



AHSANULLAH UNIVERSITY OF SCIENCE AND TECHNOLOGY

DEPARTMENT
OF
ELECTRICAL AND ELECTRONIC ENGINEERING

LAB REPORT

COURSE NO : EEE 2226
COURSE NAME : Numerical Technique Laboratory
EXPERIMENT NO : 02
DATE OF SUBMISSION : 14/07/2025

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Section : D(2)

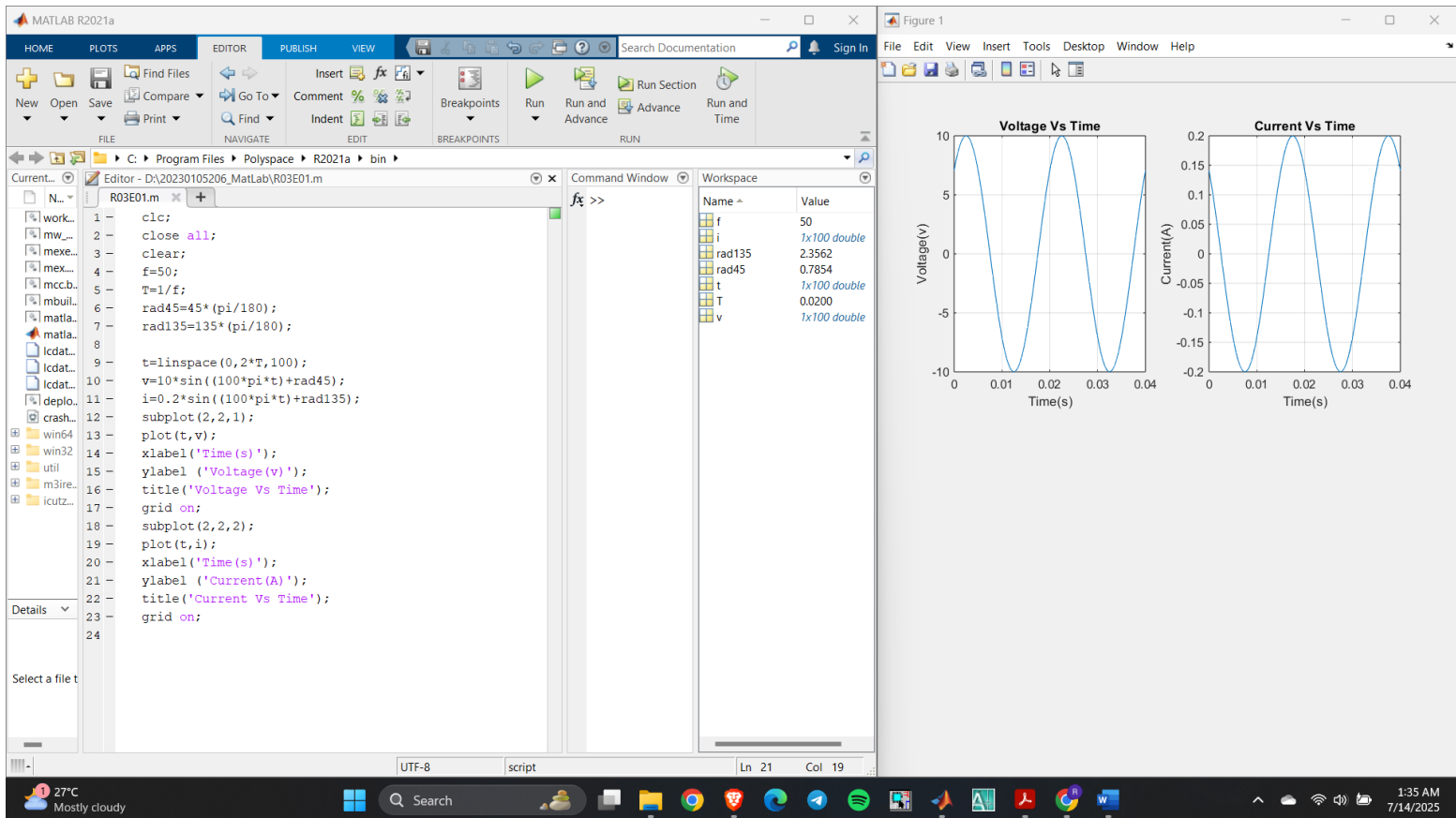
Exercise 1.

Plot the following two sinusoidal signals (for two cycles) in the same figure window but in different subplots:

(i) Plot v vs. t for: $v = 10\sin(100\pi t + 45^\circ)$

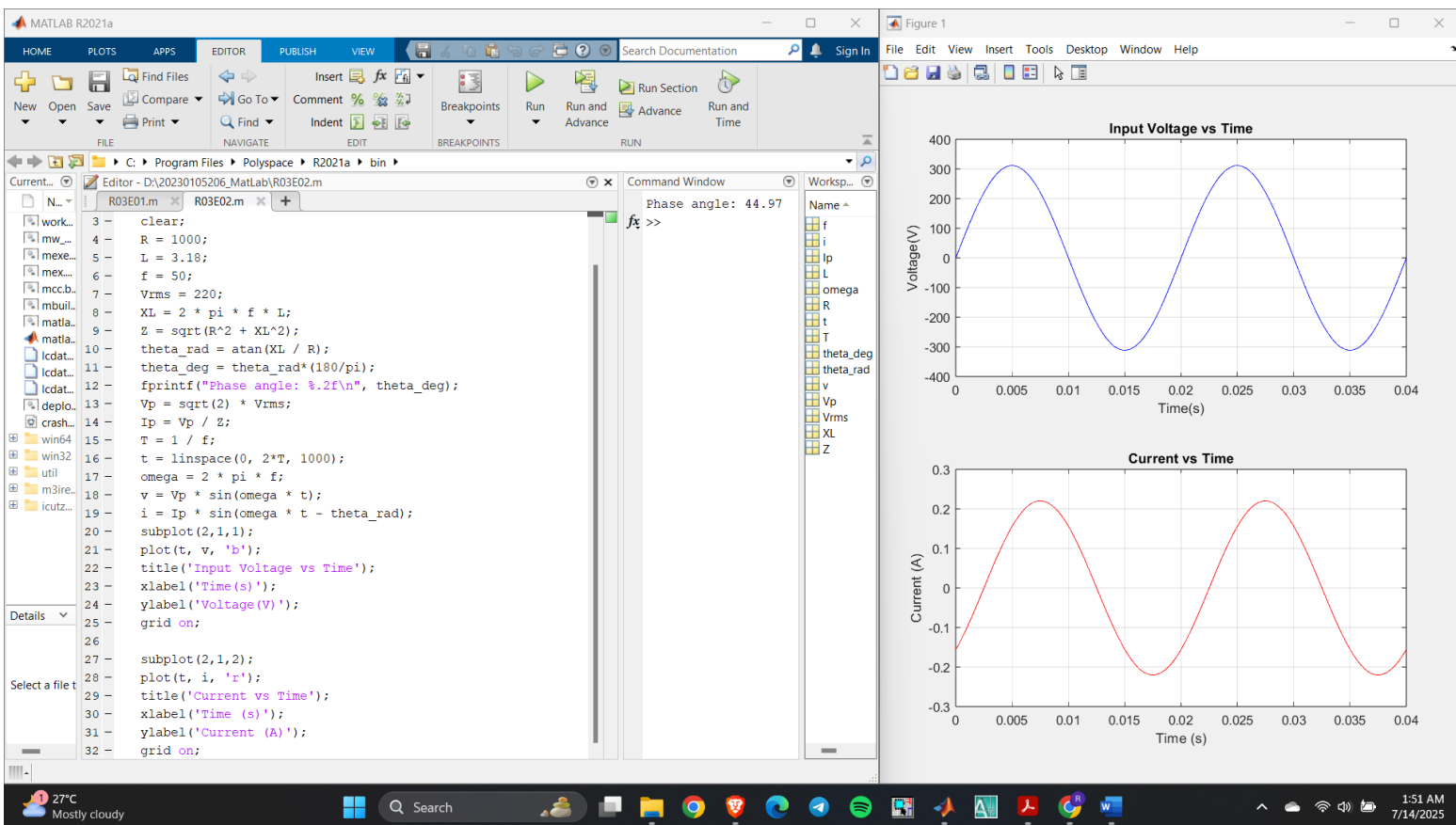
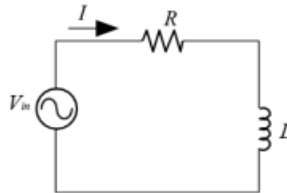
(i) Plot i vs. t for: $i = 0.2\sin(100\pi t + 135^\circ)$

Also properly label the axis.



Exercise 2.

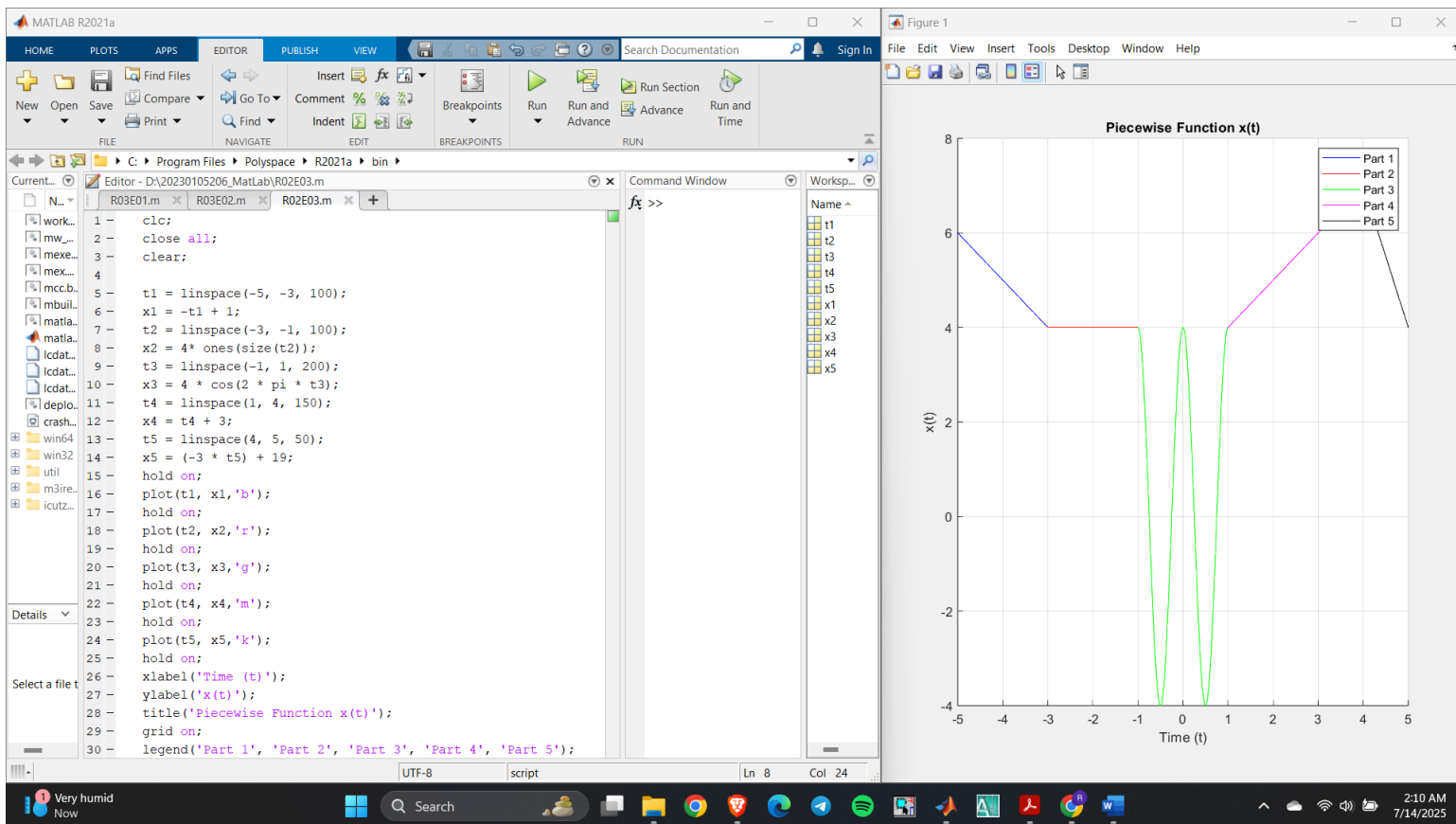
Consider the following RL circuit, where the value of resistor, $R = 1k\Omega$ and the value of the inductor, $L = 3.18 \text{ Henry}$. Also, the input voltage is 220V (rms) AC sinusoidal signal with a frequency of 50 Hz. If you calculate the phase angle difference between input voltage, V_{in} and the series current, I as shown in the following figure, you will find that the current should lag the input voltage by 45° for the given values of f , R and L .



Exercise 3.

Write a code to plot the following function (x vs. t) in MATLAB:

$$x = \begin{cases} -t + 1, & -5 \leq t \leq -3 \\ 4, & -3 \leq t \leq -1 \\ 4 \cos(2\pi t), & -1 \leq t \leq 1 \\ t + 3, & 1 \leq t \leq 4 \\ -3t + 19, & 4 \leq t \leq 5 \end{cases}$$



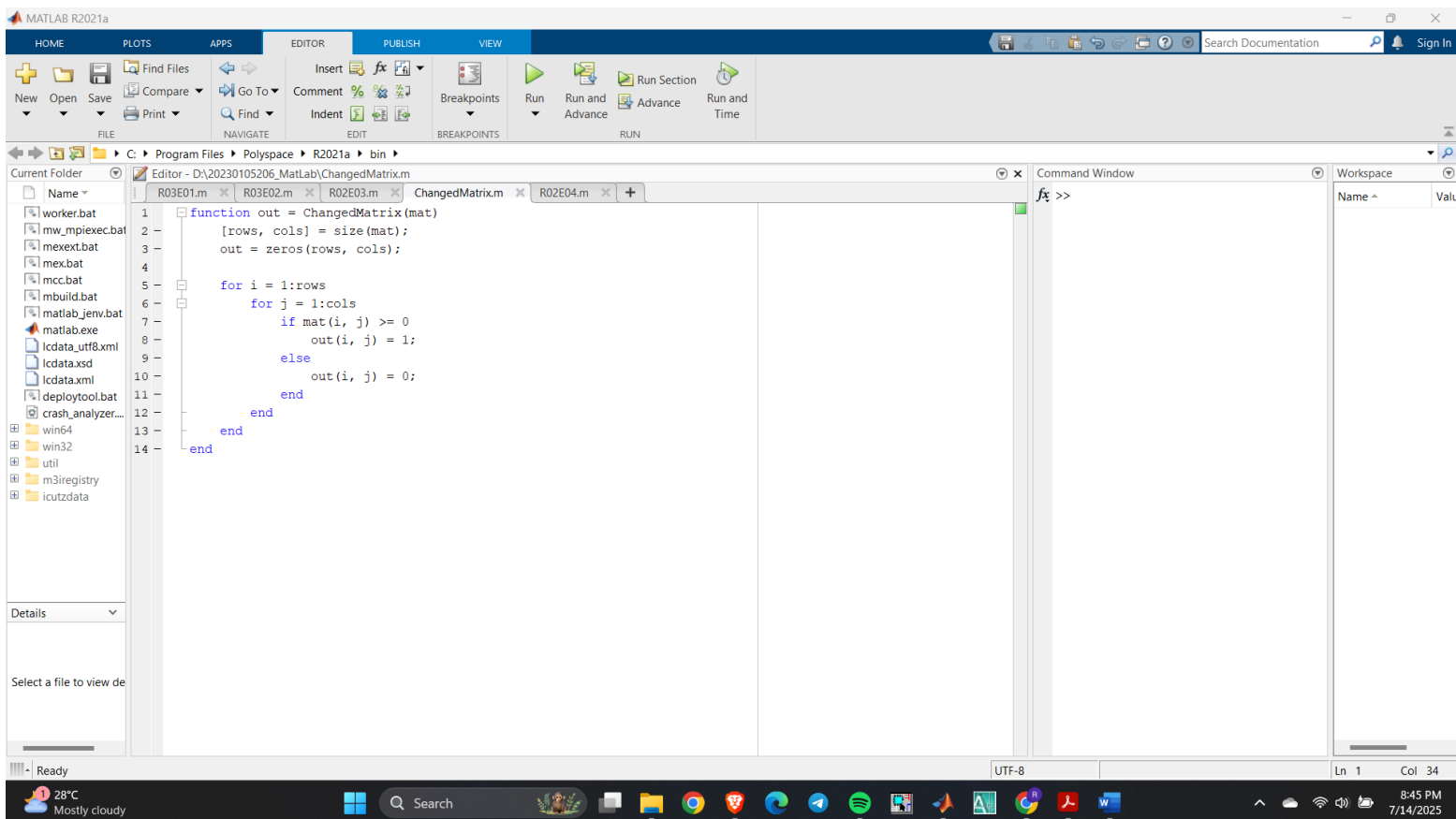
Exercise 4.

You must take a real-valued 2D matrix as input and replace all negative-valued elements of that matrix by 0 and all zero and positive-valued elements by 1. Input 2D matrix may be of arbitrary dimensions.

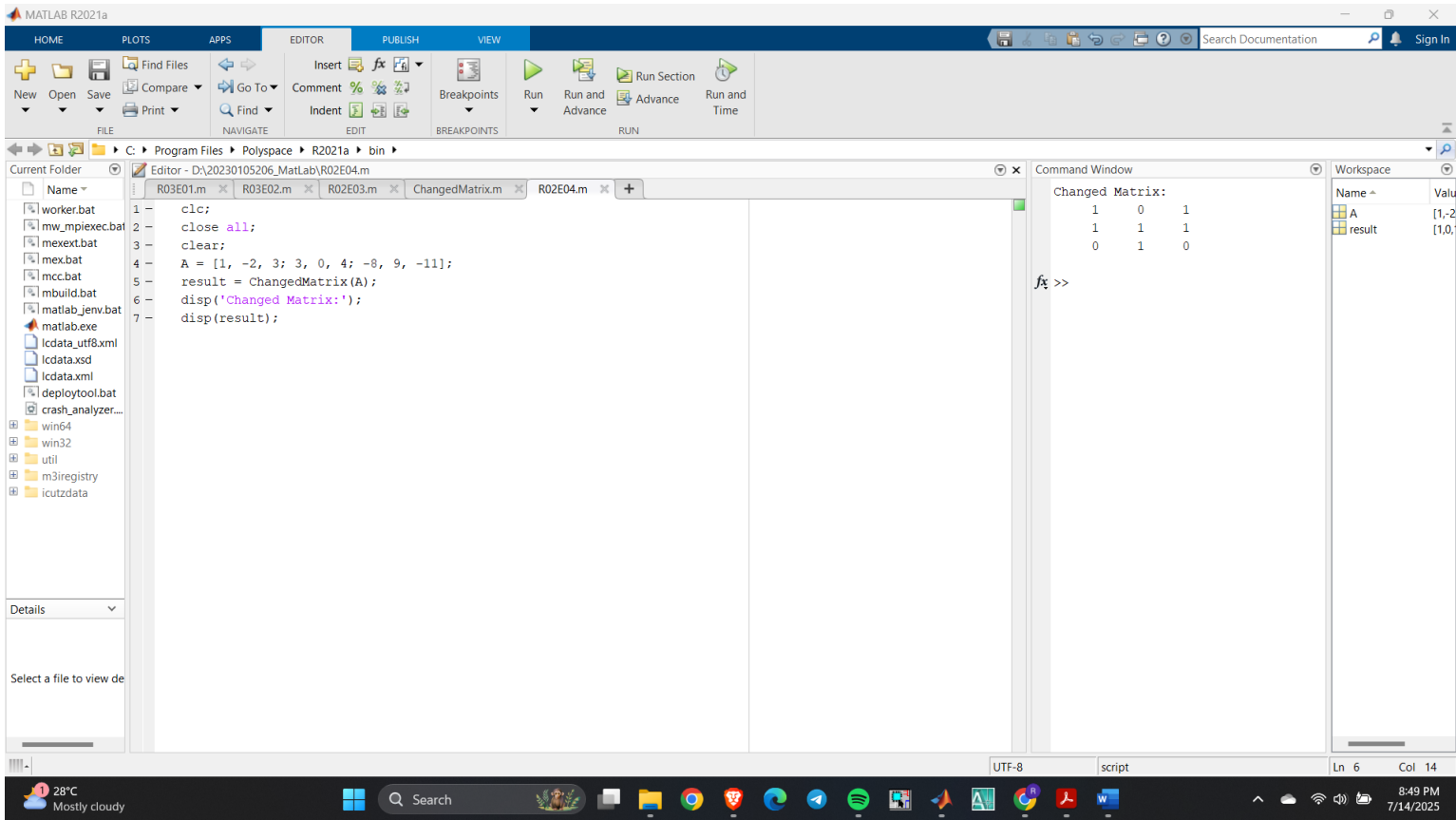
| Sample Input | Sample Output |
|---|---|
| $\begin{bmatrix} 1 & -2 & 3 \\ 3 & 0 & 4 \\ -8 & 9 & -11 \end{bmatrix}$ | $\begin{bmatrix} 1 & 0 & 1 \\ 1 & 1 & 1 \\ 0 & 1 & 0 \end{bmatrix}$ |

Use “user defined function” to do this job where input of the main code is a real-valued 2D matrix and output of main code is modified 2D matrix.

User Defined Function:



Main Function:



Exercise 5.

You have to write a code to find the average of best 3 quizzes out of 4 for a student using the following algorithm:

- Find the lowest number among the all four numbers (**do not use any built-in function**).
- Find the sum of all four numbers (**do not use any built-in function**).
- Subtract the lowest number from the sum of all four numbers to obtain the sum of best three.
- Find the average of the best three from the sum.

Use “user defined function” to do this job where inputs of the main code are quiz marks of a student and output of main code is average of best 3 quizzes.

User Defined Function:

The MATLAB R2021a interface displays the Editor window with the file `averagebestthree.m` open. The function code is as follows:

```
1 function avg = averagebestthree(a, b, c, d)
2     lowest = a;
3     if b < lowest
4         lowest = b;
5     end
6     if c < lowest
7         lowest = c;
8     end
9     if d < lowest
10        lowest = d;
11    end
12
13    total = a + b + c + d;
14    bestthreesum = total - lowest;
15    avg = bestthreesum / 3;
16
17 end
```

The Command Window shows the execution results:

```
Enter quiz 1 mark: 20
Enter quiz 2 mark: 15
Enter quiz 3 mark: 15
Enter quiz 4 mark: 10
Average of best 3 quizzes is: 16.67
fx >>
```

The Workspace window shows the following variables:

| Name | Value |
|------|-------|
| avg | 16.67 |
| q1 | 20 |
| q2 | 15 |
| q3 | 15 |
| q4 | 10 |

The MATLAB R2021a interface displays the Editor window with a script file open. The script code is as follows:

```
1 clc;
2 close all;
3 clear;
4 q1 = input('Enter quiz 1 mark: ');
5 q2 = input('Enter quiz 2 mark: ');
6 q3 = input('Enter quiz 3 mark: ');
7 q4 = input('Enter quiz 4 mark: ');
8
9 avg = averagebestthree(q1, q2, q3, q4);
10
11 fprintf('Average of best 3 quizzes is: %.2f\n', avg);
```

The Command Window shows the execution results:

```
Enter quiz 1 mark: 20
Enter quiz 2 mark: 15
Enter quiz 3 mark: 15
Enter quiz 4 mark: 10
Average of best 3 quizzes is: 16.67
fx >>
```

The Workspace window shows the following variables:

| Name | Value |
|------|-------|
| avg | 16.67 |
| q1 | 20 |
| q2 | 15 |
| q3 | 15 |
| q4 | 10 |