1.

In the context of machine learning, what is a diagnostic?

○ This refers to the process of measuring how well a learning algorithm does on a test set (data that the algorithm was not trained on).

○ An application of machine learning to medical applications, with the goal of diagnosing patients' conditions.

◉ A test that you run to gain insight into what is/isn't working with a learning algorithm.

○ A process by which we quickly try as many different ways to improve an algorithm as possible, so as to see what works.

✓ **Correct**
Yes! A diagnostic is a test that you run to gain insight into what is/isn't working with a learning algorithm, to gain guidance into improving its performance.

2.

True/False? It is always true that the better an algorithm does on the training set, the better it will do on generalizing to new data.

◉ False
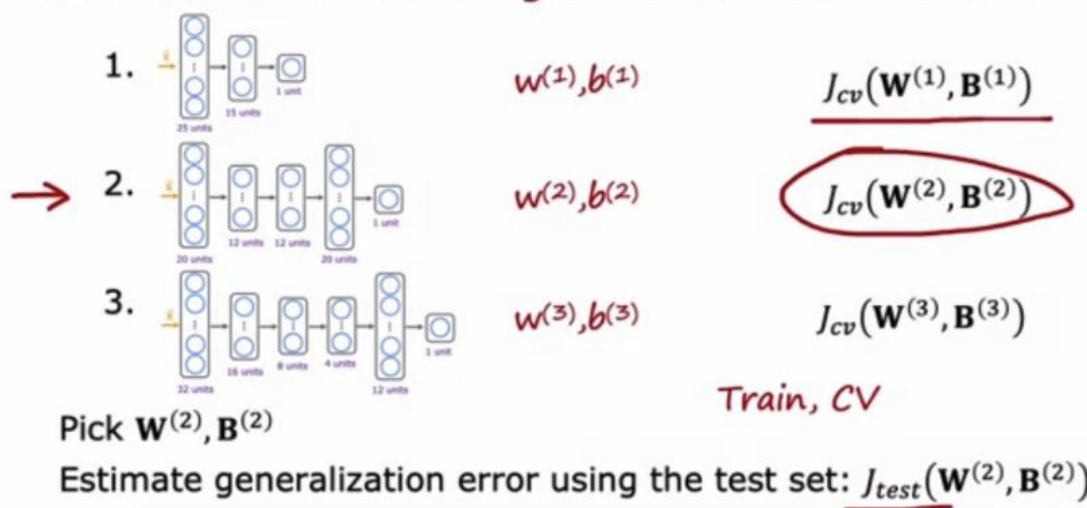
○ True

✓ **Correct**
Actually, if a model overfits the training set, it may not generalize well to new data.

3.

Model selection – choosing a neural network architecture

1. $W^{(1)}, b^{(1)}$ $J_{cv}(W^{(1)}, B^{(1)})$

→ 2. $W^{(2)}, b^{(2)}$ $J_{cv}(W^{(2)}, B^{(2)})$

3. $W^{(3)}, b^{(3)}$ $J_{cv}(W^{(3)}, B^{(3)})$

Train, CV

Pick $W^{(2)}, B^{(2)}$

Estimate generalization error using the test set: $J_{test}(W^{(2)}, B^{(2)})$

For a classification task; suppose you train three different models using three different neural network architectures. Which data do you use to evaluate the three models in order to choose the best one?

○ The test set

◉ The cross validation set

○ The training set

○ All the data -- training, cross validation and test sets put together.

✓ **Correct**
Correct. Use the cross validation set to calculate the cross validation error on all three models in order to compare which of the three models is best.