

# Regularization

Welcome to the second assignment of this week. Deep Learning models have so much flexibility and capacity that **overfitting can be a serious problem**, if the training dataset is not big enough. Sure it does well on the training set, but the learned network **doesn't generalize to new examples** that it has never seen!

**You will learn to:** Use regularization in your deep learning models.

Let's get started!

## Table of Content

- [1 - Packages](#)
- [2 - Problem Statement](#)
- [3 - Loading the Dataset](#)
- [4 - Non-Regularized Model](#)
- [5 - L2 Regularization](#)
  - [Exercise 1 - compute cost with regularization](#)
  - [Exercise 2 - backward propagation with regularization](#)
- [6 - Dropout](#)
  - [6.1 - Forward Propagation with Dropout](#)
    - [Exercise 3 - forward propagation with dropout](#)
  - [6.2 - Backward Propagation with Dropout](#)
    - [Exercise 4 - backward propagation with dropout](#)
- [7 - Conclusions](#)

## 1 - Packages

```
In [1]: # import packages
import numpy as np
import matplotlib.pyplot as plt
import sklearn
import sklearn.datasets
import scipy.io
from reg_utils import sigmoid, relu, plot_decision_boundary, initialize_parameters
from reg_utils import compute_cost, predict, forward_propagation, backward_propagation
from testCases import *
from public_tests import *

%matplotlib inline
plt.rcParams['figure.figsize'] = (7.0, 4.0) # set default size of plots
```