Homework 4:

Multiply $\bar{a}$ by $\bar{b}$ matrix A. Draw the initial $\bar{a}$ and $\bar{b}$ (relatively to the coordinate system origin O) and result of the multiplication in Cartesian coordinate system. Both in $\bar{a}$ and $\bar{b}$ are in the homogeneous 3D Cartesian coordinate system and its orientation in space is described by first three components. Compute the determinant of matrix A, describe your thoughts about received results:

1) *(1.0)* **Perform with the data provided below:**

$$\mathbf{A} = \begin{vmatrix} +1 & 0 & 0 & +4 \\ 0 & +1 & 0 & +2 \\ 0 & 0 & +1 & +6 \\ 0 & 0 & 0 & +1 \end{vmatrix} \quad \bar{a} = \begin{vmatrix} +2 \\ +1 \\ +5 \\ 0 \end{vmatrix} \quad \bar{b} = \begin{vmatrix} +2 \\ +1 \\ +5 \\ +1 \end{vmatrix}$$

2) *(2.0)* **Perform with the data provided below:**

$$\mathbf{A} = \begin{vmatrix} -1 & 0 & 0 & +4 \\ 0 & -1 & 0 & +2 \\ 0 & 0 & -1 & +6 \\ 0 & 0 & 0 & +1 \end{vmatrix} \quad \bar{a} = \begin{vmatrix} +2 \\ +1 \\ +5 \\ 0 \end{vmatrix} \quad \bar{b} = \begin{vmatrix} +2 \\ +1 \\ +5 \\ +1 \end{vmatrix}$$

3) *(2.0)* **Perform with the data provided below:**

$$\mathbf{A} = \begin{vmatrix} +\frac{\sqrt{2}}{2} & -\frac{\sqrt{2}}{2} & 0 & +4 \\ +\frac{\sqrt{2}}{2} & +\frac{\sqrt{2}}{2} & 0 & +2 \\ 0 & 0 & 1 & +6 \\ 0 & 0 & 0 & 1 \end{vmatrix} \quad \bar{a} = \begin{vmatrix} +2 \\ +1 \\ +5 \\ 0 \end{vmatrix} \quad \bar{b} = \begin{vmatrix} +2 \\ +1 \\ +5 \\ +1 \end{vmatrix}$$

4) *(2.0)* **Perform with the data provided below:**

$$\mathbf{A} = \begin{vmatrix} +0.5 & 0 & 0 & +4 \\ 0 & +1.5 & 0 & +2 \\ 0 & 0 & +1 & +6 \\ 0 & 0 & 0 & +1 \end{vmatrix} \quad \bar{a} = \begin{vmatrix} +2 \\ +1 \\ +5 \\ 0 \end{vmatrix} \quad \bar{b} = \begin{vmatrix} +2 \\ +1 \\ +5 \\ 1 \end{vmatrix}$$