

# Convolutional neural networks

## Lecture 9

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# AlexNet & ResNet

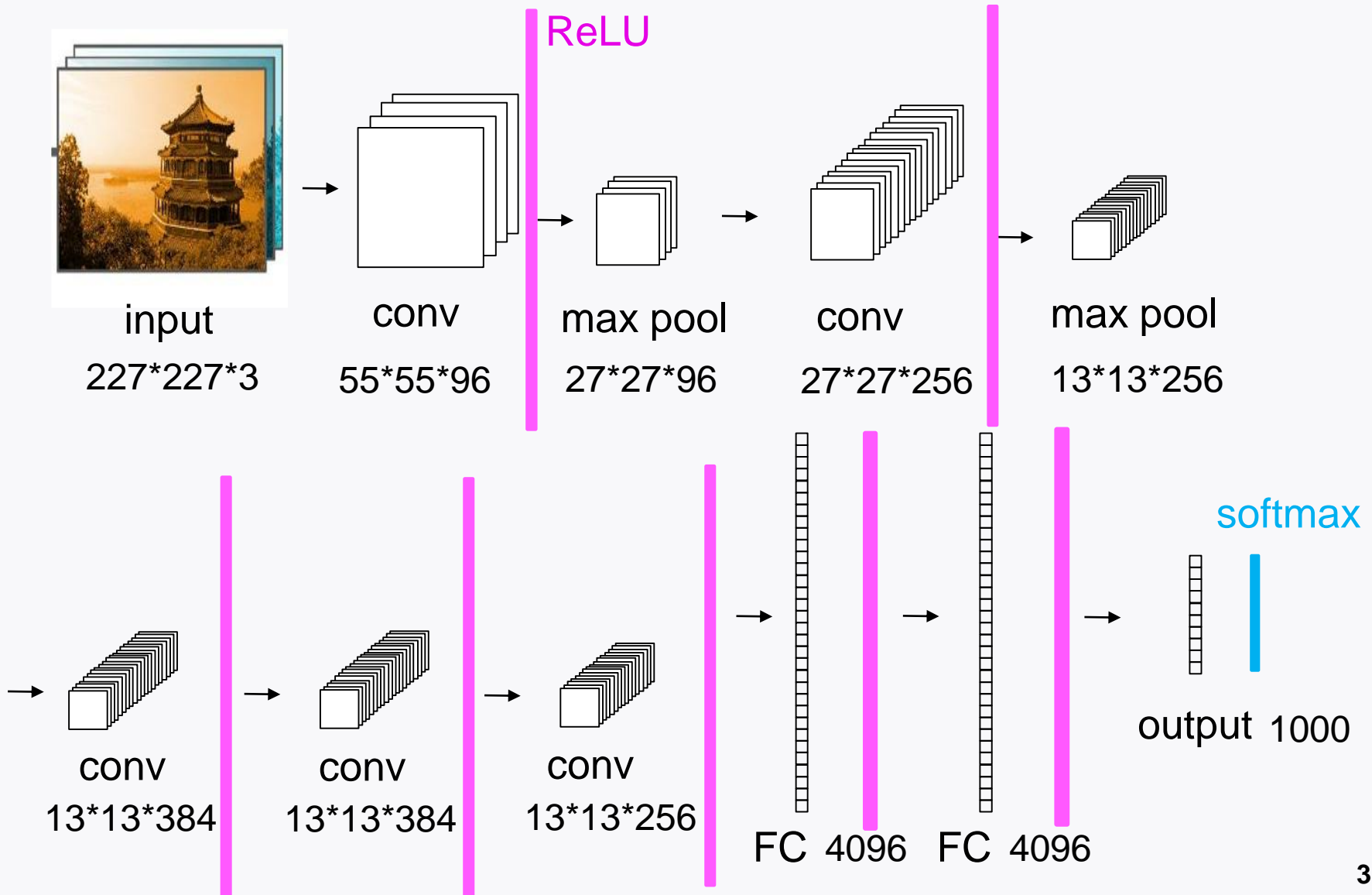
# Outline

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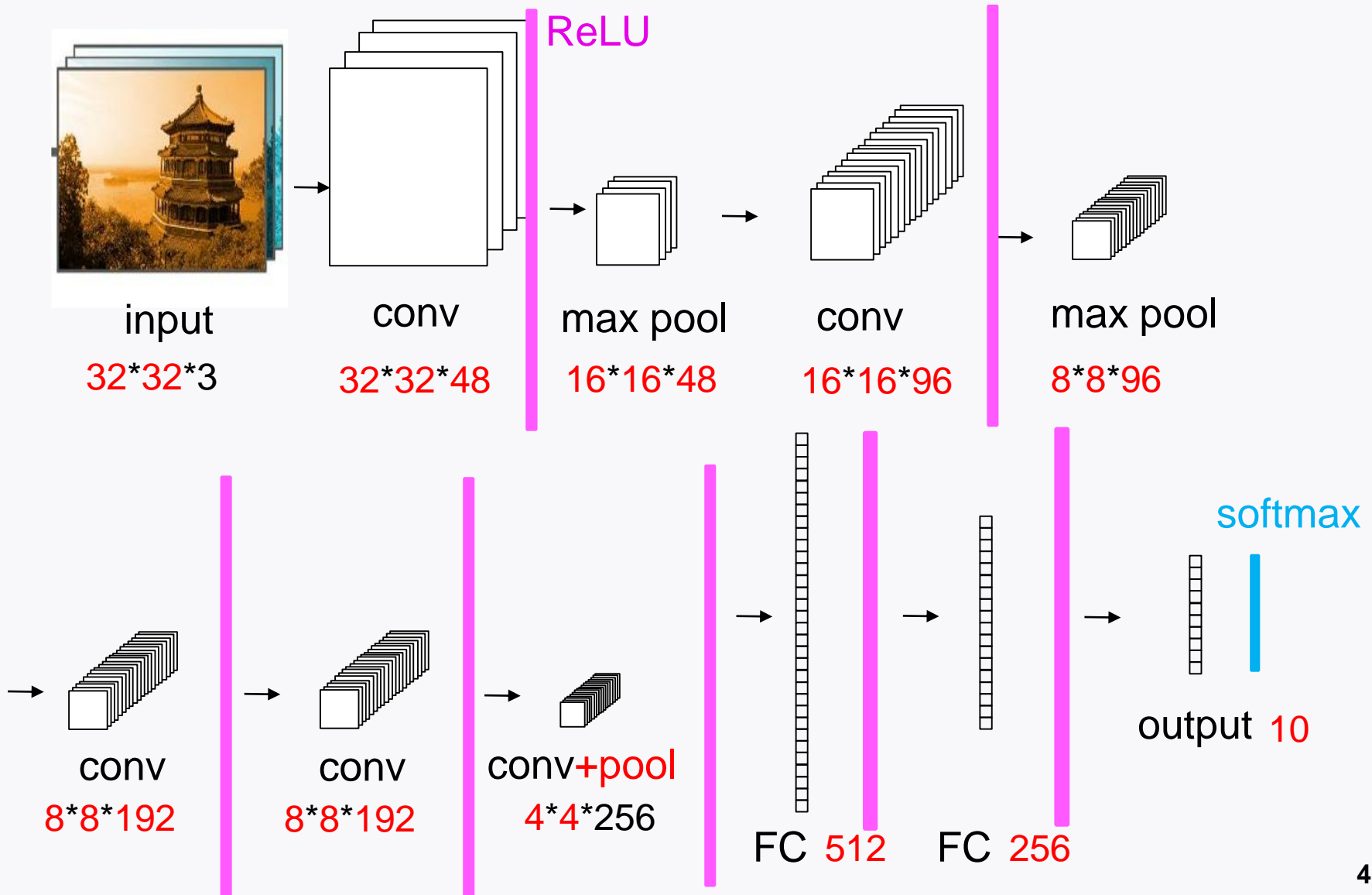
Will discuss two popular CNN architectures:

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

# AlexNet



# Simplified AlexNet for CIFAR10 (Check in PS)



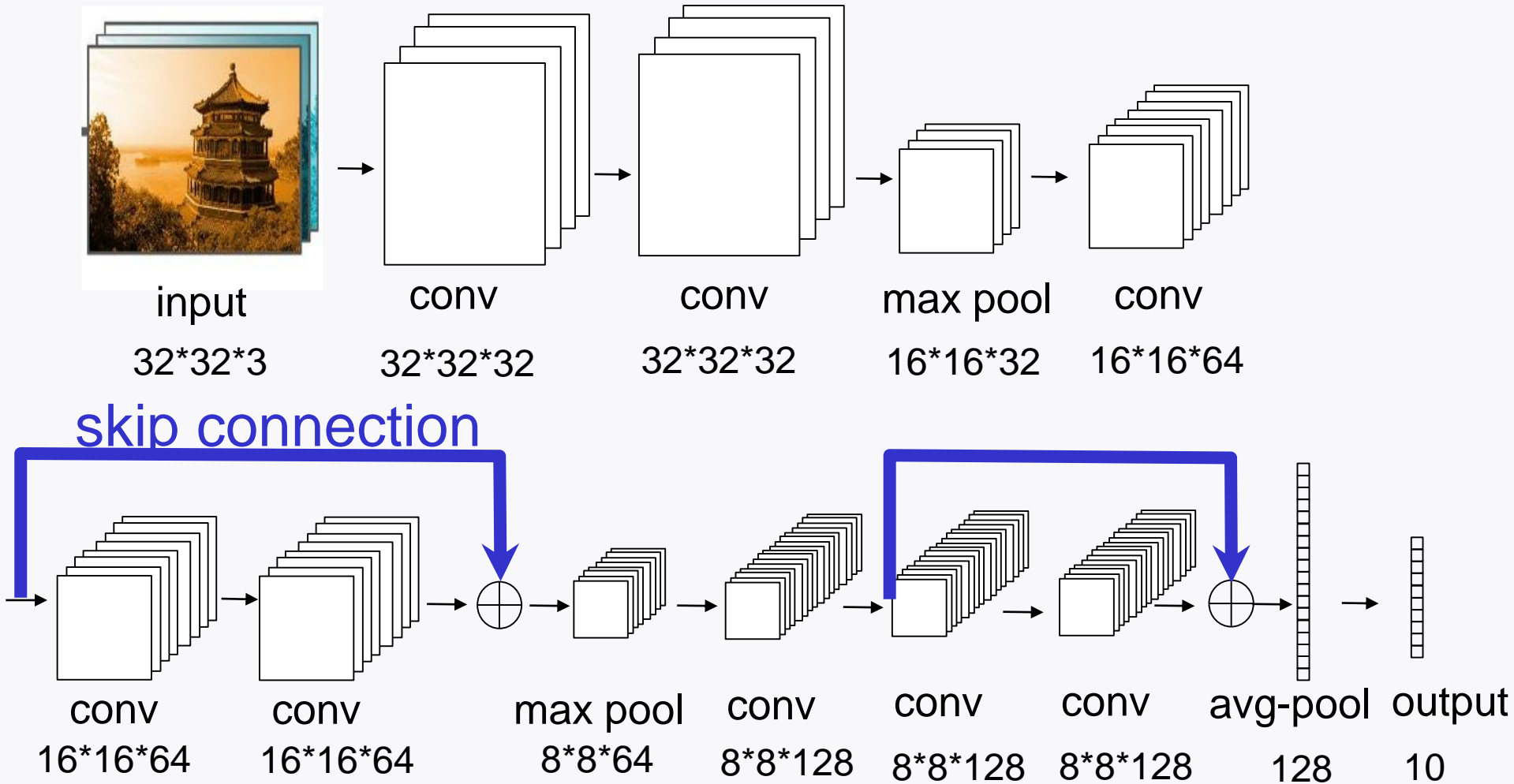
# ResNet

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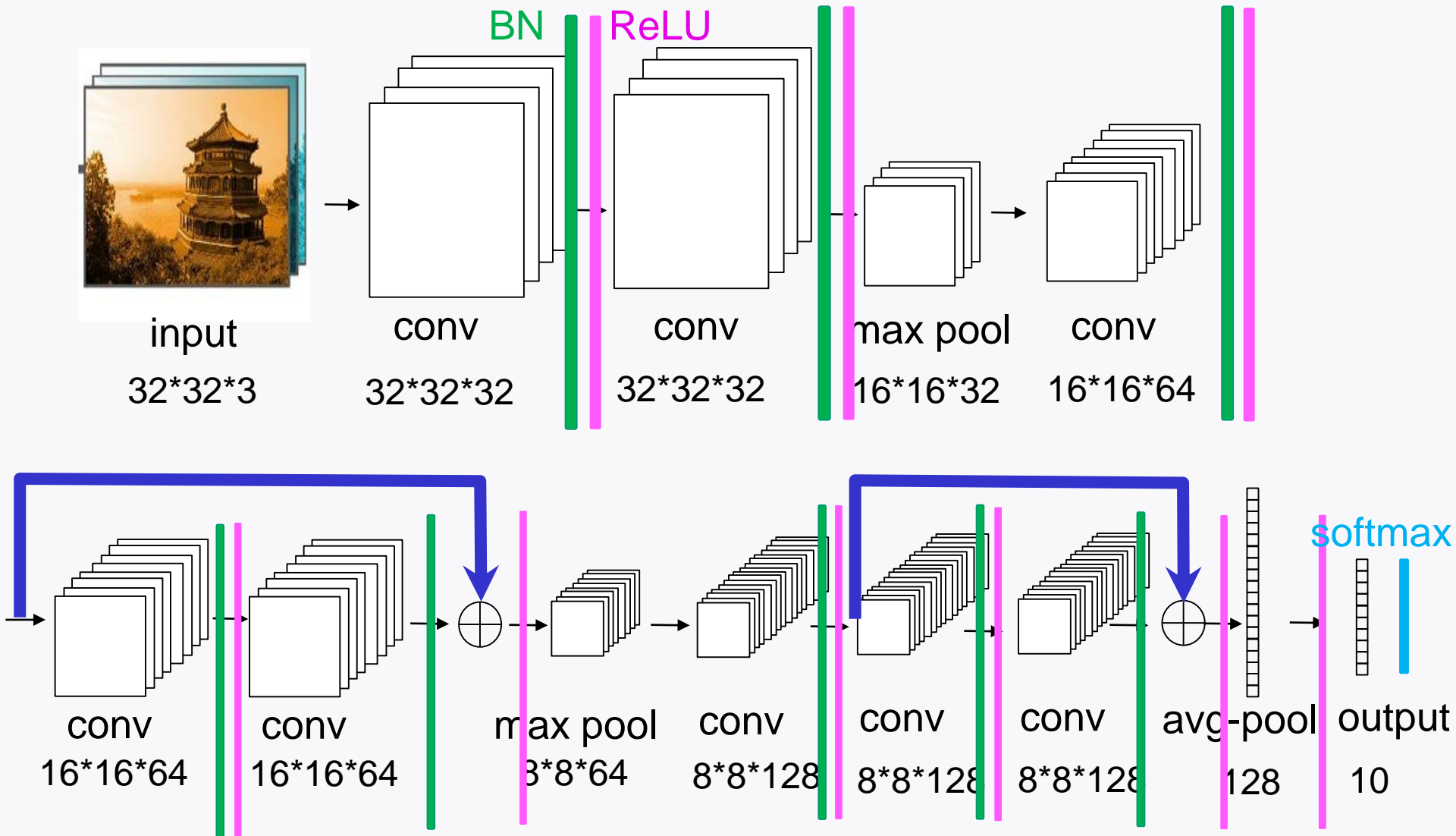
The initial version that won the 2015 ImageNet competition is complex with **152** layers.

**Hence:** Will explain it via a **simplified version** with CIFAR10 dataset.

# ResNet



# A modified ResNet that will be used in PS





# Turns out ...

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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

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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

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

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

# Outline of Day 4 lectures

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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.