1

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 that Numpy arrays
- Tensorflow tensors are stored in GPU whereas Numpy arrays are stored in CPU
- NumPy arrays are assignable whereas TensorFlow tensors are not

2

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

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

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

不知道有多少个数据点

5

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
- Backpropogation 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

6

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

$y = e^x$

$x = \ln J$

$\nabla_x y = e^x = e^{\ln J} = J$

7

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

8

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
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- open interval (0,1)
- positive real numbers

9

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

- (selected) Forward pass and Backward pass
- Upward pass and Downward pass
- Training pass and Testing pass
- Collection pass and Propagation pass

10

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 +infinity
- It tends to 0 as x tends to -infinity
- (selected) It tends to 1 as x tends to 0
- It has the equivalent representation f(x) = 1 / (1 + exp(-x))