# Key concepts on Deep Neural Networks
Quiz, 10 questions

**10/10 points (100%)**

✔ **Congratulations! You passed!**

| Next Item |

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points

1.

What is the "cache" used for in our implementation of forward propagation and backward propagation?

○ We use it to pass variables computed during forward propagation to the corresponding backward propagation step. It contains useful values for backward propagation to compute derivatives.

**Correct**
Correct, the "cache" records values from the forward propagation units and sends it to the backward propagation units because it is needed to compute the chain rule derivatives.

○ We use it to pass variables computed during backward propagation to the corresponding forward propagation step. It contains useful values for forward propagation to compute activations.

○ It is used to keep track of the hyperparameters that we are searching over, to speed up computation.

○ It is used to cache the intermediate values of the cost function during training.

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2.

Among the following, which ones are "hyperparameters"? (Check all that apply.)

☐    weight matrices $W^{[l]}$

▲

**Un-selected is correct**

☐    bias vectors $b^{[l]}$

▲

**Un-selected is correct**

☐    number of layers $L$ in the neural network

▲

**Correct**

☐    size of the hidden layers $n^{[l]}$

▲

**Correct**

☐    activation values $a^{[l]}$

▲

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Un-selected is correct

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☐    number of iterations

▲

**Correct**

☐    learning rate $\alpha$

▲

**Correct**

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✔    1 / 1
points

3.

Which of the following statements is true?

◯    The deeper layers of a neural network are typically computing more complex features of the input than the
earlier layers.

▲

**Correct**

◯    The earlier layers of a neural network are typically computing more complex features of the input than the
deeper layers.

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✔ points

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### 4.

Vectorization allows you to compute forward propagation in an $L$-layer neural network without an explicit for-loop (or any other explicit iterative loop) over the layers l=1, 2, ...,L. True/False?

○ True

◉ False

▲

**Correct**

Forward propagation propagates the input through the layers, although for shallow networks we may just write all the lines ($a^{[2]} = g^{[2]}(z^{[2]})$, $z^{[2]} = W^{[2]}a^{[1]} + b^{[2]}$, ...) in a deeper network, we cannot avoid a for loop iterating over the layers: ($a^{[l]} = g^{[l]}(z^{[l]})$, $z^{[l]} = W^{[l]}a^{[l-1]} + b^{[l]}$, ...).

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✔ 1 / 1 points

### 5.

Assume we store the values for $n^{[l]}$ in an array called layers, as follows: layer_dims = [$n_x$, 4,3,2,1]. So layer 1 has four hidden units, layer 2 has 3 hidden units and so on. Which of the following for-loops will allow you to initialize the parameters for the model?

○
```
1  for(i in range(1, len(layer_dims)/2)):
2    parameter['W' + str(i)] = np.random.randn(layers[i], layers[i-1])) * 0.01
3    parameter['b' + str(i)] = np.random.randn(layers[i], 1) * 0.01
```

○
```
1  for(i in range(1, len(layer_dims)/2)):
2    parameter['W' + str(i)] = np.random.randn(layers[i], layers[i-1])) * 0.01
3    parameter['b' + str(i)] = np.random.randn(layers[i-1], 1) * 0.01
```

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```
1   for(i in range(1, len(layer_dims))):
2       parameter['W' + str(i)] = np.random.randn(layers[i-1], layers[i])) * 0.01
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1   for(i in range(1, len(layer_dims))):
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3       parameter['b' + str(i)] = np.random.randn(layers[i], 1) * 0.01
```

▲

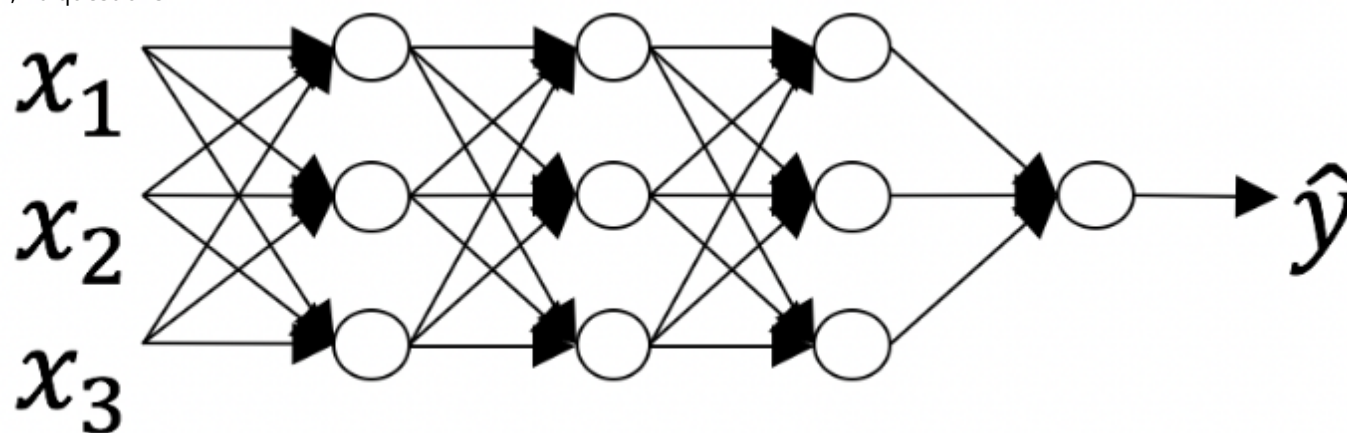**Correct**

✔    1 / 1
      points

6.

Consider the following neural network.

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How many layers does this network have?

○ The number of layers $L$ is 4. The number of hidden layers is 3.

▲

**Correct**

Yes. As seen in lecture, the number of layers is counted as the number of hidden layers + 1. The input and output layers are not counted as hidden layers.

○ The number of layers $L$ is 3. The number of hidden layers is 3.

○ The number of layers $L$ is 4. The number of hidden layers is 4.

○ The number of layers $L$ is 5. The number of hidden layers is 4.

✔ 1 / 1
  points

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Question 7.

During forward propagation, in the forward function for a layer $l$ you need to know what is the activation function in a layer (Sigmoid, tanh, ReLU, etc.). During backpropagation, the corresponding backward function also needs to know what is the activation function for layer $l$, since the gradient depends on it. True/False?

○ True

**Correct**

Yes, as you've seen in the week 3 each activation has a different derivative. Thus, during backpropagation you need to know which activation was used in the forward propagation to be able to compute the correct derivative.

○ False

✓ 1 / 1 points

8.

There are certain functions with the following properties:

(i) To compute the function using a shallow network circuit, you will need a large network (where we measure size by the number of logic gates in the network), but (ii) To compute it using a deep network circuit, you need only an exponentially smaller network. True/False?

○ True

**Correct**
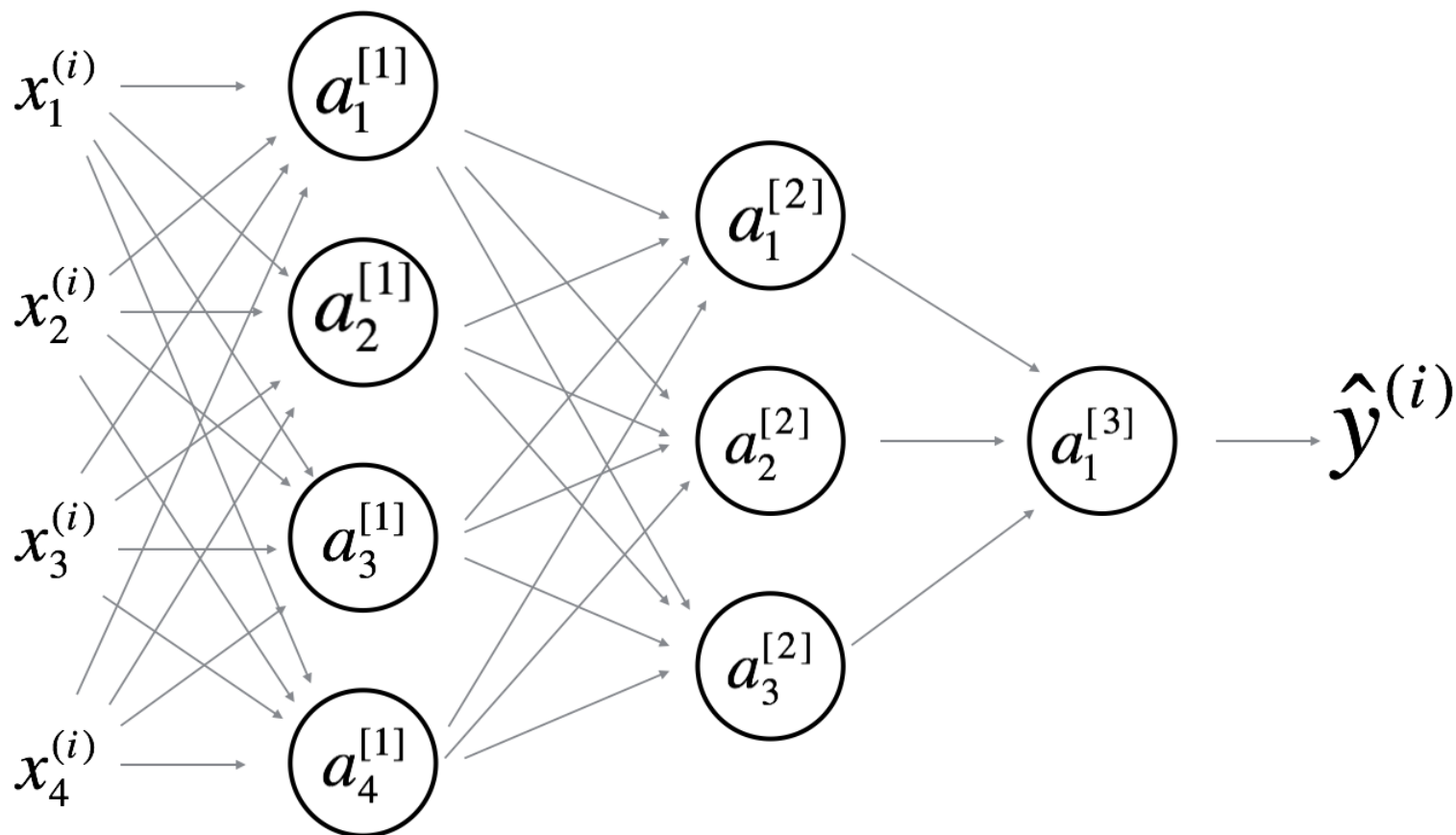
○ False

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points

9.

Consider the following 2 hidden layer neural network:



Which of the following statements are True? (Check all that apply).

$W^{[1]}$ will have shape (4, 4)

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**Correct**

Yes. More generally, the shape of $W^{[l]}$ is $\left(n^{[l]}, n^{[l-1]}\right)$.

☐  $b^{[1]}$ will have shape (4, 1)

**Correct**

Yes. More generally, the shape of $b^{[l]}$ is $\left(n^{[l]}, 1\right)$.

☐  $W^{[1]}$ will have shape (3, 4)

**Un-selected is correct**

☐  $b^{[1]}$ will have shape (3, 1)

**Un-selected is correct**

☐  $W^{[2]}$ will have shape (3, 4)

**Correct**

Yes. More generally, the shape of $W^{[l]}$ is $\left(n^{[l]}, n^{[l-1]}\right)$.

☐  $b^{[2]}$ will have shape (1, 1)

**Un-selected is correct**

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$W^{[2]}$ will have shape (3, 1)

**Un-selected is correct**

☐    $b^{[2]}$ will have shape (3, 1)

**Correct**

Yes. More generally, the shape of $b^{[l]}$ is $(n^{[l]}, 1)$.

☐    $W^{[3]}$ will have shape (3, 1)

**Un-selected is correct**

☐    $b^{[3]}$ will have shape (1, 1)

**Correct**

Yes. More generally, the shape of $b^{[l]}$ is $(n^{[l]}, 1)$.

☐    $W^{[3]}$ will have shape (1, 3)

**Correct**

Yes. More generally, the shape of $W^{[l]}$ is $(n^{[l]}, n^{[l-1]})$.

☐    $b^{[3]}$ will have shape (3, 1)