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

- (●) A neuron computes a linear function $z = Wx + b$ followed by an activation function
- ( ) 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 an activation function followed by a linear function $z = Wx + b$

Expand

Correct

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

2. Suppose that $\hat{y} = 0.9$ and $y = 1$. What is the value of the "Logistic Loss"? Choose the best option. 1 / 1 point

- $+\infty$
- 0.105
- $\mathcal{L}(\hat{y}, y) = -(\hat{y} \log y + (1 - \hat{y}) \log(1 - y))$
- 0.005

Expand

Correct

Yes. Since $\mathcal{L}(\hat{y}, y) = -(y \log \hat{y} + (1 - y) \log(1 - \hat{y}))$, for the given values we get $\mathcal{L}(\hat{y}, y) = -(1 \log 0.9 + 0 \log 0.1)$

3. Consider the Numpy array x: 1 / 1 point

$$x = np.array([[[1], [2]], [[3], [4]]])$$

What is the shape of x?

- (4,)
- (1, 2, 2)
- (2,2,1)
- (2, 2)

Expand

Correct
Yes. This array has two rows and in each row it has 2 arrays of 1x1.

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

$a = np.random.randn(3,4)\ \#\ a.shape = (3,4)$

$b = np.random.randn(1,4)\ \#\ b.shape = (1,4)$

$c = a + b$

What will be the shape of c?

- c.shape = (3, 1)
- The computation cannot happen because it is not possible to broadcast more than one dimension.
- c.shape = (3, 4)
- c.shape = (1, 4)

Expand

Correct
Yes. Broadcasting is used, so row b is copied 3 times so it can be summed to each row of a.

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

$a = np.random.randn(4, 3)$ # $a.shape = (4, 3)$

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

$c = a * b$

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 = (4, 3)
- c.shape = (1, 3)

Expand

Correct
Yes. Broadcasting is invoked, so row b is multiplied element-wise with each row of a to create c.

6. Suppose you have n_x input features per example. Recall that $X = [x^{(1)}x^{(2)}...x^{(m)}]$. What is the dimension of X? 1 / 1 point

- $(m, 1)$
- (m, n_x)
- (n_x, m)
- $(1, m)$

Expand

Correct

7. Consider the following array:

1 / 1 point

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

What is the result of $a * a$?

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

Expand

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

8. Consider the following code snippet: 1 / 1 point

$a.shape = (3, 4)$

$b.shape = (4, 1)$

for i in range(3):

for j in range(4):

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

How do you vectorize this?

- c = a + b
- c = a + b.T
- c = a.T + b
- c = a.T + b.T

Expand

Correct

9. Consider the following code: 1 / 1 point

$$a = np.random.randn(3, 3)$$

$$b = np.random.randn(3, 1)$$

$$c = a * b$$

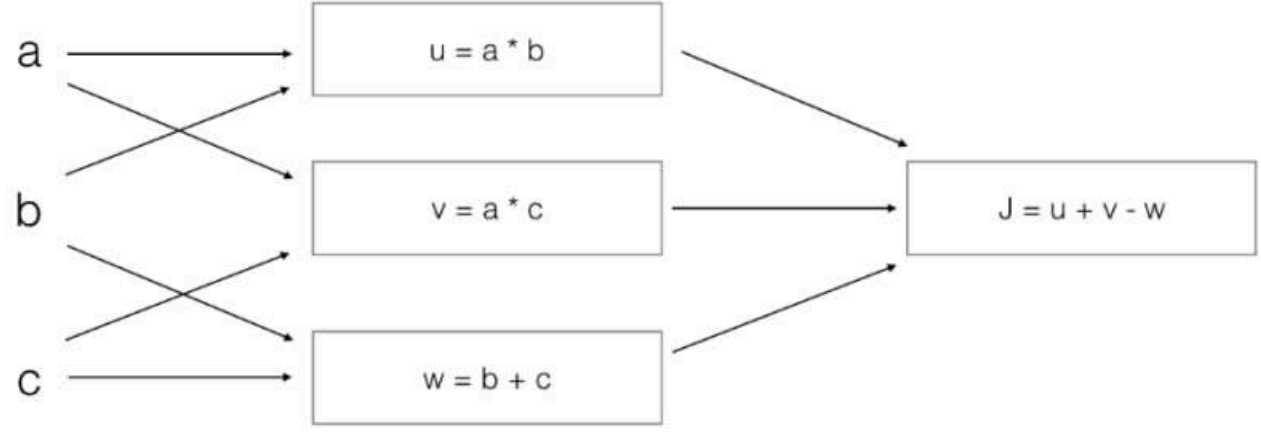
What will be c? (If you're not sure, feel free to run this in python to find out).

- (●) This will invoke broadcasting, so b is copied three times to become (3,3), and $*$ is an element-wise product so c.shape will be (3, 3)
- ( ) It will lead to an error since you cannot use "*" to operate on these two matrices. You need to instead use np.dot(a,b)
- ( ) This will invoke broadcasting, so b is copied three times to become (3, 3), and $*$ invokes a matrix multiplication operation of two 3x3 matrices so c.shape will be (3, 3)
- ( ) This will multiply a 3x3 matrix a with a 3x1 vector, thus resulting in a 3x1 vector. That is, c.shape = (3,1).

Expand

Correct

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



What is the output J?

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

What is the output J?

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

Expand

Correct

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