1.) Traditional Neural Networks contain at most 2-3 layers, while Deep Learning models are "deeper" as they can have hundreds of hidden layers.

2.) The typical applications of Deep Learning are ->

   a.) Face recognition
   b.) Text translation
   c.) Image classification
   d.) Image analysis
   e.) Audio-Video analysis
   f.) Self-Driving Cars

3.) The major USP of deep learning is its accuracy. Accuracy makes deep learning a state-of-the-art application as it can do many of the things long thought to have been the expertise of humans like Chess, Go, radiological scans, etc.

4.) The three technology enablers which make Deep Learning state-of-the-art are ->

   a.) Easy access to massive sets of labeled data
   b.) Enhanced hardware enabling massive upscaling in computational power
   c.) Prevalence and presence of pre-trained models curated by experts

5.) The basic premise of a neural network is to mimic the human brain. A Deep Neural Network is the technological manifestation of such an effort. Here are the salient points of DNN's architecture ->
   a.) Multiple non-linear processing layers
   b.) Consists of input, hidden, and output layers
   c.) Layers are interconnected via nodes, i.e., neurons
   d.) Each hidden layer uses the output of the previous layer as its input

6.) Convolutional Neural Networks (CNNs) are the most popular deep learning algorithms which deal with images and videos.

   It has two distinct layers -> Feature Detection layers and Classification layers.

   The Feature Detection Layers perform the following three tasks ->

   a.) **Convolution** -> Puts the input image through a set of filters, each of which activates certain features from the images.

b.) **Pooling** -> Simplifies the output by reducing the number of features that the network needs to learn about.
c.) **Rectified Linear Unit** -> allows for faster and more effective training by mapping negative values to zero and maintaining positive values.

After learning features in many layers, i.e., feature detection, the architecture of a CNN shifts to classification.

Classification layers perform the following two tasks ->

a.) The penultimate layer is a fully connected layer that outputs a vector of K dimensions where K is the number of classes the network will be able to predict. This vector contains all the probabilities for each type of image being classified.
b.) The final layer uses a softmax function to provide the classification output.

7.) AlexNet was first published in 2012 and is the most extensively used model for image classification. It uses an already vast network to classify images into thousands of categories.

8.) CheXNet is a 121-layered Convolutional Neural network. The model was trained on 112,120 frontal view X-ray scans from the ChestX-ray14 dataset.

The test set contains 420 frontal scans. The validation was done on 10,000 bootstrap samples randomly chosen, with replacement, from the test set.

The model can produce high-quality heatmaps for better screening, diagnosis, and testing. Concurrently, automation of such levels can be used to provide low-cost, readily accessible diagnostic healthcare to low-income communities and countries.