Convert a quaternion to a rotation matrix

Question

In this script, you need to convert the given quaternion to a rotation matrix

- Your final solution for the rotation matrix must be stored in R

Input Format

- quat will be unit quaternion represented by a 1x4 matrix of the form [Qs, Qx, Qy, Qz]
- [Qs, Qx, Qy, Qz] is the matrix equivalent of the quaternion Qs + Qx i + Qy j + Qz k

Output Format

- Your solution for R must be a 3x3 matrix
- R must be a valid rotation matrix

Code

- Write your code in the space provided within the script, as per the script comments.

Helpful Notes

- The formula for converting a rotation matrix to a quaternion is as follows:

$$
\begin{aligned}
&R = \\
&[1 - 2Q_y^2 - 2Q_z^2, 2Q_xQ_y - 2Q_zQ_s, 2Q_xQ_z + 2Q_yQ_s \\
&2Q_xQ_y + 2Q_zQ_s, 1 - 2Q_x^2 - 2Q_z^2, 2Q_yQ_z - 2Q_xQ_s \\
&2Q_xQ_z - 2Q_yQ_s, 2Q_yQ_z + 2Q_xQ_s, 1 - 2Q_x^2 - 2Q_y^2]
\end{aligned}
$$