Matlab Competency Check

1. Define a $50 \times 50$ matrix called $M$. The entries of $M$ should be random integers between 0 and 5. (Hint: try the \texttt{randi} command.)

2. Access the element in the 27th row and the 32nd column, and display this element in hexadecimal form.

3. Set every element of $M$ which happens to be a 5 to 6. Call this modified matrix $N$.

4. Form a histogram showing how many times each element of $N$ occurs (hint: try the \texttt{hist} command.)

5. Extract the $4 \times 4$ sub-matrix in the center of $N$, and store this submatrix as the variable $P$.

6. Calculate the inverse of $P$, and call it $Q$. (Hint: try the \texttt{inv} command.)

7. Form the matrix products $P \cdot Q$ and $Q \cdot P$ and verify that both products yield the identity matrix.

8. Multiply $P$ and $Q$ together element-wise and call the output $S$.

9. Write code to replace the largest value of $S$ by 0. (Hint: use the \texttt{max} function.)