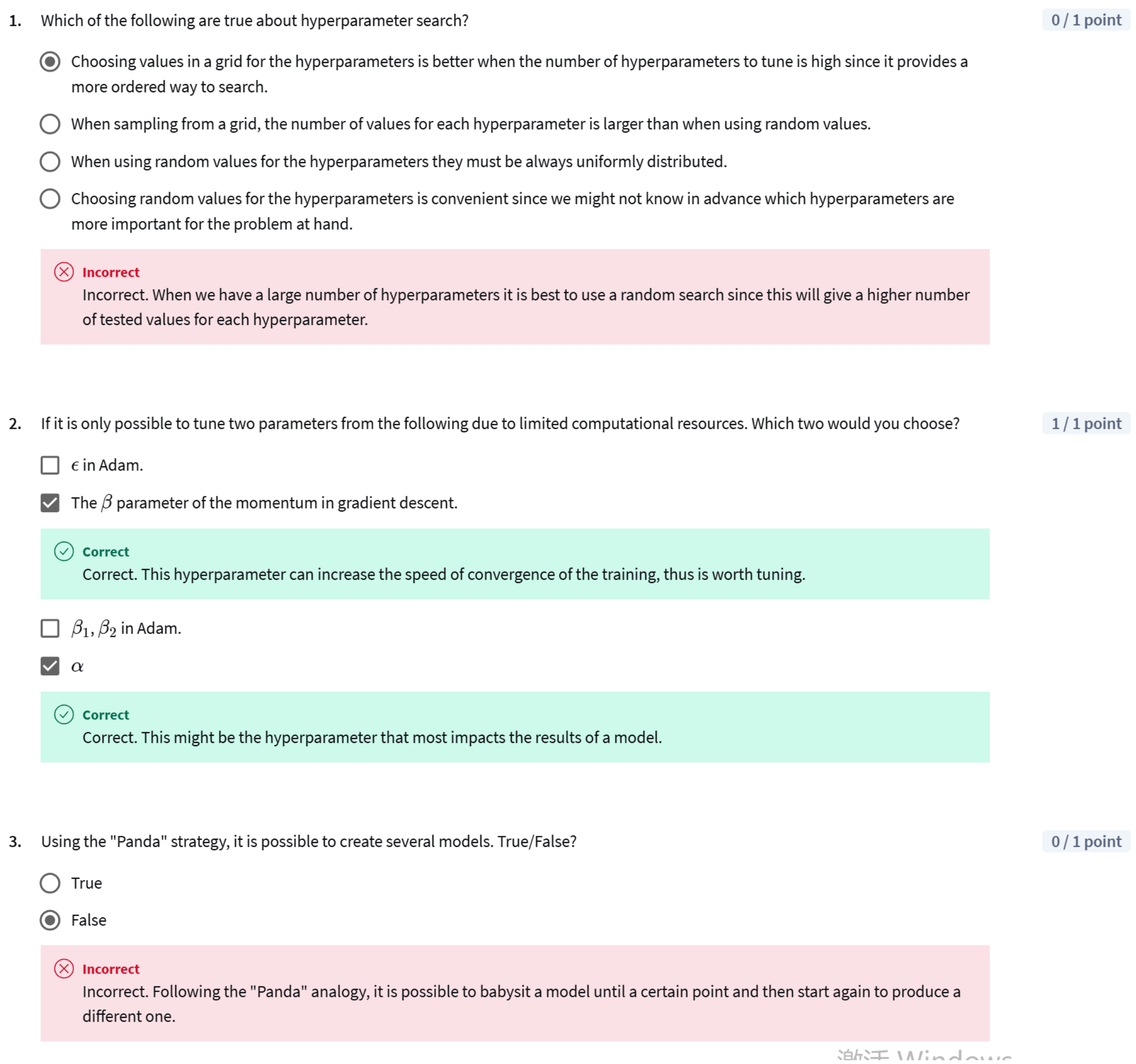


1. Which of the following are true about hyperparameter search?

0 / 1 point

● Choosing values in a grid for the hyperparameters is better when the number of hyperparameters to tune is high since it provides a more ordered way to search.

○ When sampling from a grid, the number of values for each hyperparameter is larger than when using random values.

○ When using random values for the hyperparameters they must be always uniformly distributed.

○ Choosing random values for the hyperparameters is convenient since we might not know in advance which hyperparameters are more important for the problem at hand.

⊗ **Incorrect**
Incorrect. When we have a large number of hyperparameters it is best to use a random search since this will give a higher number of tested values for each hyperparameter.

2. If it is only possible to tune two parameters from the following due to limited computational resources. Which two would you choose?

1 / 1 point

□ ϵ in Adam.

☑ The β parameter of the momentum in gradient descent.

✓ **Correct**
Correct. This hyperparameter can increase the speed of convergence of the training, thus is worth tuning.

□ β_1, β_2 in Adam.

☑ α

✓ **Correct**
Correct. This might be the hyperparameter that most impacts the results of a model.

3. Using the "Panda" strategy, it is possible to create several models. True/False?

0 / 1 point

○ True

● False

⊗ **Incorrect**
Incorrect. Following the "Panda" analogy, it is possible to babysit a model until a certain point and then start again to produce a different one.

4. If you think β (hyperparameter for momentum) is between 0.9 and 0.99, which of the following is the recommended way to sample a value for beta?

1 / 1 point

○

r = np.random.rand() beta = r*0.9 + 0.09

○

r = np.random.rand() beta = r*0.09 + 0.9

○

r = np.random.rand() beta = 1-10**(- r + 1)

●

r = np.random.rand() beta = 1-10**(- r - 1)

✓ Correct

5. Once good values of hyperparameters have been found, those values should be changed if new data is added or a change in computational power occurs. True/False?

1 / 1 point

● True

○ False

✓ Correct

Correct. The choice of some hyperparameters such as the batch size depends on conditions such as hardware and quantity of data.

6. When using batch normalization it is OK to drop the parameter $W^{[l]}$ from the forward propagation since it will be subtracted out when we compute $\tilde{z}^{[l]} = \gamma z^{[l]}_{\text{normalize}} + \beta^{[l]}$. True/False?

0 / 1 point

○ False

● True

ⓧ Incorrect

Incorrect. The parameter $W^{[l]}$ doesn't get subtracted during the batch normalization process, although it gets re-scaled.

7. Which of the following are true about batch normalization?

1 / 1 point

○ The parameter ϵ in the batch normalization formula is used to accelerate the convergence of the model.

○ There is a global value of γ and β that is used for all the hidden layers where batch normalization is used.

○ The parameters β and γ of batch normalization can't be trained using Adam or RMS prop.

● One intuition behind why batch normalization works is that it helps reduce the internal covariance.

✓ **Correct**
Yes. Internal covariance is a name to express that there has been a change in the distribution of the activations. Since after each iteration of gradient descent the parameters of a layer change, we might think that the activations suffer from covariance shift.

1 / 1 point

8. Which of the following are true about batch normalization?

☑ The parameters $\gamma^{[l]}$ and $\beta^{[l]}$ set the variance and mean of $\tilde{z}^{[l]}$.

✓ **Correct**
Correct. When applying the linear transformation $\tilde{z}^{(l)} = \beta^{[l]} z_{norm}^{(l)} + \gamma^{[l]}$ we set the variance and mean of $\tilde{z}^{[l]}$.

□ $\beta^{[l]}$ and $\gamma^{[l]}$ are hyperparameters that must be tuned by random sampling in a logarithmic scale.

□ $z_{norm}^{(i)} = \frac{z^{(i)}-\mu}{\sqrt{\sigma^2}}$.

☑ When using batch normalization we introduce two new parameters $\gamma^{[l]}$, $\beta^{[l]}$ that must be "learned" or trained.

✓ **Correct**
Correct. Batch normalization uses two parameters β and γ to compute $\tilde{z}^{(i)} = \beta z_{norm}^{(i)} + \gamma$.

9. A neural network is trained with Batch Norm. At test time, to evaluate the neural network on a new example you should perform the normalization using μ and σ^2 estimated using an exponentially weighted average across mini-batches seen during training. True/false?

1 / 1 point

○ False

● True

✓ **Correct**
Correct. This is a good practice to estimate the μ and σ^2 to use since at test time we might not be predicting over a batch of the same size, or it might even be a single example, thus using the μ and σ^2 of a single sample doesn't make sense.

10. Which of the following are some recommended criteria to choose a deep learning framework?

1 / 1 point

○ It must run exclusively on cloud services, to ensure its robustness.

○ It must be implemented in C to be faster.

○ It must use Python as the primary language.

● Running speed.

✓ **Correct**
Correct. The running speed is a major factor, especially when working with large datasets.

Your grade: 100%

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

Next item →

1. If searching among a large number of hyperparameters, you should try values in a grid rather than random values, so that you can carry out the search more systematically and not rely on chance. True or False?

1 / 1 point

● False

○ True

✓ **Correct**

2. If it is only possible to tune two parameters from the following due to limited computational resources. Which two would you choose?

1 / 1 point

□ ϵ in Adam.

☑ The β parameter of the momentum in gradient descent.

✓ **Correct**
Correct. This hyperparameter can increase the speed of convergence of the training, thus is worth tuning.

□ β_1, β_2 in Adam.

☑ α

✓ **Correct**
Correct. This might be the hyperparameter that most impacts the results of a model.

3. During hyperparameter search, whether you try to babysit one model ("Panda" strategy) or train a lot of models in parallel ("Caviar") is largely determined by:

1 / 1 point

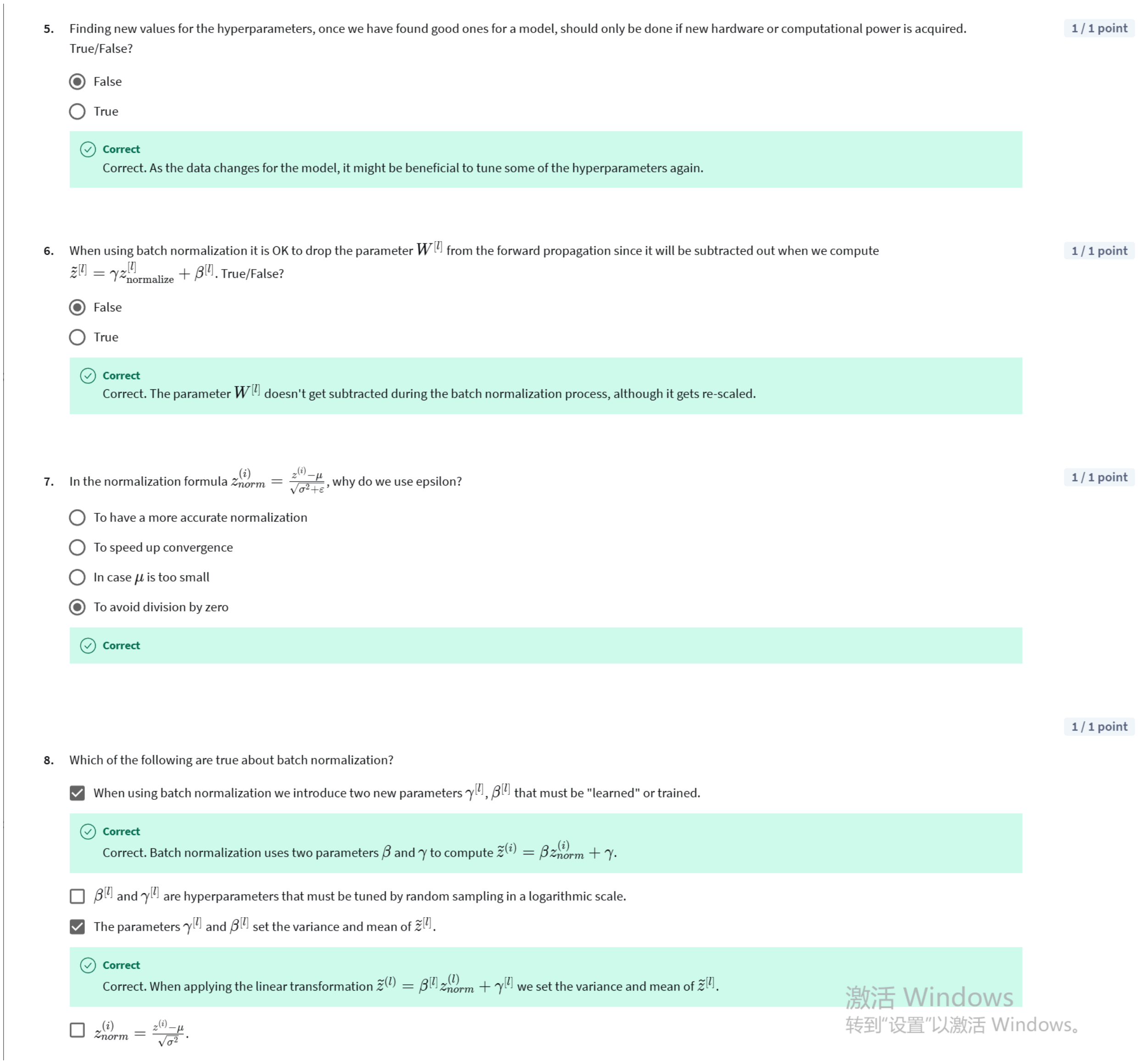
○ Whether you use batch or mini-batch optimization

○ The presence of local minima (and saddle points) in your neural network

○ The number of hyperparameters you have to tune

● The amount of computational power you can access

✓ **Correct**



5. Finding new values for the hyperparameters, once we have found good ones for a model, should only be done if new hardware or computational power is acquired. True/False?

1 / 1 point

● False

○ True

Correct

Correct. As the data changes for the model, it might be beneficial to tune some of the hyperparameters again.

6. When using batch normalization it is OK to drop the parameter $W^{[l]}$ from the forward propagation since it will be subtracted out when we compute $\tilde{z}^{[l]} = \gamma z^{[l]}_{\text{normalize}} + \beta^{[l]}$. True/False?

1 / 1 point

● False

○ True

Correct

Correct. The parameter $W^{[l]}$ doesn't get subtracted during the batch normalization process, although it gets re-scaled.

7. In the normalization formula $z^{(i)}_{norm} = \frac{z^{(i)}-\mu}{\sqrt{\sigma^2+\varepsilon}}$, why do we use epsilon?

1 / 1 point

○ To have a more accurate normalization

○ To speed up convergence

○ In case μ is too small

● To avoid division by zero

Correct

1 / 1 point

8. Which of the following are true about batch normalization?

☑ When using batch normalization we introduce two new parameters $\gamma^{[l]}, \beta^{[l]}$ that must be "learned" or trained.

Correct

Correct. Batch normalization uses two parameters β and γ to compute $\tilde{z}^{(i)} = \beta z^{(i)}_{norm} + \gamma$.

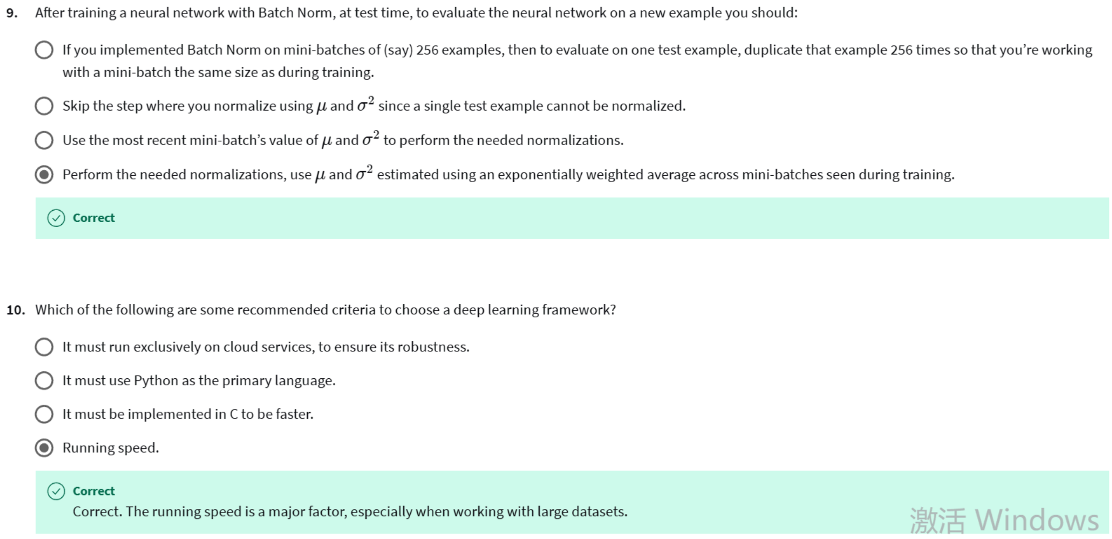
□ $\beta^{[l]}$ and $\gamma^{[l]}$ are hyperparameters that must be tuned by random sampling in a logarithmic scale.

☑ The parameters $\gamma^{[l]}$ and $\beta^{[l]}$ set the variance and mean of $\tilde{z}^{[l]}$.

Correct

Correct. When applying the linear transformation $\tilde{z}^{(l)} = \beta^{[l]} z^{(l)}_{norm} + \gamma^{[l]}$ we set the variance and mean of $\tilde{z}^{[l]}$.

□ $z^{(i)}_{norm} = \frac{z^{(i)}-\mu}{\sqrt{\sigma^2}}$.



9. After training a neural network with Batch Norm, at test time, to evaluate the neural network on a new example you should:

○ If you implemented Batch Norm on mini-batches of (say) 256 examples, then to evaluate on one test example, duplicate that example 256 times so that you're working with a mini-batch the same size as during training.

○ Skip the step where you normalize using μ and σ^2 since a single test example cannot be normalized.

○ Use the most recent mini-batch's value of μ and σ^2 to perform the needed normalizations.

● Perform the needed normalizations, use μ and σ^2 estimated using an exponentially weighted average across mini-batches seen during training.

Correct

10. Which of the following are some recommended criteria to choose a deep learning framework?

○ It must run exclusively on cloud services, to ensure its robustness.

○ It must use Python as the primary language.

○ It must be implemented in C to be faster.

● Running speed.

Correct

Correct. The running speed is a major factor, especially when working with large datasets.