- $J = (b-1) * (c+a)$
- $J = (c-1) * (b+a)$
- $J = (a-1) * (b+c)$
- $J = a*b + b*c + a*c$

Correct

Yes.

$J = u + v - w = a*b + a*c - (b+c) = a*(b+c) - (b+c) = (a-1)*(b+c).$

1. What does a neuron compute? 1 / 1 point

- A neuron computes a function g that scales the input x linearly (Wx + b)
- A neuron computes the mean of all features before applying the output to an activation function
- A neuron computes a linear function $z = Wx + b$ followed by an activation function
- A neuron computes an activation function followed by a linear function $z = Wx + b$

Correct
Correct, we generally say that the output of a neuron is a = g(Wx + b) where g is the activation function (sigmoid, tanh, ReLU, ...).

2. Suppose that $\hat{y} = 0.5$ and $y = 0$. What is the value of the "Logistic Loss"? Choose the best option. 1 / 1 point

- 0.693
- $+\infty$
- $\mathcal{L}(\hat{y}, y) = -\left(y \log \hat{y} + (1 - y) \log(1 - \hat{y})\right)$
- 0.5

Correct
Yes. Given the values of $\hat{y}$ and y we get $\mathcal{L}(0.5, 0) = -\left(0 \log 0.5 + 1 \log(0.5)\right) \approx 0.693$.

3. Suppose x is a (8, 1) array. Which of the following is a valid reshape? 1 / 1 point

- (●) x.reshape(2, 2, 2)
- ( ) x.reshape(1, 4, 3)
- ( ) x.reshape(-1, 3)
- ( ) x.reshape(2, 4, 4)

Correct
Yes. This generates uses 2*2*2 = 8 entries.

4. Consider the following random arrays a and b, and c: 1 / 1 point

$a = np.random.randn(2, 3)$ # $a.shape = (2, 3)$

$b = np.random.randn(2, 1)$ # $b.shape = (2, 1)$

$c = a + b$

What will be the shape of c?

- ( ) The computation cannot happen because the sizes don't match. It's going to be "Error"!
- ( ) c.shape = (3, 2)
- (●) c.shape = (2, 3)
- ( ) c.shape = (2, 1)

Correct
Yes! This is broadcasting. b (column vector) is copied 3 times so that it can be summed to each column of a.

5. Consider the two following random arrays a and b: 1 / 1 point

$a = np.random.randn(1,3)\ \#\ a.shape = (1,3)$

$b = np.random.randn(3,3)\ \#\ b.shape = (3,3)$

$c = a * b$

What will be the shape of c?

- ○ The computation cannot happen because the sizes don't match.
- ○ The computation cannot happen because it is not possible to broadcast more than one dimension.
- ○ c.shape = (1, 3)
- ◉ c.shape = (3, 3)

Correct

Yes. Broadcasting allows row a to be multiplied element-wise with each row of b to from c.

1 / 1 point

6. Suppose you have n_x input features per example. If we decide to use row vectors $\mathbf{x}_j$ for the features and

$$X = \begin{bmatrix} \mathbf{x}_1 \\ \mathbf{x}_2 \\ \vdots \\ \mathbf{x}_m \end{bmatrix}.$$

What is the dimension of X?

- ◉ (m, n_x)
- ○ $(1, n_x)$

- ○ (n_x, n_x)
- ○ (n_x, m)

Correct
Yes. Each $\mathbf{x}_j$ has dimension $1 \times n_x$, X is built stacking all rows together into a $m \times n_x$ array.

7. Consider the following array: 1 / 1 point

$a = np.array([[2, 1], [1, 3]])$

What is the result of $a * a$?

- ○ The computation cannot happen because the sizes don't match. It's going to be an "Error"!
- ○ $\begin{pmatrix} 4 & 2 \\ 2 & 6 \end{pmatrix}$
- ◉ $\begin{pmatrix} 4 & 1 \\ 1 & 9 \end{pmatrix}$
- ○ $\begin{pmatrix} 5 & 5 \\ 5 & 10 \end{pmatrix}$

Correct
Yes, recall that * indicates element-wise multiplication.

1 / 1 point

8. Consider the following code snippet:

$a.shape = (3, 4)$

$b.shape = (4, 1)$

for i in range(3):

for j in range(4):

c[i][j] = a[i][j]*b[j]

How do you vectorize this?

- ○ c = np.dot(a,b)
- ○ c = a*b
- ◉ c = a*b.T
- ○ c = a.T*b

Correct
Yes. b.T gives a column vector with shape (1, 4). The result of c is equivalent to broadcasting a*b.T.

9. Consider the following arrays: **1 / 1 point**

$a = np.array([[1, 1], [1, -1]])$

$b = np.array([[2], [3]])$

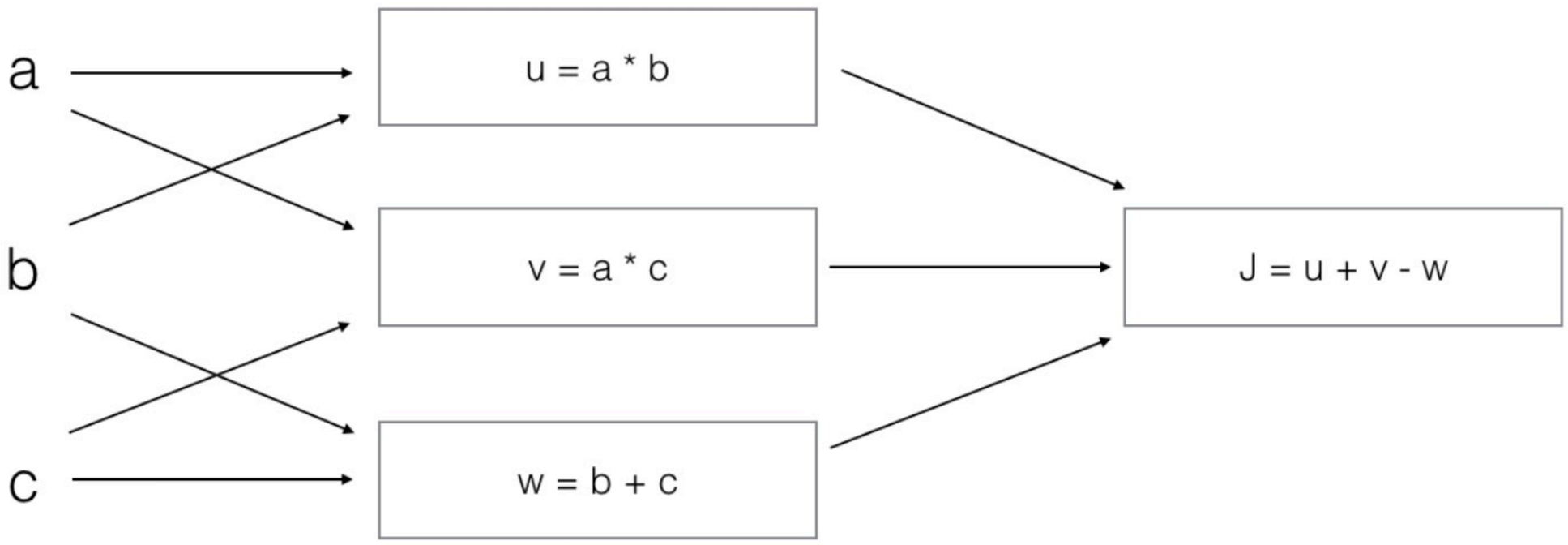
$c = a + b$

Which of the following arrays is stored in c?

- $\begin{matrix} 3 & 4 \\ 3 & 2 \end{matrix}$
- $\begin{pmatrix} 3 & 3 \\ 3 & 1 \\ 4 & 4 \\ 5 & 2 \end{pmatrix}$
- The computation cannot happen because the sizes don't match. It's going to be an "Error"!
- $\begin{matrix} 3 & 3 \\ 4 & 2 \end{matrix}$

Correct
Yes. The array b is a column vector. This is copied two times and added to the array a to construct the array c.

10. Consider the following computation graph. 1 / 1 point



What is the output J?