Assignment-1 (Quiz) - Results



Attempt 2 of 2

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

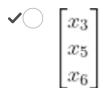
Attempt Score 1.6 / 2 - 80 %

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

Question 1

$$\begin{bmatrix} 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \\ x_5 \\ x_6 \end{bmatrix}_{\mathbf{i} \in \mathbb{R}}$$

The result of the matrix-vector product



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

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

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

Question 2

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

	HR	ВР	Temp
Patient-1 Patient-2 Patient-3 Patient-4	72	118	37.5

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 P has the shape structure patients imes timestamps imes features. What does the entry $p_{2,3,3}$ of the tensor represent?

Temperature of 3rd patient at 2PM

Temperature of 3rd patient at 2AM

✓ Temperature of 2nd patient at 2AM

Temperature of 2nd patient at 2PM

Question 4

A train network comprising 20 stations and 50 paths is represented by the -matrix 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 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:

1	HR	BP	Temp
Patient-1 Patient-2	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?

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

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

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

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