Your grade: 100%

Your latest: **100%** • Your highest: **100%**
To pass you need at least 80%. We keep your highest score.

Next item →

1. What do you think applying this filter to a grayscale image will do? **1 / 1 point**

$$\begin{bmatrix} 0 & 1 & 1 & 0 \\ 1 & 3 & 3 & 1 \\ -1 & -3 & -3 & -1 \\ 0 & -1 & -1 & 0 \end{bmatrix}$$

- ○ Detect 45-degree edges.
- ◉ Detect horizontal edges.
- ○ Detecting image contrast.
- ○ Detect vertical edges.

Correct
Correct. There is a high difference between the values in the top part from those in the bottom part of the matrix. When convolving this filter on a grayscale image, the horizontal edges will be detected.

2. Suppose your input is a 128 by 128 color (RGB) image, and you are not using a convolutional network. If the first hidden layer has 64 neurons, each one fully connected to the input, how many parameters does this hidden layer have (including the bias parameters)? **1 / 1 point**

- ○ 1048640
- ○ 3145728

- ○ 1048576
- ◉ 3145792

Correct
Correct, the number of inputs for each unit is $128 \times 128 \times 3$ since the input image is RGB, so we need $128 \times 128 \times 3 \times 64$ parameters for the weights and 64 parameters for the bias parameters, thus $128 \times 128 \times 3 \times 64 + 64 = 3145792$.

3. Suppose your input is a 300 by 300 color (RGB) image, and you use a convolutional layer with 100 filters that are each 5x5. How many parameters does this hidden layer have (including the bias parameters)? **1 / 1 point**

- ○ 2501
- ◉ 7600
- ○ 7500
- ○ 2600

Correct
Correct, you have $25 \times 3 = 75$ weights and 1 bias per filter. Given that you have 100 filters, you get 7,600 parameters for this layer.

4. You have an input volume that is $127 \times 127 \times 16$, and convolve it with 32 filters of 5×5, using a stride of 2 and no padding. What is the output volume? **1 / 1 point**

- ○ $123 \times 123 \times 16$
- ◉ $62 \times 62 \times 32$

- ○ $123 \times 123 \times 32$
- ○ $62 \times 62 \times 16$

Correct

Correct, using the formula $n_H^{[l]} = \frac{n_H^{[l-1]} + 2 \times p - f}{s} + 1$ with $n_H^{[l-1]} = 127$, $p = 0, f = 5$, and $s = 2$ we get 62.

5. You have an input volume that is 15x15x8, and pad it using “pad=2”. What is the dimension of the resulting volume (after padding)? **1 / 1 point**

- ○ 17x17x8
- ○ 17x17x10
- ◉ 19x19x8
- ○ 19x19x12

Correct

Correct, padding is applied over the height and the width of the input image. If the padding is two, you add 4 to the height dimension and 4 to the width dimension.

6. You have a volume that is $64 \times 64 \times 32$, and convolve it with 40 filters of 9×9, and stride 1. You want to use a "same" convolution. What is the padding? **1 / 1 point**

- ○ 8
- ◉ 4
- ○ 6

- ◯ 0

Correct
Yes, when using a padding of 4 the output volume has $n_H = \frac{64-9+2\times4}{1} + 1$.

7. You have an input volume that is 128x128x12, and apply max pooling with a stride of 4 and a filter size of 4. What is the output volume? **1 / 1 point**

- ◯ $64 \times 64 \times 12$
- ◯ $128 \times 128 \times 3$
- ◉ $32 \times 32 \times 12$
- ◯ $32 \times 32 \times 3$

Correct
Yes, using the formula $n_H^{[l]} = \frac{n_H^{[l-1]}+2\times p-f}{s} + 1$ with $p = 0, f = 4$, $s = 4$ and $n_H^{[l-1]} = 32$.

8. Which of the following are hyperparameters of the pooling layers? (Choose all that apply) **1 / 1 point**

- ☑ Whether it is max or average.

Correct
Yes, these are the two types of pooling discussed in the lectures, and choosing which to use is considered a hyperparameter.

- ☑ Filter size.

Correct

Yes, although usually, we set $f = s$ this is one of the hyperparameters of a pooling layer.

- [ ] Average weights.
- [ ] Number of filters.

9. Which of the following are true about convolutional layers? (Check all that apply) **1 / 1 point**

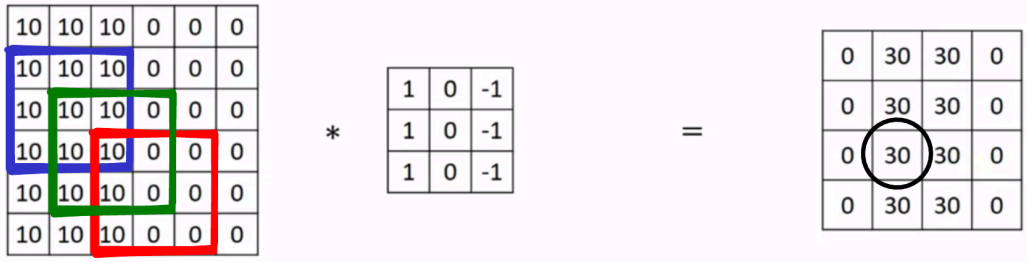
- [ ] It speeds up the training since we don't need to compute the gradient for convolutional layers.
- [x] Convolutional layers provide sparsity of connections.

Correct
Yes, this happens since the next activation layer depends only on a small number of activations from the previous layer.

- [x] It allows a feature detector to be used in multiple locations throughout the whole input volume.

Correct
Yes, since convolution involves sliding the filter throughout the whole input volume the feature detector is computed over all the volume.

10. The following image depicts the result of a convolution at the right when using a stride of 1 and the filter is shown right next.



- (●) It depends on the pixels enclosed by the green square.
- ( ) It depends on the pixels enclosed by the blue square.

On which pixels does the circled pixel of the activation at the right depend?

- ( ) It depends on the pixels enclosed by the red square.
- ( ) It depends on all the pixels of the image on the left.

Correct

Yes, this is the position of the filter when we move it two pixels down and one to the right.