Congratulations! You passed!

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1. Which of the following do you typically see in ConvNet? (Check all that apply.) **1 / 1 point**

- ○ Multiple FC layers followed by a CONV layer.
- ◉ Use of FC layers after flattening the volume to generate output classes.
- ○ ConvNet makes exclusive use of CONV layers.
- ○ Use of multiple POOL layers followed by a CONV layer.

Expand

Correct
Yes, FC layers are typically used in the last few layers after flattening the volume to generate the output in classification.

2. LeNet - 5 made extensive use of padding to create valid convolutions, to avoid increasing the number of channels after every convolutional layer. True/False? **1 / 1 point**

- ◉ False
- ○ True

Expand

Correct
Yes, back in 1998 when the corresponding paper of LeNet - 5 was written padding wasn't used.

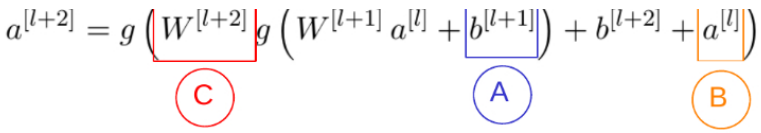
3. Training a deeper network (for example, adding additional layers to the network) allows the network to fit more complex functions and thus almost always results in lower training error. For this question, assume we're referring to "plain" networks. **1 / 1 point**

- ○ True
- ◉ False

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

Expand

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

5. In the best scenario when adding a ResNet block it will learn to approximate the identity function after a lot of training, helping improve the overall performance of the network. True/False? **1 / 1 point**

- True
- False

Expand

Correct
Correct. When adding a ResNet block it can easily learn to approximate the identity function, thus in a worst-case scenario, it will not affect the performance of the network at all.

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

- False
- True

Expand

Correct
Yes, a 1×1 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**

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

Correct

- [x] Inception blocks usually use 1x1 convolutions to reduce the input data volume's size before applying 3x3 and 5x5 convolutions.

✓ Correct

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. Use these weights as an initial point for the training of the whole network.
- ○ It is always better to train a network from a random initialization to prevent bias in our model.
- ◉ 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, freeze the softmax layer, and re-train the rest of the layers.

Expand

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

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

- [ ] The depthwise convolution convolves the input volume with 1×1 filters over the depth dimension.
- [x] Depthwise-separable convolutions are composed of two different types of convolutions.

✓ **Correct**
Yes, it is composed of a depthwise convolution followed by a pointwise convolution.

- [x] The pointwise convolution convolves the output volume with 1×1 filters.

✓ **Correct**
Yes, the number of filters for the output of the depthwise-separable convolution is determined by the number of 1 × 1 filters used.

- [x] The depthwise convolution convolves each channel in the input volume with a separate filter.

✓ **Correct**
Yes, the output of this kind of convolution is the same as the input.

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 3×3 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

- (●) 1020
- ( ) 8250
- ( ) 1101

Expand

Correct

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