⚠ **Try again once you are ready**

Grade received 50%   **Latest Submission Grade** 50%   **To pass** 80% or higher

[**Try again**]

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1. Which of the following do you typically see in ConvNet? (Check all that apply.)   **0 / 1 point**

- ◉ Use of multiple POOL layers followed by a CONV layer.

- ○ Multiple FC layers followed by a CONV layer.

- ○ Use of FC layers after flattening the volume to output classes.

- ○ ConvNet makes exclusive use of CONV layers.

[⤢ **Expand**]

⊗ **Incorrect**
No, this is not a common practice.

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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**

- ○ True

- ◉ False

[⤢ **Expand**]

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

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3. The motivation of Residual Networks is that very deep networks are so good at fitting complex functions that when training them we almost always overfit the training data. True/False?   **1 / 1 point**

- ◉ False

- ○ True

[⤢ **Expand**]

✓ **Correct**
Correct, very deep neural networks are hard to train and a deeper network does not always imply lower training error. Residual Networks allow us to train very deep neural networks.

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4. The following equation captures the computation in a ResNet block. What goes into the two blanks above?   **1 / 1 point**

$$a^{[l+2]} = g(W^{[l+2]}g(W^{[l+1]}a^{[l]} + b^{[l+1]}) + b^{l+2} + \underline{\quad\quad}) + \underline{\quad\quad}$$

- ○ 0 and $z^{[l+1]}$, respectively

- ○ 0 and $a^{[l]}$, respectively

○ $a^{[l]}$ and 0, respectively

○ $z^{[l]}$ and $a^{[l]}$, respectively

⤢ **Expand**

✓ **Correct**
Correct

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

0 / 1 point

☑ A ResNet with L layers would have on the order of L^2 skip connections in total.

> ! **This should not be selected**
> This is false, this is a property of DenseNets, which we did not talk about in this course.

☑ The skip-connections compute a complex non-linear function of the input to pass to a deeper layer in the network.

> ! **This should not be selected**
> This is false, skip connections make it easy for the model to learn an identity mapping, not a complex non-linear function.

☐ Using a skip-connection helps the gradient to backpropagate and thus helps you to train deeper networks

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

⤢ **Expand**

✗ **Incorrect**
You didn't select all the correct answers

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

0 / 1 point

◉ True

○ False

⤢ **Expand**

✗ **Incorrect**
No, a $$1 \times 1$$ layer doesn't act as a single number because it makes a sum over the depth of the volume.

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

1 / 1 point

☐ 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.

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

> ✓ **Correct**

☑ 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) might not hurt training set performance.

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

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8. Parameters trained for one computer vision task can't be used directly in another task. In most cases, we must change the softmax layer, or the last layers of the model and re-train for the new task. True/False?

0 / 1 point

○ False

○ True

⊗ **Incorrect**
No, this is a good way to take advantage of open-source models trained more or less for the task you want to do. This may also help you save a great number of computational resources and data.

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

0 / 1 point

☐ The pointwise convolution convolves the input volume with 1×1 filters.

☑ The depthwise convolution convolves the input volume with 1×1 filters over the depth dimension.

> ❗ **This should not be selected**
> No, this is what the pointwise convolution does.

☐ Depthwise-separable convolutions are composed of two different types of convolutions.

☑ The depthwise convolution convolves each channel in the input volume with a separate filter.

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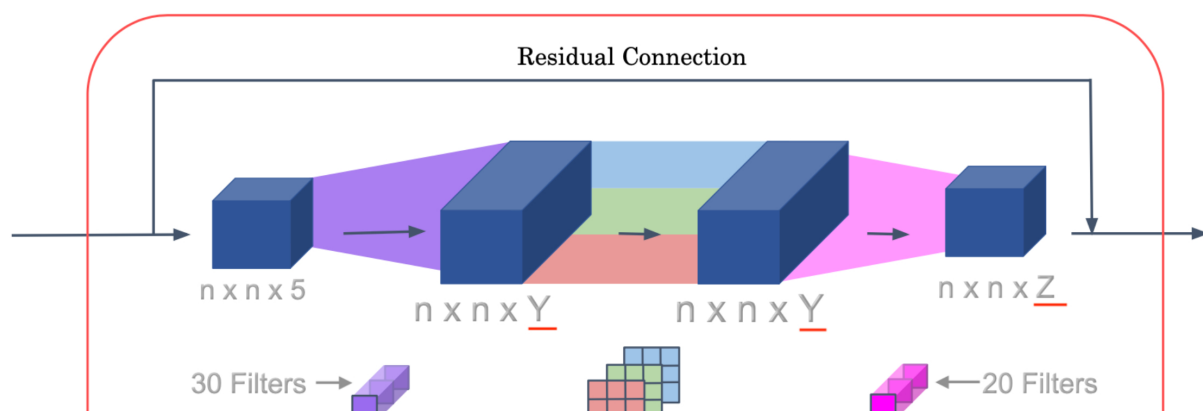> Yes, the output of this kind of convolution is the same as the input.

⊗ **Incorrect**
You didn't select all the correct answers

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10. Fill in the missing dimensions shown in the image below (marked W, Y, Z).

1 / 1 point

MobileNet v2 Bottleneck

Residual Connection

n x n x 5   n x n x Y   n x n x Y   n x n x Z

30 Filters →   ← 20 Filters

1 x 1 x W
Expansion

Depthwise

1 x 1 x 30
Pointwise

◉ W = 5, Y = 30, Z = 20

◯ W = 30, Y = 30, Z = 5

◯ W = 30, Y = 20, Z =20

◯ W = 5, Y = 20, Z = 5

↗ **Expand**

✓ **Correct**