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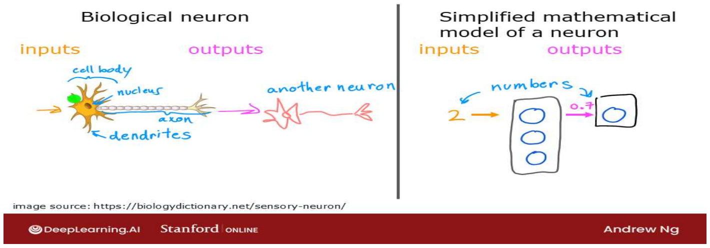
Optional Lab - Neurons and Layers

In this lab we will explore the inner workings of neurons/units and layers. In particular, the lab will draw parallels to the models you have mastered in Course 1, the regression/linear model and the logistic model. The lab will introduce Tensorflow and demonstrate how these models are implemented in that framework.



Packages

Tensorflow and Keras

Tensorflow is a machine learning package developed by Google. In 2019, Google integrated Keras into Tensorflow and released Tensorflow 2.0. Keras is a framework developed independently by François Chollet that creates a simple, layer-centric interface to Tensorflow. This course will be using the Keras interface.

In [1]:
```
import numpy as np
import matplotlib.pyplot as plt
import tensorflow as tf
from tensorflow.keras.layers import Dense, Input
from tensorflow.keras import Sequential
from tensorflow.keras.losses import MeanSquaredError, BinaryCrossentropy
from tensorflow.keras.activations import sigmoid
from lab_utils_common import dlc
from lab_neurons_utils import plt_prob_1d, sigmoidnp, plt_linear, plt_logistic
plt.style.use('./deeplearning.mplstyle')
import logging
logging.getLogger("tensorflow").setLevel(logging.ERROR)
tf.autograph.set_verbosity(0)
```

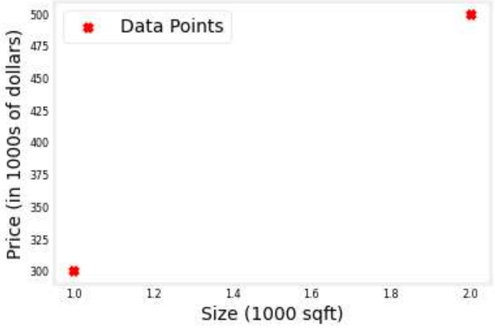
Neuron without activation - Regression/Linear Model

DataSet

We'll use an example from Course 1, linear regression on house prices.

In [2]:
```
X_train = np.array([[1.0], [2.0]], dtype=np.float32)           #(size in 1000 square feet)
Y_train = np.array([[300.0], [500.0]], dtype=np.float32)       #(price in 1000s of dollars)

fig, ax = plt.subplots(1,1)
ax.scatter(X_train, Y_train, marker='x', c='r', label="Data Points")
ax.legend( fontsize='xx-large')
ax.set_ylabel('Price (in 1000s of dollars)', fontsize='xx-large')
ax.set_xlabel('Size (1000 sqft)', fontsize='xx-large')
plt.show()
```



Regression/Linear Model