

MATLAB Assignment #5

Reading Assignment:

MATLAB Lecture #5
MATLAB Handout

MATLAB Assignment:

1. (25 points) Write a MATLAB program using a **for loop** to determine the number of values that are positive, the number of values that are negative, and the number of values that equal zero in a vector containing N elements. Prompt the user to enter N and the vector of values and then display the number of positive, negative, and zero values. Example:

```
Enter the number of elements in the vector: 8
Enter the array: [1,-3,0,6,7,-1,-2,55]
Results:
Number of positive values: 4
Number of negative values: 3
Number of zero values: 1
```

Test the program for cases with 1, 8, and 25 elements.

2. (25 points) Repeat the example above for a two dimensional matrix. Prompt the user to enter the number of rows, the number of columns, and the matrix. Test the program for matrices with dimensions (1x8), (8x1), and (3x4) and be sure to include an assortment of positive, negative, and zero values as the inputs.
3. (25 points) Write a MATLAB program using a **while loop** to calculate $\cos(x)$ accurate to 6 digits after the decimal point using the following infinite series:

$$\cos(x) = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \dots \quad \text{where } x \text{ is in radians}$$

Prompt the user to enter an angle A in degrees and display $\cos(A)$. Test the program for -30° , 0° , 30° , 120° , 210° , and 300° .

4. (25 points) Write a MATLAB program to:
 - Prompt the user to enter numeric grades (one at a time) within a **while loop**. Any number of grades can be entered. The user should enter a negative number to indicate that there are no more grades.
 - Determine the number of grades in each grade range using a standard 10 point scale: A(90 or higher), B (80-90), C (70-80), D (60-70), and F (0-60).
 - Determine the maximum, minimum, and average grade.
 - Display the results including the number of grades, maximum grade, minimum grade, and the number of grades in each grade range.
 - Test the program for cases including 4 grades, 10 grades, and 20 grades with the grades reasonably distributed between the grade ranges.