CS 302/352: Computer graphics

Lab Assignment #2

MATLAB Tutorial Based Assignment

Objective Questions

1. What does the command `linspace(1, 10, 5)` do in MATLAB?

   A) Creates a vector of 5 equally spaced points between 1 and 10.

   B) Creates a vector from 1 to 10 with an increment of 5.

   C) Creates a logarithmic space between 1 and 10.

   D) Creates a matrix with 5 rows and 10 columns.

2. Which MATLAB operation calculates the element-wise multiplication of two matrices A and B?

   A) A * B B) A .* B

   C) A ./ B D) A ^ B

3. What will the following MATLAB code return?

```
A = [3 6; 4 8];

B = [1 2; 3 4];

C = A \ B;
```

   A) Element-wise division of `B` by `A`.

   B) The solution to the linear system A×C=B.

   C) The inverse of `A` multiplied by `B`.

   D) Syntax error.

4. In MATLAB, which command returns only the unique elements of a vector v?

   A) sort(v) B) unique(v)

   C) distinct(v) D) find(v)

5. What is the output of the following code?

```
x = 3;
if x > 5
    disp('Greater than 5');
elseif x == 3
    disp('Equal to 3');
else
    disp('Less than 5');
end
```

A) Greater than 5

B) Equal to 3

C) Less than 5

D) Syntax Error

Coding Problems

1. **Vector Creation and Operations**

    a. Create a vector from 1 to 20 with an increment of 2.
    b. Find and print the square of each element in the vector.
    c. Extract and print all even numbers from the vector.

2. **Matrix Manipulations**

    a. Define a 3×3 matrix A with random integers.
    b. Calculate the determinant of A.
    c. Find the transpose of A and print it.

3. **Solving Linear Equations**

    a. Solve the system of equations using the matrix method:
    $2x+y+z=5$
    $x-y+z=2$
    $x+y+z=4$

4. **Conditional Statements**

    a. Write a script to take a number as input from the user.
    b. Print whether the number is positive, negative, or zero.

5. **Polynomial Operations**

    a. Represent the polynomial $3x^2+2x+$ as a vector.
    b. Find the derivative of the polynomial and print it.
    c. Calculate and display the value of the polynomial at x=5.

6. **2D Plotting**

    a. Plot the sine and cosine functions for xxx values between -2π and 2π.
    b. Use different colours and styles for the two plots.
    c. Add a legend, title, and labels for the axes.

7. **Subplots and Parametric Plot**

    a. Create subplots to display the functions y=sin(2x), y=cos(2x) and y=tan(2x).
    b. Use the fourth subplot for a parametric plot of x = sin(t), y = cos(t) for t from 0 to 2π

Instructions

- Include comments in your code explaining each step.
- Ensure your code handles edge cases (e.g., empty lists or sets).
- Submit your answers in a pdf file with format: assignment2_<roll. no.>.pdf.