0.3% 2.3% 0.6% 3 56.0% 4.0% 32.0% 4 40.4% 59.6% 20.6% 5% 20.6% 7 0.7% 7 0.7% 80.0% 82.4 4.3% 69.6% 21.7% 9 9.1%	0.774976 Run 3 Macro-avg. precision 1355	Predicted Class 9
Excercise: 4)C) "Training / Test set splits"	Learning Iterations Initial learning weights diameter Momentum Normalization Shuffle examples	363 0.1 0.5 Min-Max FALSE	Predicted Class 7.5 6 > 1.4% 1.4% 0 2.0% 93.2% 0.3% 1.3% 0.3% 2.6% 3.50.0% 15.4% 34.6% 4.19.5% 80.5% 55.9% 17.6% 5.9% 10% 6.2% 90.2% 2 7.3.6% 8.0% 8	Predicted 0 3.9% 13.7% 1 82.5% 3.4% 4.4% 3.9% 2 1.6% 92.9% 0.3% 2.3% 0.6% 3 56.0% 4.0% 32.0% 4 40.4% 20.6% 59.6% 20.6% 10.0% 6.7% 80.0% 6% 0.7% 7 0.7% 8 0.7% 8 0.7% 9 9.1%	0.774976 Run 3 Macro-avg. precision 1355	Predicted Class 9
Excercise: 4)C) "Training / Test set splits"	Learning Iterations Initial learning weights diameter Momentum Normalization Shuffle examples	363 0.1 0.5 Min-Max FALSE	Predicted Class 7.5 6 > 1.4% 1.4% 0 2.0% 93.2% 0.3% 1.3% 0.3% 2.6% 3.50.0% 15.4% 34.6% 4.19.5% 80.5% 55.9% 17.6% 5.9% 10% 6.2% 90.2% 2 7.3.6% 8.0% 8	Predicted 0 13.7% 1 82.5% 3.4% 4.4% 3.9% 1.6% 92.9% 0.3% 2.3% 0.6% 3 56.0% 4.0% 32.0% 4 40.4% 59.6% 20.6% 5% 20.6% 7 0.7% 7 0.7% 80.0% 82.4 4.3% 69.6% 21.7% 9 9.1%	0.774976 Run 3 Macro-avg. precision 1355	Predicted Class 9

			5			
Multi Class Neural Network	Learning Rate	0.054096	Run 1 Macro-avg. precision	0.820939 Run 2 Macro-avg. precision	0.846246 Run 3 Macro-avg. precision 0.8	25259
	Learning Iterations	363	Predicted Class	Predicted Class	Predicted Class	
	Initial loarning weights dispected	0.4	1 2 3 4 5 6 >	8 9 10 1 2 3 9 5 6	2 8 9 10 1 2 3 4 5 6	> 8 9 10
	Initial learning weights diameter	0.1				
	Momentum	0.5	1 77.8% 11.4% 4.5% 1.1% 0.6% 1.1	3.4% 1 87.1% 2.5% 0.6% 1.2%	1.2% 7.4% 1 83.7% 3.9% 3.4% 1.1% 1.1%	0.6% 6.29
excercise: 4)C) "Training / Test set splits"	Normalization	Min-Max				
	Shuffle examples	FALSE	2 93.9% 2.4% 0.8% 2.0% 0.4	0.4% 2 1.6% 91.6% 2.4% 0.4% 2.8%	0.4% 0.8% 2 1.1% 90.8% 1.8% 5.9%	0.49
	Random Number Seed	42	3 19.0% 9.5% 61.9% 9.5	3 71.4% 23.8%	4.8% 3 31.3% 6.3% 50.0%	12.5%
			4 12.5% 84.4% 3.1%	4 15.2% 82.6% 2.2%	4 9.1% 87.9% 3.0%	
lormalization used as above			\$55		8	
			<u>U</u> 5 11.5% 3.8% 73.1%	11.5% Up 5 16.7% 12.5% S8.3%	12.5% O 5 20.0% 14.3% 51.4%	2.9%
			€ 6 1.3% 10.2% 81.5% 7.0	% 6 0.7% 5.4% 2.0% 85.7 %	E -	2.1%
			7 2.6% 2.6% 94.	7 1.6% 7.4%	89.3% 0.8% 7 3.7% 2.8%	
			7 2.6% 94.			88.0% 5.6%
			5.7	76 92.376 1.576	13.6% 86.4% 8	5.9% 92.2%
			9 2.7%	78.4% 18.9% 9 12.8%	51.3% 35.9%	14.3% 50.0% 35.79
				10 22.9%	76.0%	
			10 11.5% 2.3% 3.4% 1.3	8.0% 73.6%	10 11.6%	4.3% 82.69
raining/Test split: 65% / 35%	Hidden Nodes	125 65% / 35%	Run 1 Micro-avg. precision	0.854054 Run 2 Micro-avg. precision	0.82973 Run 3 Micro-avg. precision 0.8	54054
ulti Class Neural Network	Learning Rate	0.054096	Run 1 Macro-avg. precision	0.800648 Run 2 Macro-avg. precision	0.804236 Run 3 Macro-avg. precision 0.	34923
	Learning Iterations	363	Predicted Class	Predicted Class	Predicted Cla	s
			1 2 3 9 5 6 >	A 9 4	> # 9 10 1 2 3 4 5 6	
	Initial learning weights diameter	0.1				· ·
	Momentum	0.5	1 73.8% 2.1% 7.6% 3.4% 1.4% 2.1	% 9.7% 1 79.2% 3.2% 5.6% 4.0%	1.6% 6.4% 1 91.1% 3.0% 0.7% 0.7% 0	1% 1.5% 2.
excercise: 4)C) "Training / Test set splits"	Normalization	Min-Max		1 /9.2% 3.2% 5.6% 4.0%		
	Shuffle examples	FALSE	2 1.0% 91.8% 0.5% 1.0% 1.5% 3.6%	0.5% 2 1.6% 93.8% 1.6% 0.5% 1.6%	0.5% 2 0.9% 91.5% 1.9% 4	7% 0.5% 0.
	Random Number Seed	42	3 37.5% 50.0% 6.3	% 6.3% 3 35.7% 64.3%	3 70.4% 25.9%	3.7%
			4 16.7% 83.3%		4 3.8% 88.5% 7	1%
lormalization used as above			556	4 24.3% 73.0% 2.7%		
			5 E	5.6% 11.1% S 15.0% 10.0% 65.0%	10.0% 0 5 15.4% 7.7% 65.4%	11
			6 0.8% 6.3% 86.5% 5.6	% 0.8% E 6 10.9% 0.9% 84.5%	3.6% 6 0.9% 6.2%	0% 0.9%
			7 2.2% 3.4% 94.4			
			7 2.2% 3.4% 94.1	7 1.0%	82.5% 1.0% 2.1% 7 3.4% 1.1%	85.1% 6.9%
			8 6.1	% 93.9%	18.9% 81.1%	9.3% 90.7%
			9 3.3%	80.0% 16.7%	9	80.0% 20
			9 3.3%	80.0% 16.7% 9	70.0% 30.0%	80.0% 20
			9 3.3% 10 4.7% 4.7% 1.6	,	70.0% 30.0% 9 2.6% 79.5% 10 21.2% 3.8%	80.0% 20 5.8% 69
				,	10 2134	
				,	10 2134	
raining/Test split: 75% / 25%	Hidden Nodes	125 75% / 25%		,	2.6% 79.5% 10 21.2% 3.8%	
		125 75% / 25% 0.054096	Run 1 Micro-avg. precision	9 10 15.4% 0.863894 Run 2 Micro-avg. precision	2.6% 79.5% 10 21.2% 3.8% 0.826087 Run 3 Micro-avg. precision 0.8	5.8% 69
raining/Test split: 75% / 25% Multi Class Neural Network	Learning Rate	0.054096	10 4.7% 1.6	0.863894 Run 2 Micro-avg. precision 0.827224 Run 2 Macro-avg. precision	0.826087 Run 3 Micro-avg. precision 0.783249 Run 3 Macro-avg. precision 0.7	5.8% 69
			Run 1 Micro-avg. precision Run 1 Macro-avg. precision	0.863894 Run 2 Micro-avg. precision 0.827224 Run 2 Macro-avg. precision Predicted Class	0.826087 Run 3 Micro-avg. precision 0.8 0.783249 Run 3 Macro-avg. precision 0.7	29868 99948
	Learning Rate	0.054096	Run 1 Micro-avg. precision Run 1 Macro-avg. precision Predicted Class	0.863894 Run 2 Micro-avg. precision 0.827224 Run 2 Macro-avg. precision Predicted Class	0.826087 Run 3 Micro-avg. precision 0.783249 Run 3 Macro-avg. precision 0.7	29868 99948
	Learning Rate Learning Iterations	0.054096 363	Run 1 Micro-avg. precision Run 1 Macro-avg. precision Predicted Class	0.863894 Run 2 Micro-avg. precision 0.827224 Run 2 Macro-avg. precision Predicted Class	0.826087 Run 3 Micro-avg. precision 0.8 Run 3 Macro-avg. precision 0.7 Run 3 Macro-avg. precision 0.7 Predicted Class	29868 99948
lulti Class Neural Network	Learning Rate Learning Iterations Initial learning weights diameter	0.054096 363 0.1 0.5	Run 1 Micro-avg. precision Run 1 Macro-avg. precision Predicted Class 7 3 9 5 6 7	0.863894 Run 2 Micro-avg. precision 0.827224 Run 2 Macro-avg. precision Predicted Class 71.9% 2.2% 4.5%	0.826087 Run 3 Micro-avg. precision 0.8 0.783249 Run 3 Macro-avg. precision 0.7	29868 99948
lulti Class Neural Network	Learning Rate Learning Iterations Initial learning weights diameter Momentum Normalization	0.054096 363 0.1 0.5 Min-Max	Run 1 Micro-avg. precision Run 1 Macro-avg. precision Predicted Class	0.863894 Run 2 Micro-avg. precision 0.827224 Run 2 Macro-avg. precision Predicted Class	0.826087 Run 3 Micro-avg. precision 0.8 0.783249 Run 3 Macro-avg. precision 0.7	29868 99948 2.1% 6.2%
lulti Class Neural Network	Learning Rate Learning Iterations Initial learning weights diameter Momentum Normalization Shuffle examples	0.054096 363 0.1 0.5 Min-Max	Run 1 Micro-avg. precision Run 1 Macro-avg. precision Predicted Class 7 3 9 5 6 7	0.863894 Run 2 Micro-avg. precision 0.827224 Run 2 Macro-avg. precision Predicted Class 7	0.826087 Run 3 Micro-avg. precision 0.783249 Run 3 Macro-avg. precision 0.783249 Run 3 Macro-avg. precision 0.7 Predicted Class 1 83.5% 2.1% 5.2% 1.0% 1.1% 14.6% 1 2.0% 85.1% 7.4% 4.1%	29868 99948 2.1% 6.2%
	Learning Rate Learning Iterations Initial learning weights diameter Momentum Normalization	0.054096 363 0.1 0.5 Min-Max	10 4.7% 1.6 Run 1 Micro-avg. precision Run 1 Macro-avg. precision Predicted Class 1 79.4% 4.9% 1.0% 3.9% 2.0% 2. 2 0.7% 86.1% 3.5% 4.2% 5.6%	0.863894 Run 2 Micro-avg. precision 0.827224 Run 2 Macro-avg. precision Predicted Class 71.9% 2.2% 4.5% 1 71.9% 2.2% 4.5% 2 1.4% 93.1% 0.7% 3.4% (3 66.7% 22.2% 1.4% 93.1% 0.7% 3.4% (0.826087 Run 3 Micro-avg. precision 0.783249 Run 3 Macro-avg. precision 0.784	29868 99948 2.1% 6.2%
lulti Class Neural Network xcercise: 4)C) "Training / Test set splits"	Learning Rate Learning Iterations Initial learning weights diameter Momentum Normalization Shuffle examples	0.054096 363 0.1 0.5 Min-Max	10 4.7% 1.6 Run 1 Micro-avg. precision Run 1 Macro-avg. precision Predicted Class 1 79.4% 4.9% 1.0% 3.9% 2.0% 2. 2 0.7% 86.3% 3.5% 4.2% 5.6% 3 50.0% 8.3% 41.7% 4 5.3% 94.7%	0.863894 Run 2 Micro-avg. precision 0.827224 Run 2 Macro-avg. precision Predicted Class 7	0.826087 Run 3 Micro-avg. precision 0.783249 Run 3 Macro-avg. precision 0.784	29868 99948 2.1% 6.2%
ulti Class Neural Network xcercise: 4)C) "Training / Test set splits"	Learning Rate Learning Iterations Initial learning weights diameter Momentum Normalization Shuffle examples	0.054096 363 0.1 0.5 Min-Max	10 4.7% 1.6 Run 1 Micro-avg. precision Run 1 Macro-avg. precision Predicted Class 7 2 9 5 6 2 1 79.4% 4.9% 1.0% 3.9% 2.0% 2. 2 0.7% 86.1% 3.5% 4.2% 5.6% 3 50.0% 8.3% 41.7%	0.863894 Run 2 Micro-avg. precision 0.827224 Run 2 Macro-avg. precision Predicted Class 7	0.826087 Run 3 Micro-avg. precision 0.783249 Run 3 Macro-avg. precision 0.7 Predicted Class 9 4 9 4 1 83.5% 2.1% 5.2% 1.0% 2 2.0% 85.1% 7.4% 4.1%	29868 99948 - 4 2 40 2.1% 6.2%
ulti Class Neural Network ccercise: 4)C) "Training / Test set splits"	Learning Rate Learning Iterations Initial learning weights diameter Momentum Normalization Shuffle examples	0.054096 363 0.1 0.5 Min-Max	10 4.7% 1.6 Run 1 Micro-avg. precision Run 1 Macro-avg. precision Predicted Class 1 79.4% 4.9% 1.0% 3.9% 2.0% 2. 2 0.7% 86.3% 3.5% 4.2% 5.6% 3 50.0% 8.3% 41.7% 4 5.3% 94.7%	0.863894 Run 2 Micro-avg. precision 0.827224 Run 2 Macro-avg. precision Predicted Class 71.9% 2.2% 4.5% 1 71.9% 2.2% 4.5% 2 1.4% 93.1% 0.7% 3.4% (3 66.7% 22.2% 4.5% 1 51.9% 48.1%	0.826087 Run 3 Micro-avg. precision 0.783249 Run 3 Macro-avg. precision 0.783249 Run 3 Macro-avg. precision 0.7 Predicted Class 1.1% 14.6% 1 83.5% 2.1% 5.2% 1.0% 4.1% 1.1% 3 31.6% 5.3% 63.2% 4.1% 15.8% 84.2% 15.8% 52.9%	29868 99948 2.1% 6.2% 0.7%
ulti Class Neural Network ccercise: 4)C) "Training / Test set splits"	Learning Rate Learning Iterations Initial learning weights diameter Momentum Normalization Shuffle examples	0.054096 363 0.1 0.5 Min-Max	Run 1 Micro-avg. precision Run 1 Macro-avg. precision Predicted Class 1 79.4% 4.9% 1.0% 3.9% 2.0% 2. 2 0.7% 86.3% 3.5% 4.2% 5.6% 3 50.0% 8.3% 41.7% 4 5.3% 94.7% 92.3% 2.0% 2.0% 2.0% 2.0% 2.0% 2.0% 2.0% 2.0	0.863894 Run 2 Micro-avg. precision 0.827224 Run 2 Macro-avg. precision Predicted Class 7	0.826087 Run 3 Micro-avg. precision 0.783249 Run 3 Macro-avg. precision 0.783249 Run 3 Macro-avg. precision 0.783249 Run 3 Macro-avg. precision 0.78 2 2.0% 85.1% 7.4% 4.1% 3 31.6% 5.3% 63.2% 4 15.5% 84.2% 52.9% 50.9%	29868 99948 2.1% 6.2% 0.7%
ulti Class Neural Network ccercise: 4)C) "Training / Test set splits"	Learning Rate Learning Iterations Initial learning weights diameter Momentum Normalization Shuffle examples	0.054096 363 0.1 0.5 Min-Max	10 4.7% 1.66 Run 1 Micro-avg. precision Run 1 Macro-avg. precision Predicted Class 7	0.863894 Run 2 Micro-avg. precision 0.827224 Run 2 Macro-avg. precision Predicted Class 7.29% 2.2% 4.5% 5.9% 5.9% 66.7% 22.2% 4.5% 50.0% 66.7% 22.2% 48.1% 50.0% 66.7% 22.2% 48.1% 50.0% 66.3% 9.0% 9.0% 9.0% 9.0% 9.0% 9.0% 9.0% 9.0	0.826087 Run 3 Micro-avg. precision 0.783249 Run 3 Macro-avg. precision 0.783249 Run 3 Macro-avg. precision 0.783249 Run 3 Macro-avg. precision 0.79 Predicted Class Predicted Class 2 20% 85.3% 7.4% 4.1% 3 31.6% 5.3% 63.2% 4 15.8% 84.2% 12.5% 52.9% 13.8% 52.9% 13.8% 52.9% 13.8% 52.9% 14.8% 52.9% 15.8% 52.9% 10 21.2% 52.9%	29868 99948 2.1% 6.2% 0.7%
ulti Class Neural Network ccercise: 4)C) "Training / Test set splits"	Learning Rate Learning Iterations Initial learning weights diameter Momentum Normalization Shuffle examples	0.054096 363 0.1 0.5 Min-Max	10 4.7% 1.66 Run 1 Micro-avg. precision Run 1 Macro-avg. precision Predicted Class 7	0.863894 Run 2 Micro-avg. precision 0.827224 Run 2 Macro-avg. precision Predicted Class 7 1 71.9% 2.2% 4.5% 5.9% 5.9% 5.9% 5.9% 5.9% 5.9% 66.7% 5.9% 48.1% 50.0% 66.7% 5.9% 5.9% 66.3% 50.0% 50.0% 5	0.826087 Run 3 Micro-avg. precision 0.8 0.783249 Run 3 Macro-avg. precision 0.7 1.1% 14.6% 1 83.5% 2.1% 5.2% 1.0% 1.1% 1.1% 1.1% 1.1% 1.1% 1.1% 1.1	29868 99948 2.1% 6.2% 0.7% 0.7%
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ulti Class Neural Network ccercise: 4)C) "Training / Test set splits"	Learning Rate Learning Iterations Initial learning weights diameter Momentum Normalization Shuffle examples	0.054096 363 0.1 0.5 Min-Max	Run 1 Micro-avg. precision Run 1 Macro-avg. precision Predicted Class 1 79.4% 4.9% 1.0% 3.9% 2.0% 2. 2 0.7% 86.1% 3.5% 4.2% 5.6% 3 50.0% 8.3% 41.7% 4 5.3% 94.7% 92.3% 1.6% 92.3% 2. 7 1.6% 92.3% 2.	0.863894 Run 2 Micro-avg. precision 0.827224 Run 2 Macro-avg. precision Predicted Class 7	0.826087 Run 3 Micro-avg. precision 0.783249 Run 3 Macro-avg. precision 0.783249 Run 3 Macro-avg. precision 0.7 1.1% 14.6% 1 83.5% 2.1% 5.2% 1.0% 1.1% 1.1% 1.1% 1.1% 1.1% 1.1% 1.1	29868 99948 21% 6.2% 0.7% 0.7% 17.6% 4.5%
ulti Class Neural Network cercise: 4)C) "Training / Test set splits"	Learning Rate Learning Iterations Initial learning weights diameter Momentum Normalization Shuffle examples	0.054096 363 0.1 0.5 Min-Max	Run 1 Micro-avg. precision Run 1 Macro-avg. precision Predicted Class 1 79.4% 4.9% 1.0% 3.9% 2.0% 2. 2 0.7% 86.1% 3.5% 4.2% 5.6% 3 50.0% 8.3% 41.7% 4 5.3% 94.7% 92.3% 1.6% 92.3% 2. 7 1.6% 92.3% 2.	0.863894 Run 2 Micro-avg. precision 0.827224 Run 2 Macro-avg. precision Predicted Class 7	0.826087 Run 3 Micro-avg. precision 0.783249 Run 3 Macro-avg. precision 0.783249 Run 3 Macro-avg. precision 0.783249 Run 3 Macro-avg. precision 0.78 1.1% 14.6% 1 83.5% 2.1% 5.2% 1.0% 1.0% 2 2.0% 85.1% 7.4% 4.1% 1.1% 3 31.6% 5.3% 63.2% 4 15.8% 15.8% 12.5% 5 17.6% 11.8% 52.9%	29868 99948 2.1% 6.2% 0.7% 0.7% 17.6% 4.5% 81.7% 5.0% 9.7% 90.3%
ulti Class Neural Network cercise: 4)C) "Training / Test set splits"	Learning Rate Learning Iterations Initial learning weights diameter Momentum Normalization Shuffle examples	0.054096 363 0.1 0.5 Min-Max	Run 1 Micro-avg. precision Run 1 Macro-avg. precision Predicted Class 1 79.4% 4.9% 1.0% 3.9% 2.0% 2. 2 0.7% 86.1% 3.5% 4.2% 5.6% 3 50.0% 8.3% 41.7% 4 5.3% 94.7% 92.3% 1.6% 92.3% 2. 7 1.6% 92.3% 2.	0.863894 Run 2 Micro-avg. precision 0.827224 Run 2 Macro-avg. precision Predicted Class 7	0.826087 Run 3 Micro-avg. precision 0.783249 Run 3 Macro-avg. precision 0.783249 Run 3 Macro-avg. precision 0.7 1.1% 14.6% 1 83.5% 2.1% 5.2% 1.0% 1.1% 1.1% 1.1% 1.1% 1.1% 1.1% 1.1	29868 99948 2.1% 6.2% 0.7% 0.7% 17.6% 4.5% 81.7% 5.0% 9.7% 90.3%
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ccercise: 4)C) "Training / Test set splits" ormalization used as above	Learning Rate Learning Iterations Initial learning weights diameter Momentum Normalization Shuffle examples Random Number Seed	0.054096 363 0.1 0.5 Min-Max FALSE 42	Run 1 Micro-avg. precision Run 1 Macro-avg. precision Predicted Class 1 79.4% 4.9% 1.0% 3.9% 2.0% 2. 2 0.7% 86.3% 3.5% 4.2% 5.6% 3 50.0% 8.3% 41.7% 4 5.3% 94.7% 92.3% 7 1.6% 92.3% 8 4.7% 10 2.6% 2.6% 2.6%	0.863894 Run 2 Micro-avg. precision 0.827224 Run 2 Macro-avg. precision Predicted Class 7 2 4 5 6 2.5% 4.5% 22.2% 4.5% 3.4% 6 2.5% 5.0% 6.3% 9 5.0% 9 6.	0.826087 Run 3 Micro-avg. precision 0.783249 Run 3 Macro-avg. precision 0.783249 Run 3 Macro-avg. precision 0.783249 Run 3 Macro-avg. precision 0.78 1.1% 14.6% 1 83.5% 2.1% 5.2% 1.0% 1.0% 2 2.0% 85.1% 7.4% 4.1% 1.1% 3 31.6% 5.3% 63.2% 4 4.1% 15.5% 5.3% 63.2% 4 15.5% 5.3% 63.2% 5.2% 1.6% 7 1.7% 11.7% 11.7% 11.7% 11.7% 11.7% 11.7%	29868 99948 2.1% 6.2% 0.7% 0.7% 17.6% 4.5% 81.7% 5.0% 9.7% 90.3%
excercise: 4)C) "Training / Test set splits" ormalization used as above raining/Test split: 85% / 15%	Learning Rate Learning Iterations Initial learning weights diameter Momentum Normalization Shuffle examples Random Number Seed Hidden Nodes	0.054096 363 0.1 0.5 Min-Max FALSE 42	Run 1 Micro-avg. precision Run 1 Macro-avg. precision Predicted Class 1 79.4% 4.9% 1.0% 3.9% 2.0% 2. 2 0.7% 86.1% 3.5% 4.2% 5.6% 3 50.0% 8.3% 41.7% 4 5.3% 94.7% 92.3% 7 1.6% 92.3% 8 4.7% Run 1 Micro-avg. precision	0.863894 Run 2 Micro-avg. precision 0.827224 Run 2 Macro-avg. precision Predicted Class 7	0.826087 Run 3 Micro-avg. precision 0.783249 Run 3 Macro-avg. precision 0.783249 Run 3 Macro-avg. precision 0.783249 Run 3 Macro-avg. precision 0.78 1.1% 14.6% 1 83.5% 2.1% 5.2% 1.0% 4.1% 1.1% 3 31.6% 5.3% 63.2% 4.1% 15.8% 84.2% 15.8% 90.9% 7 1.7% 11.7% 90.9% 10 20.5% 90.9% 10 20.5%	29868 99948 21% 6.2% 0.7% 0.7% 17.6% 4.5% 81.7% 5.0% 9.7% 90.3% 72.7% 27.3% 2.6% 76.9%
ulti Class Neural Network xcercise: 4)C) "Training / Test set splits" ormalization used as above	Learning Rate Learning Iterations Initial learning weights diameter Momentum Normalization Shuffle examples Random Number Seed	0.054096 363 0.1 0.5 Min-Max FALSE 42	Run 1 Micro-avg. precision Run 1 Macro-avg. precision Predicted Class 1 79.4% 4.9% 1.0% 3.9% 2.0% 2. 2 0.7% 86.3% 3.5% 4.2% 5.6% 3 50.0% 8.3% 41.7% 4 5.3% 94.7% 92.3% 7 1.6% 92.3% 8 4.7% 10 2.6% 2.6% 2.6%	0.863894 Run 2 Micro-avg. precision 0.827224 Run 2 Macro-avg. precision Predicted Class 7 2 4 5 6 2.5% 4.5% 22.2% 4.5% 3.4% 6 2.5% 5.0% 6.3% 9 5.0% 9 6.	0.826087 Run 3 Micro-avg. precision 0.783249 Run 3 Macro-avg. precision 0.783249 Run 3 Macro-avg. precision 0.783249 Run 3 Macro-avg. precision 0.78 1.1% 14.6% 1 83.5% 2.1% 5.2% 1.0% 4.1% 1.1% 3 31.6% 5.3% 63.2% 4.1% 15.8% 84.2% 15.8% 90.9% 7 1.7% 11.7% 90.9% 10 20.5% 90.9% 10 20.5%	29868 99948 21% 6.2% 0.7% 0.7% 17.6% 4.5% 81.7% 5.0% 9.7% 90.3%

