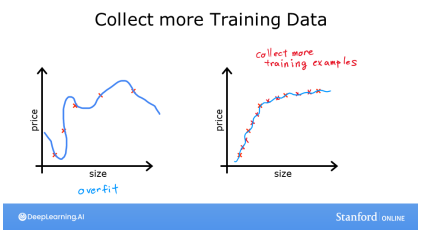
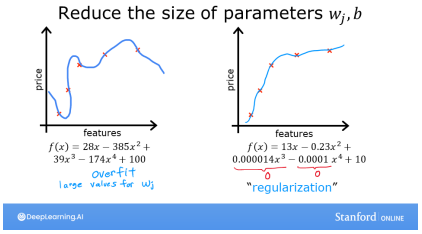
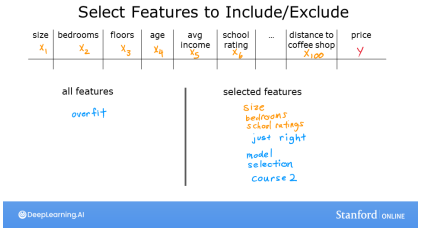
# Ungraded Lab: Overfitting




## Goals

In this lab, you will explore:

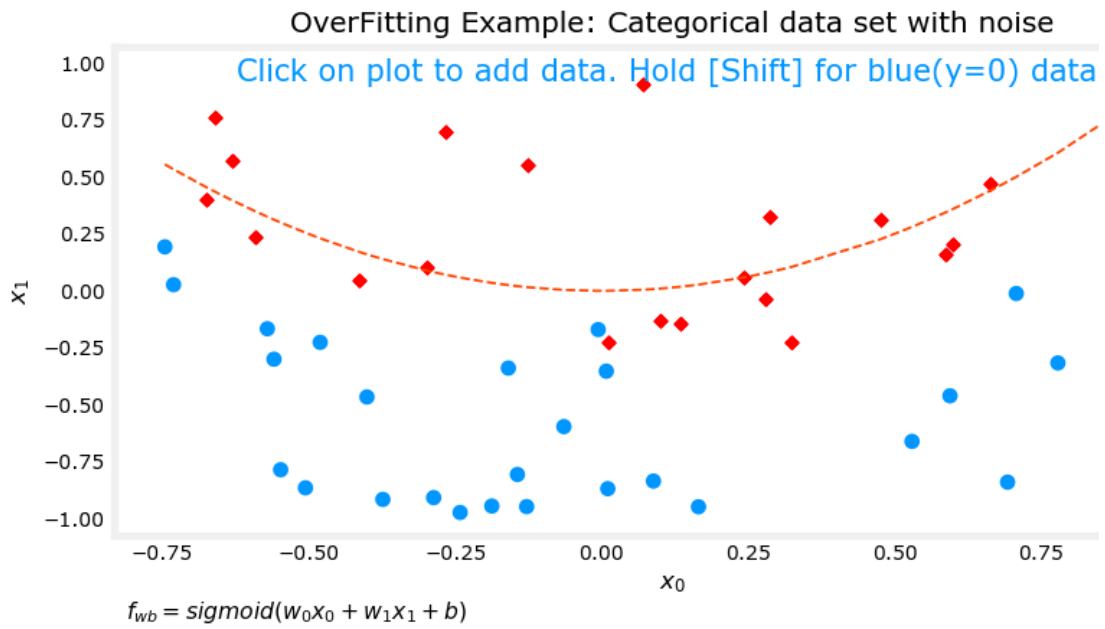
- the situations where overfitting can occur
- some of the solutions

In [1]:
```
%matplotlib widget
import matplotlib.pyplot as plt
from ipywidgets import Output
from plt_overfit import overfit_example, output
plt.style.use('./deeplearning.mplstyle')
```

# Overfitting

The week's lecture described situations where overfitting can arise. Run the cell below to generate a plot that will allow you to explore overfitting. There are further instructions below the cell.

In [2]:
```
1 plt.close("all")
2 display(output)
3 ofit = overfit_example(False)
```





In the plot above you can:

- switch between Regression and Categorization examples
- add data
- select the degree of the model
- fit the model to the data

Here are some things you should try:

- Fit the data with degree = 1; Note 'underfitting'.
- Fit the data with degree = 6; Note 'overfitting'
- tune degree to get the 'best fit'
- add data:
  - extreme examples can increase overfitting (assuming they are outliers).
  - nominal examples can reduce overfitting
- switch between `Regression` and `Categorical` to try both examples.

To reset the plot, re-run the cell. Click slowly to allow the plot to update before receiving the next click.

Notes on implementations:

- the 'ideal' curves represent the generator model to which noise was added to achieve the data set

- 'fit' does not use pure gradient descent to improve speed. These methods can be used on smaller data sets.

## Congratulations!

You have developed some intuition about the causes and solutions to overfitting. In the next lab, you will explore a commonly used solution, Regularization.

In [ ]: