1. **Can you think of a few applications for a sequence-to-sequence RNN? What about a sequence-to-vector RNN? And a vector-to-sequence RNN?**

Applications:

* Speech recognition
* Machine translation
* Image captioning
* Question-Answering
* Sentence Prediction

1. **Why do people use encoder–decoder RNNs rather than plain sequence-to-sequence RNNs for automatic translation?**

* seq-2-seq RNNs translate one word at a time
* encoder-decoder RNNs read & translate a sentence at a time

1. **How could you combine a convolutional neural network with an RNN to classify videos?**

* Run a frame from each second of video through a CNN
* Feed CNN outputs as input sequence to RNN
* Feed RNN outputs to softmax layer for probabilities of each class

1. **What are the advantages of building an RNN using dynamic\_rnn() rather than static\_rnn()?**

* avoids out-of-memory errors
* directly takes single tensor as input and output (covering all time steps)
* no need to stack, unstack, or transpose
* generates a smaller easier to visualize graph in TensorBoard

1. **How can you deal with variable-length input sequences? What about variable-length output sequences?**

* Set sequence\_length parameter when calling static\_rnn() or dynamic\_rnn().
* Pad smaller input/output to make them the same size as the largest input/output.