

Convolutional neural networks

Lecture 9

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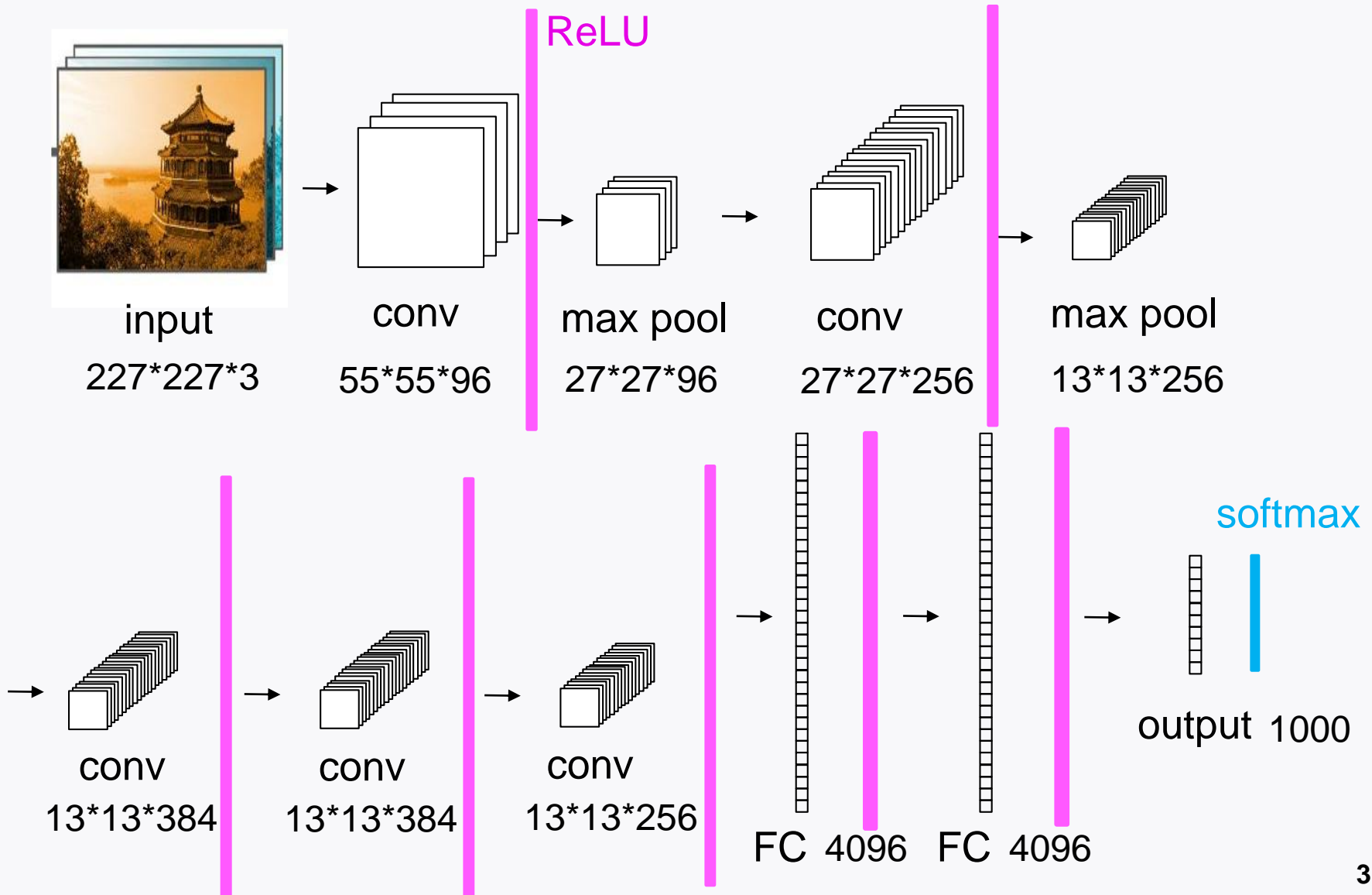
AlexNet & ResNet

Outline

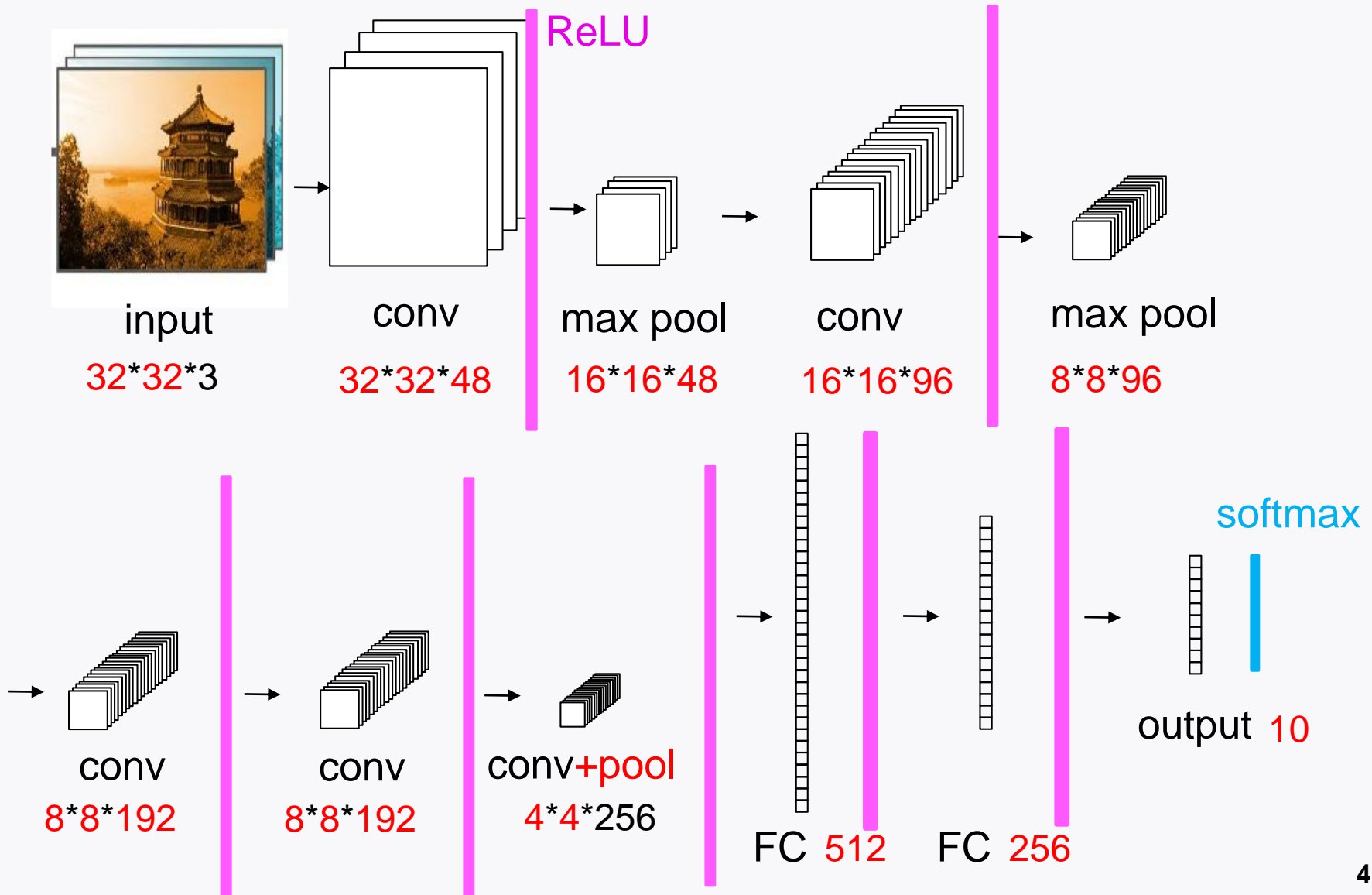
Will discuss two popular CNN architectures:

1. **AlexNet** (by the Godfather of deep learning);
2. **ResNet** (state of the art).

AlexNet



Simplified AlexNet for CIFAR10 (Check in PS)

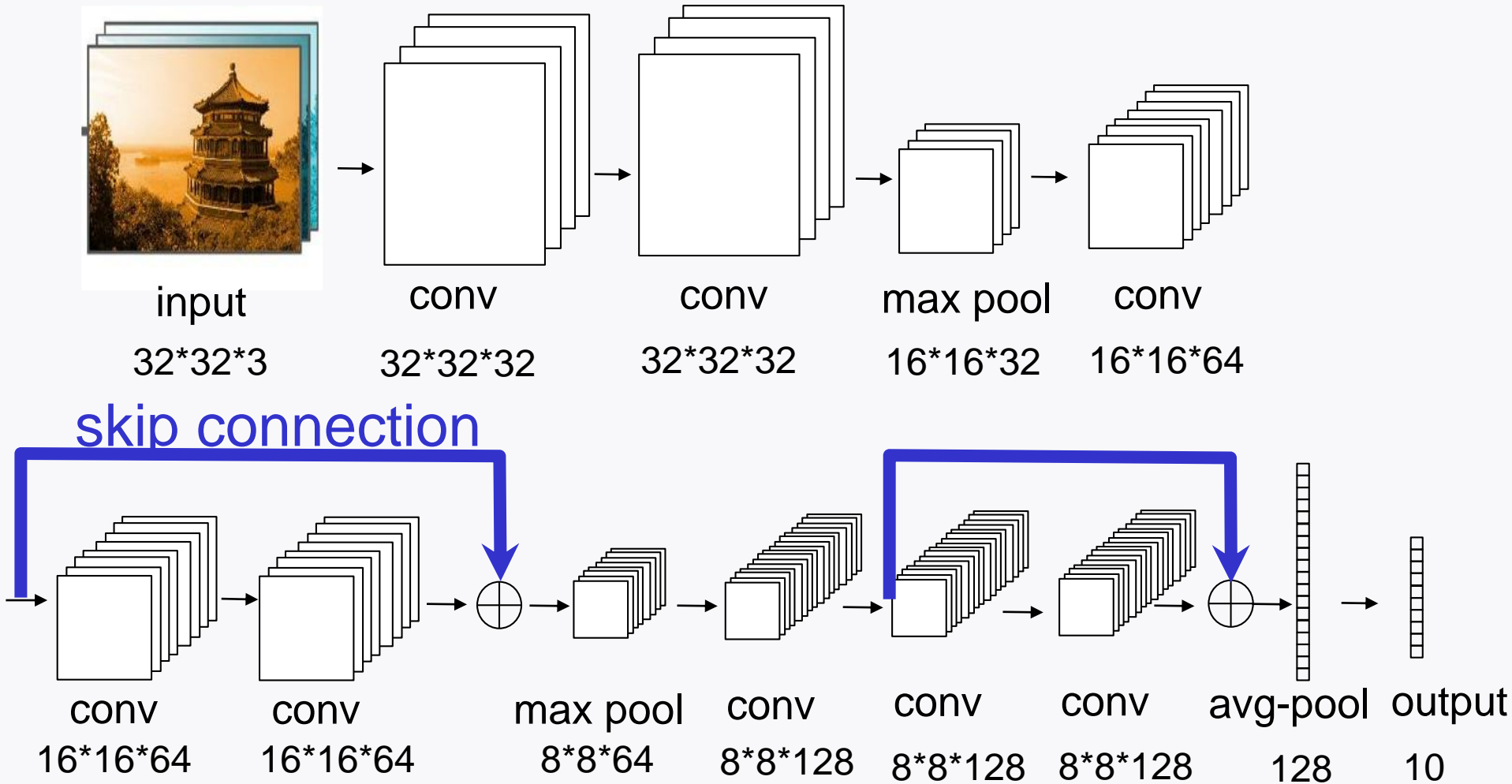


ResNet

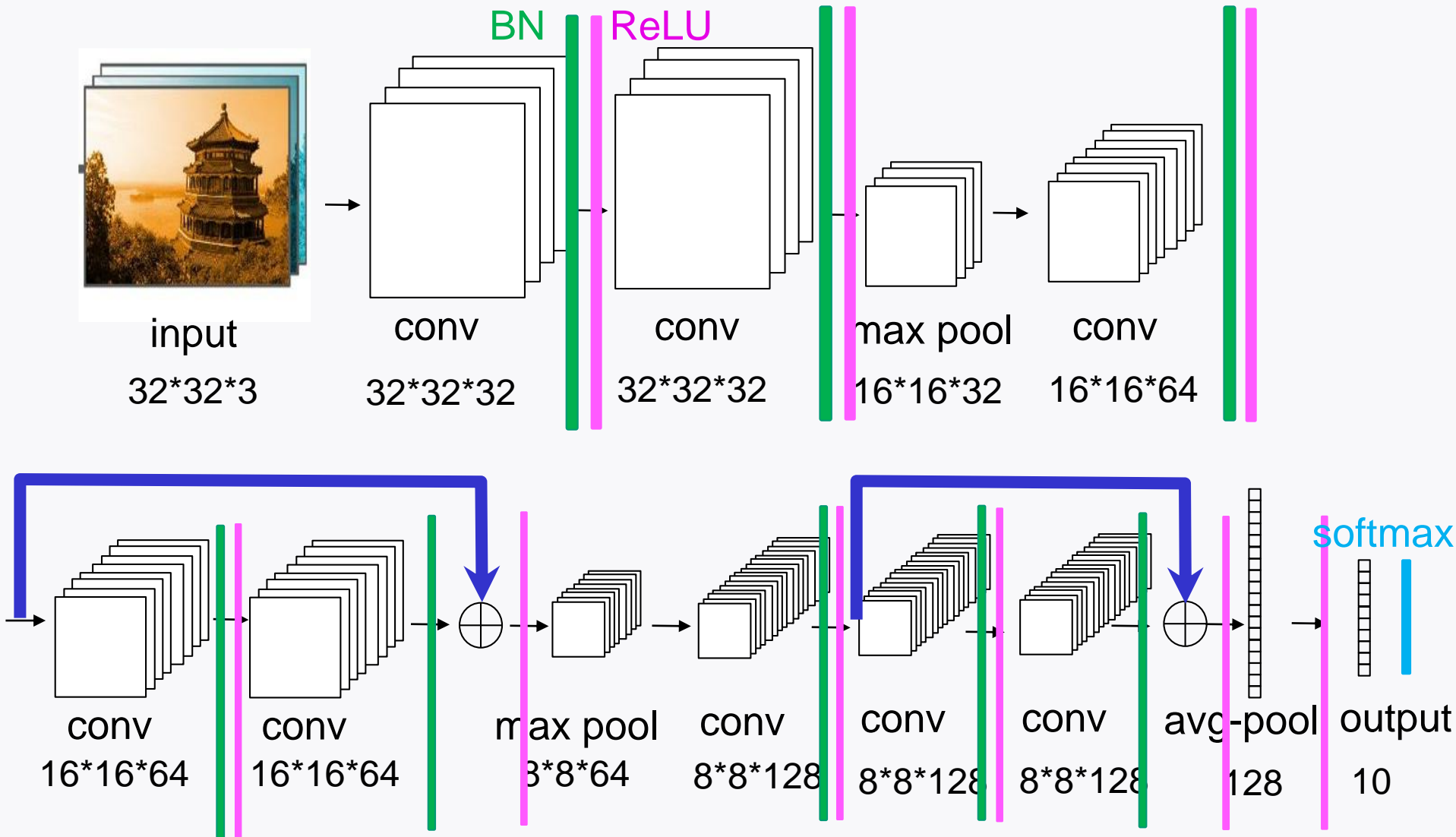
The original version is very complex with **152** layers.

Hence: Will explain how it looks via a **simplified version** tailored to CIFAR10 dataset.

ResNet



A modified ResNet that will be used in PS



Turns out ...

Skip-connection plays a crucial role to enable stable & fast training!

What you will check in PS:

ResNet offers higher accuracy than AlexNet.

Applications of CNNs

Image recognition

Image inpainting

Object detection

Coloring

Defect detection

Style transfer

Medical diagnosis
(e.g., cancer detection)

Super-resolution image
synthesis

Any **decision** or **manipulation** w.r.t. **image** data

Limitations

Not well applicable to **time series** data.

This is where recurrent neural networks (RNNs) kick in.

Outline of Day 4 lectures

1. Talk about RNN's applications and history.

2. Study two key building blocks of RNNs.

Recurrent neurons

A memory cell

3. Investigate basic RNNs.

4. Study LSTM (Long Short-Term Memory) cells.