

1

Multiple Choice 1 point

Which of the following is a significant difference between NumPy arrays and TensorFlow tensors?

- ☐ NumPy arrays can be multidimensional but TensorFlow tensors can't
- ☐ Tensorflow tensors store data more efficiently than Numpy arrays
- ☐ Tensorflow tensors are stored in GPU whereas Numpy arrays are stored in CPU
- ☒ NumPy arrays are assignable whereas TensorFlow tensors are not

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Multiple Choice 1 point

If A and B are tensors, what is the difference, if any, between:

STAR:

$A * B$

MATMUL:

`tf.matmul(A, B)`

- ☒ STAR is elementwise multiplication whereas MATMUL is matrix multiplication
- ☐ STAR is matrix multiplication whereas MATMUL is elementwise multiplication
- ☐ Both STAR and MATMUL do elementwise multiplication
- ☐ Both STAR and MATMUL do matrix multiplication

3 Multiple Choice 1 point

The following code results in an error. Why?

```
input_const = tf.constant(3.)
with tf.GradientTape() as tape:
    result = tf.square(input_const)
gradient = tape.gradient(result, input_const)
print("deriv of result w.r.t. input_const = ", gradient.numpy())
```

- ☒ By default, constants are not tracked by GradientTape
- ☐ tf.square() is not a differentiable function
- ☐ tf.constant(3.) is not the right way to create a constant in Tensorflow
- ☐ tape.gradient() has its arguments in reverse order of what they should be

4 Multiple Choice 1 point

What of the following is NOT true about computation graphs?

- ☐ They are data structures representing computational operations
- ☐ They play a major role in Tensorflow in particular and deep learning in general
- ☒ They are graphs representing how many computational resources a deep learning model needs
- ☐ They help algorithms treat computation as data

5 Multiple Choice 1 point

What is the relationship between backpropagation and computation graphs?

- ☒ Backpropagation is the application of chain rule to a computation graph in order to compute derivatives
- ☐ Backpropagation is the use of computation graphs to speed up computations
- ☐ Backpropagation takes the weights and biases of a neural network as input and outputs its computation graph
- ☐ Backpropagation is an algorithm to learn computation graphs from data

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Multiple Choice 1 point

Suppose J is a positive floating point number. What will the following code print?

```
x = tf.Variable(tf.math.log(J))  
with tf.GradientTape() as tape:  
    y = tf.exp(x)  
print(tape.gradient(y, x).numpy())
```

- ☒ J
- ☐ $\exp(J)$
- ☐ $\log(J)$
- ☐ $-J$

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Multiple Choice 1 point

Consider the logistic function $f(x) = \exp(x) / (1 + \exp(x))$. What is its domain, i.e., the set of valid inputs?

- ☒ all real numbers
- ☐ closed interval $[0,1]$
- ☐ open interval $(0,1)$
- ☐ positive real numbers

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Multiple Choice 1 point

Consider the logistic function $f(x) = \exp(x) / (1 + \exp(x))$. What is its range, i.e., the set of possible outputs?

- ☐ all real numbers
- ☐ closed interval $[0,1]$
- ☒ open interval $(0,1)$
- ☐ positive real numbers

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Multiple Choice 1 point

What are the names of the two phases in the backpropagation algorithm?

- ☒ Forward pass and Backward pass
- ☐ Upward pass and Downward pass
- ☐ Training pass and Testing pass
- ☐ Collection pass and Propagation pass

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Multiple Choice 1 point

Consider the standard logistic function (also called the sigmoid function)

$$f(x) = \exp(x) / (1 + \exp(x))$$

Which of the following is NOT true?

- ☐ It tends to 1 as x tends to $+\infty$
- ☐ It tends to 0 as x tends to $-\infty$
- ☒ It tends to 1 as x tends to 0
- ☐ It has the equivalent representation $f(x) = 1 / (1 + \exp(-x))$