## Congratulations! You passed!

**Grade received** 90% **Latest Submission Grade** 90% **To pass** 80% or higher

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1. When building a ConvNet, typically you start with some POOL layers followed by some CONV layers. True/False? **1 / 1 point**

- (•) False
- ( ) True

Expand

Correct
Correct. It is typical for ConvNets to use a POOL layer after some Conv layers; sometimes even one POOL layer after each CONV layer; but is not common to start with POOL layers.

2. In LeNet - 5 we can see that as we get into deeper networks the number of channels increases while the height and width of the volume decreases. True/False? **1 / 1 point**

- (•) True
- ( ) False

Expand

Correct
Correct, since in its implementation only valid convolutions were used, without padding, the height and width of the volume were reduced at each convolution. These were also reduced by the POOL layers, whereas the number of channels was increased from 6 to 16.

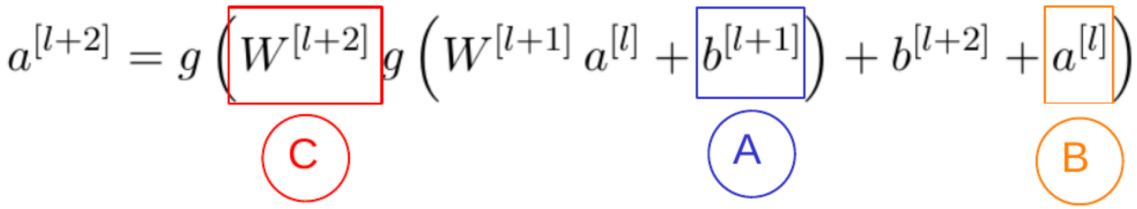
3. Training a deeper network (for example, adding additional layers to the network) allows the network to fit more complex functions and thus almost always results in lower training error. For this question, assume we're referring to "plain" networks. **1 / 1 point**

- (•) False
- ( ) True

Expand

Correct
Correct, Resnets are here to help us train very deep neural networks.

4. The computation of a ResNet block is expressed in the equation: **1 / 1 point**




Which part corresponds to the skip connection?

- The equation of ResNet.
- The term in the orange box, marked as $B$.
- The term in the red box, marked as $C$

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Expand

**Correct**
Yes, this term is the result of the skip connection or shortcut.

5. Which ones of the following statements on Residual Networks are true? (Check all that apply.) **1 / 1 point**

- [x] The skip-connection makes it easy for the network to learn an identity mapping between the input and the output within the ResNet block.

**Correct**
This is true.

- [ ] The skip-connections compute a complex non-linear function of the input to pass to a deeper layer in the network.
- [x] Using a skip-connection helps the gradient to backpropagate and thus helps you to train deeper networks

**Correct**
This is true.

- [ ] A ResNet with L layers would have on the order of $L^2$ skip connections in total.

Expand

**Correct**
Great, you got all the right answers.

6. $1 \times 1$ convolutions are the same as multiplying by a single number. True/False? **1 / 1 point**

- True
- False

Expand

Correct
Yes, a $1 \times 1$ layer doesn't act as a single number because it makes a sum over the depth of the volume.

7. Which ones of the following statements on Inception Networks are true? (Check all that apply.) 0 / 1 point

- [x] A single inception block allows the network to use a combination of 1x1, 3x3, 5x5 convolutions and pooling.

  Correct

- [ ] Inception networks incorporate a variety of network architectures (similar to dropout, which randomly chooses a network architecture on each step) and thus has a similar regularizing effect as dropout.
- [x] Inception blocks usually use 1x1 convolutions to reduce the input data volume's size before applying 3x3 and 5x5 convolutions.

  Correct

- [ ] Making an inception network deeper (by stacking more inception blocks together) can improve performance, but can also lead to overfitting and increase in computational cost.

Expand

Incorrect
You didn't select all the correct answers

8. When having a small training set to construct a classification model, which of the following is a strategy of transfer learning that you would use to build the model? 1 / 1 point

- (•) Use an open-source network trained in a larger dataset freezing the layers and re-train the softmax layer.
- ( ) Use an open-source network trained in a larger dataset. Use these weights as an initial point for the training of the whole network.
- ( ) Use an open-source network trained in a larger dataset, freeze the softmax layer, and re-train the rest of the layers.
- ( ) It is always better to train a network from a random initialization to prevent bias in our model.

Expand

Correct
Yes, this is a strategy that can provide a good result with small data.

9. Which of the following are true about Depth wise-separable convolutions? (Choose all that apply) 1 / 1 point

- [ ] The result has always the same number of channels $n_c$ as the input.
- [x] They combine depthwise convolutions with pointwise convolutions.

  Correct
  Correct, this combination is what we call depth wise separable convolutions.

- [x] They have a lower computational cost than normal convolutions.

  Correct
  Yes, as seen in the lectures the use of the depthwise and pointwise convolution reduces the computational cost significantly.

- [ ] They are just a combination of a normal convolution and a bottleneck layer.

Expand

Correct
Great, you got all the right answers.

10. Suppose that in a MobileNet v2 Bottleneck block we have an $n \times n \times 5$ input volume, we use $30$ filters for the expansion, in the depthwise convolutions we use $3 \times 3$ filters, and $20$ filters for the projection. How many parameters are used in the complete block, suppose we don't use bias? 1 / 1 point

- 80
- 1101
- 1020
- 8250

Expand

Correct
Yes, the expansion filters use 5 × 30 = 150 parameters, the depthwise convolutions need 3 × 3 × 30 = 270 parameters, and the projection part 30 × 20 = 600 parameters.