

## Assignment-1 (Quiz) - Results



### Attempt 2 of 2

Written Dec 7, 2023 7:34 PM - Dec 7, 2023 7:50 PM

Attempt Score **1.6 / 2 - 80 %**

Overall Grade (Highest Attempt) **1.6 / 2 - 80 %**

### Question 1

$$\begin{bmatrix} 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \\ x_5 \\ x_6 \end{bmatrix}$$

The result of the matrix-vector product  $\begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \\ x_5 \\ x_6 \end{bmatrix}$  is \_\_\_\_\_.

☒  $\begin{bmatrix} x_3 \\ x_5 \\ x_6 \end{bmatrix}$

☐  $\begin{bmatrix} x_5 \\ x_3 \\ x_6 \end{bmatrix}$

☐  $\begin{bmatrix} x_5 \\ x_6 \\ x_3 \end{bmatrix}$

☐  $\begin{bmatrix} x_4 \\ x_5 \\ x_6 \end{bmatrix}$

### Question 2

What does  $\frac{x^{(1)} + x^{(2)} + x^{(3)} + x^{(4)}}{4}$  represent for the following data matrix?

	HR	BP	Temp
Patient-1	76	126	38.0
Patient-2	74	120	38.0
Patient-3	72	118	37.5
Patient-4	78	136	37.0

- ☐ Average TEMP  
☐ Average HR  
☒ Average patient  
☐ Average BP

### Question 3

Suppose we measured for 100 patients at 24 hourly timestamps (starting from 00:00 hours) 3 features (heart rate, blood pressure, and temperature). The resulting 3D tensor  $\mathbf{P}$  has the shape structure *patients*  $\times$  *timestamps*  $\times$  *features*. What does the entry  $P_{2,3,3}$  of the tensor represent?

- ☐ Temperature of 3<sup>rd</sup> patient at 2PM  
☐ Temperature of 3<sup>rd</sup> patient at 2AM  
☒ Temperature of 2<sup>nd</sup> patient at 2AM  
☐ Temperature of 2<sup>nd</sup> patient at 2PM

### Question 4

A train network comprising 20 stations and 50 paths is represented by the -matrix  $\mathbf{P}$  whose entries are defined as

$$p_{ij} = \begin{cases} 1, & \text{if station } j \text{ is on route } i, \\ 0, & \text{otherwise;} \end{cases}$$

Suppose the 5th column of  $\mathbf{P}$  is sparse; that is, only a few entries of that column are nonzero values while most of the other entries are zeros. Based on this information, which one of the following statement is correct?

- ☐ Path-5 has only a few stations

- ☐ Path-5 does never contains Station-5
- ☐ Station-5 never shows up on Path-5
- ✓ ☐ Station-5 shows up only on a few paths

### Question 5

Suppose we have the following patient data matrix X:

	HR	BP	Temp
Patient-1	76	126	38.0
Patient-2	74	120	38.0
Patient-3	72	118	37.5
Patient-4	78	136	37.0

where HR is measured in beats per minute. Suppose we want to convert the HR values in X to beats per hour. Which one of the following matrix-matrix product achieves that?

☐  $\mathbf{DX}$ , where  $\mathbf{D} = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1/60 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$

☐  $\mathbf{XD}$ , where  $\mathbf{D} = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1/60 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$

✗ ☐  $\mathbf{DX}$ , where  $\mathbf{D} = \begin{bmatrix} 1/60 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$

➡ ☐  $\mathbf{XD}$ , where  $\mathbf{D} = \begin{bmatrix} 1/60 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$