Lecture 6 Quiz

4/5 points (80%)

Quiz, 5 questions

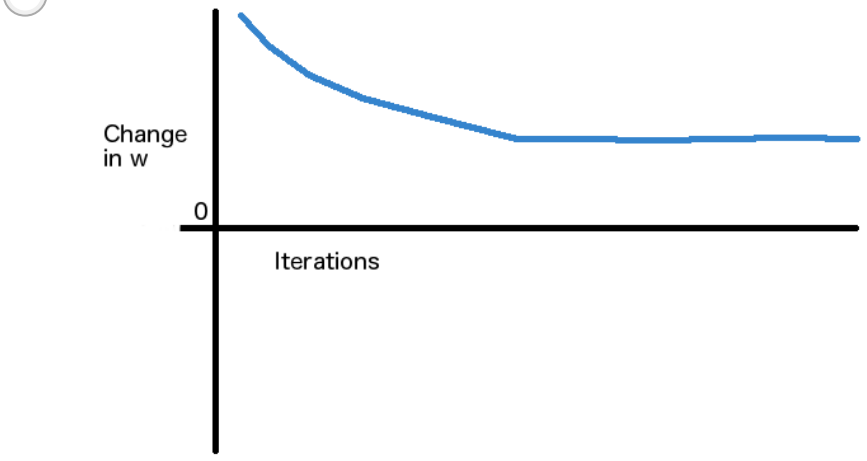
✔ Congratulations! You passed!

Next Item

✔ 1 / 1 points

1.
Suppose w is the weight on some connection in a neural network. The network is trained using gradient descent until the learning *converges*. We plot the change of w as training progresses. Which of the following scenarios shows that convergence has occurred? **Notice that we're plotting the change in w, as opposed to w itself.**

Note that in the plots below, each *iteration* refers to a single *step* of steepest descent on a *single minibatch*.



Lecture 6 Quiz

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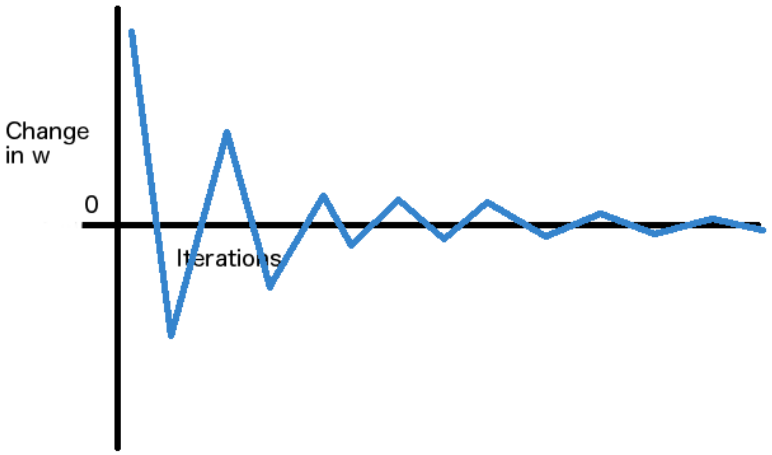
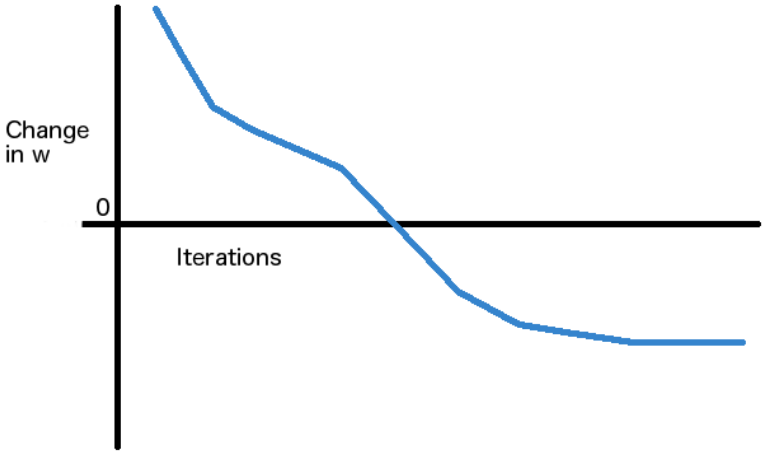
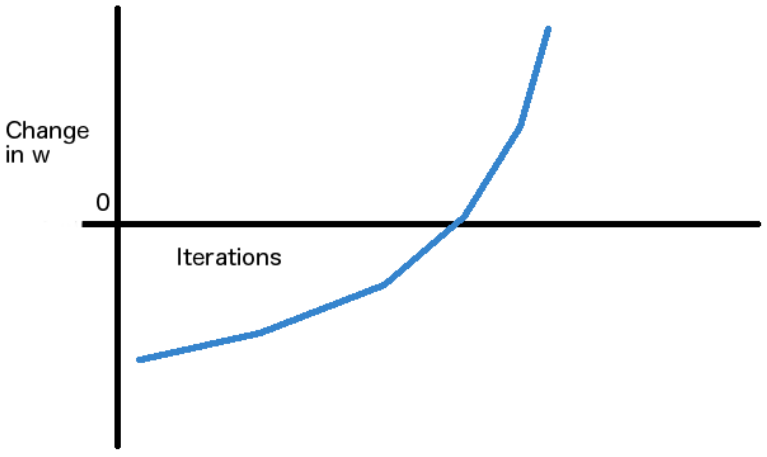


Correct

If the optimization has converged, w must converge to (or at most oscillate around) a point. So the change in w must converge to (or oscillate around) zero.





0 / 1

points

Lecture 6 Quiz

Quiz, 5 questions

4/5 points (80%)

2.

Suppose you are using mini-batch gradient descent for training some neural nets on a large dataset. All neurons are logistic. You have to decide the mini-batch size and learning rate. You try some values and find that the value of the objective function on the training set keeps fluctuating and does not converge. What could be going wrong? Check all that apply.

- [x] The mini-batch size could be too small.

Correct
Small mini-batch may lead to more sampling noise in the estimated gradient.

- [x] The learning rate may be too big.

Correct
Large learning rates may cause divergent oscillations in weight space.

- [ ] The weights may have been initialized to large values.

This should not be selected
Large weights may lead to saturation of hidden units causing slow convergence ("plateauing") but not fluctuations if the output of each unit is bounded (as is the case with logistic units).

- [ ] The size of the dataset may be too large.

This should not be selected
Larger dataset does not lead to fluctuations.

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1 / 1 points

3.

Lecture 6 Quiz

Quiz, 5 questions

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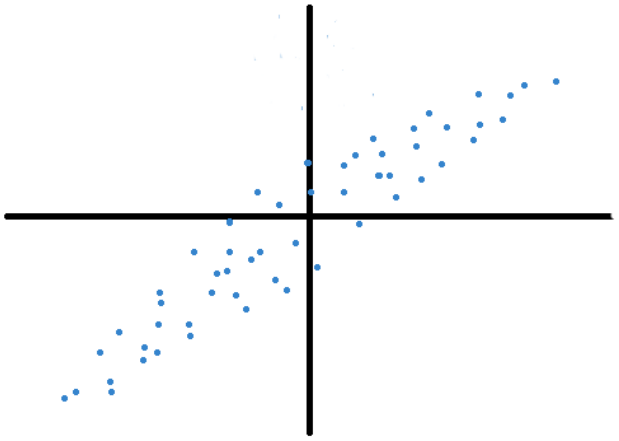
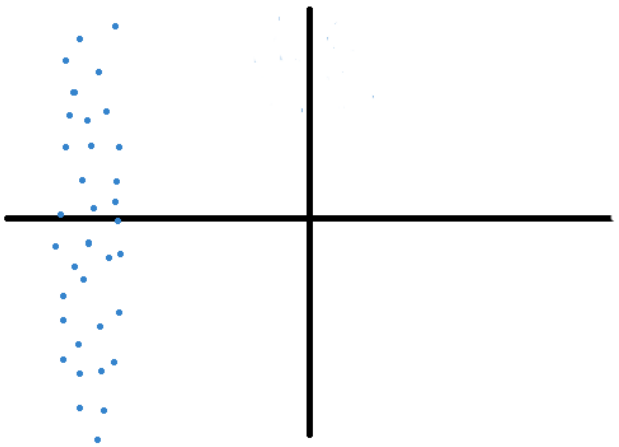
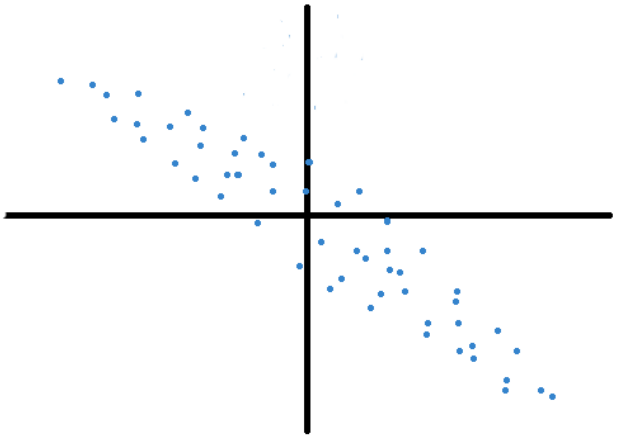
Four datasets are shown below. Each dataset has two input values (plotted below) and a target value (not shown). Each point in the plots denotes one training case. Assume that we are solving a classification problem. Which of the following datasets would most likely be easiest to train using neural nets ?







Lecture 6 Quiz

Quiz, 5 questions

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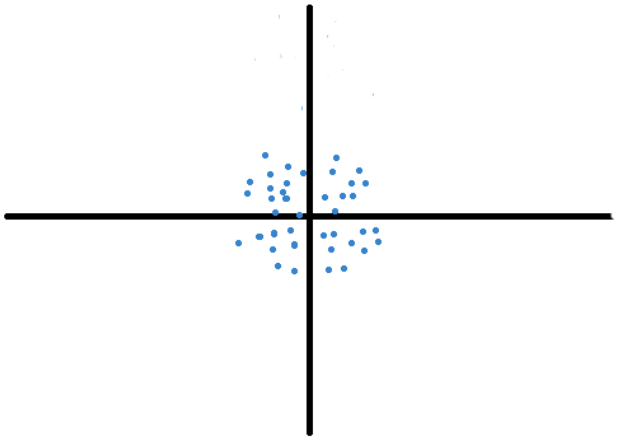

Correct

This dataset has mean zero and diagonal covariance.

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1 / 1 points

4.

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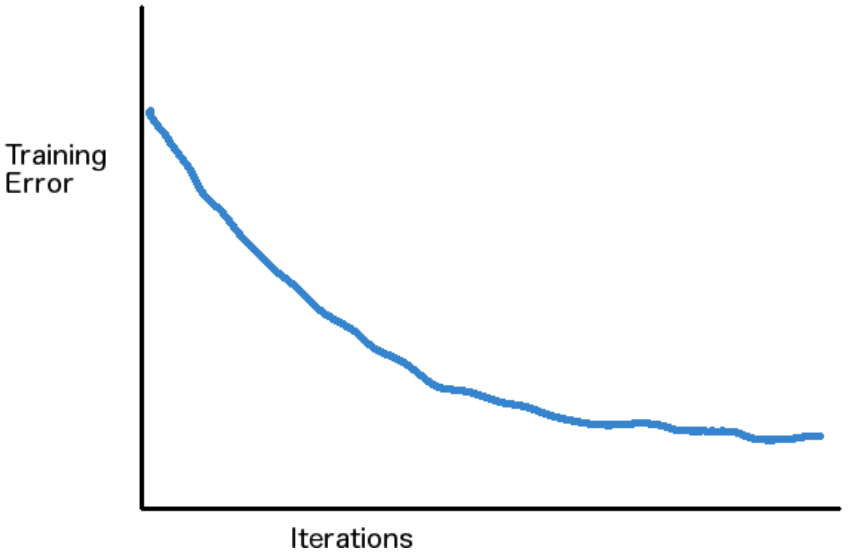
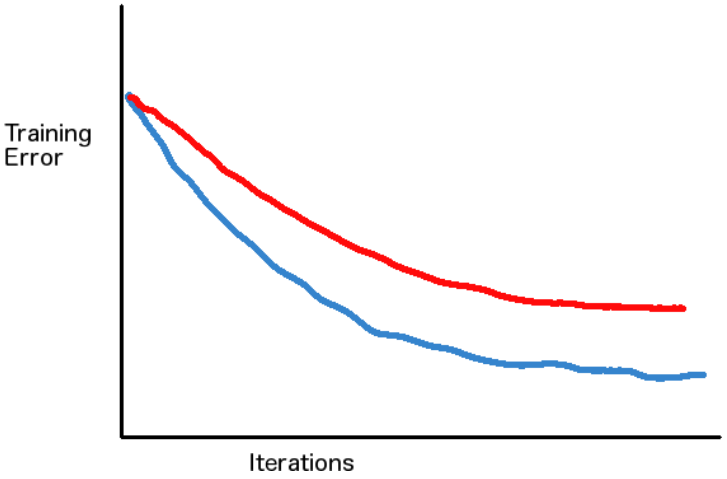
Claire is training a neural net using mini-batch gradient descent. She chose a particular learning rate and found that the training error decreased as more iterations of training were performed as shown here in blue



She was not sure if this was the best she could do. So she tried a **smaller** learning rate. Which of the following error curves (shown in red) might she observe now? Select the two most likely plots.

Note that in the plots below, each *iteration* refers to a single *step* of steepest descent on a *single minibatch*.



Correct

A smaller learning rate may lead to slower convergence.

Lecture 6 Quiz

Quiz, 5 questions

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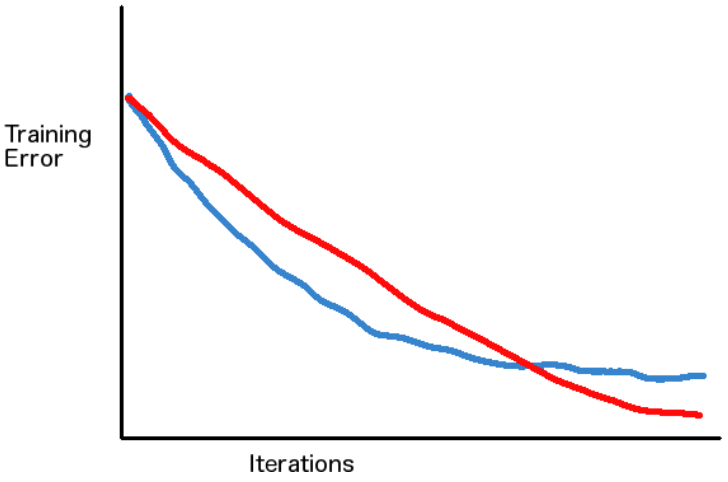
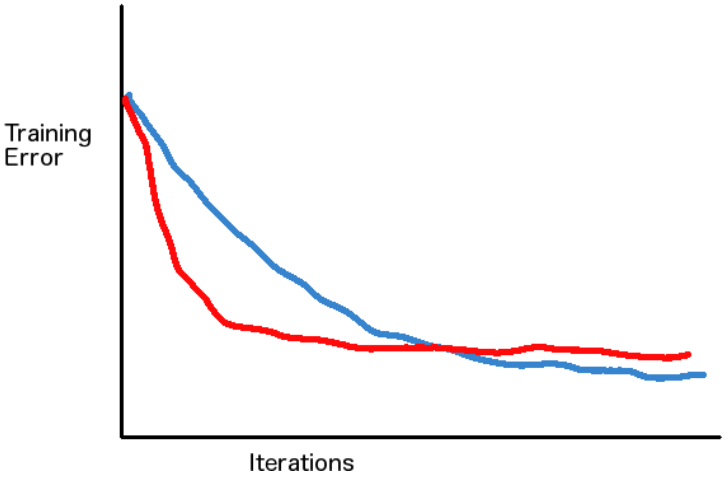
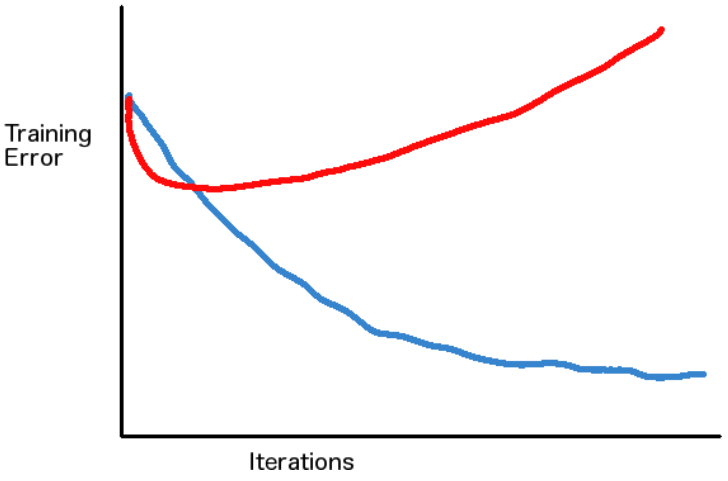


Correct

A smaller learning rate may lead to slower progress initially but result in a lower final error.



Un-selected is correct



Un-selected is correct