ENGR 1120 - Spring 2020
Lab Assignment 10: Using Two-Dimensional Arrays
More Graphics - The Patch Object

Overview :

You are going to learn to use two dimensional arrays in MATLAB. These are often referred to as Matrices and this is where MATLAB gets its name! There are many tools built in for working with matrices. If you are curious check the help. Today we are going to practice the basics and learn a new way to make graphics in MATLAB.

Basic Form of a Matrix:

The **size** of a matrix is the **number of rows** and the **number of columns** in the matrix respectively. The matrix A shown below has m rows and n columns.

$$A = \begin{pmatrix} a_{11} & a_{12} & ... & a_{1n} \\ a_{21} & a_{22} & ... & a_{2n} \\ & & . & \\ & a_{ij} & & \\ & & . & \\ a_{m1} & a_{m2} & ... & a_{mn} \end{pmatrix}$$

Initializing a Two Dimensional Matrix:

- Choose a valid variable name and use the *square brackets* to create a matrix with hardcoded data.
- Commas (,) separate columns of the matrix. Spaces also work.
- Semicolons (;) separate rows of the matrix. A newline will also work.

Accessing and Assigning:

- Basically the same as with 1D
- `x = A(3,5) % access element in row 3 column 5`
- `y = 25)`
- `A(6,2) = y % assign element in row 6 column 2`

Assignment :

The program below generates figure1 shown on the next page using a patch object. **Your job is to write a MATLAB program to generate figures 2 3 and 4.** They **do not** have to exactly the same as the figures shown.

```
clear variables;clc;close all
s=1;
cube.vertices=[0, 0, 0
               s, 0, 0
               s, s, 0
               0, s, 0
               0, 0, s
               s, 0, s
               s, s, s
               0, s, s];

cube.faces=[1, 2, 3, 4
            5, 6, 7, 8
            1, 2, 6, 5
            2, 3, 7, 6
            3, 4, 8, 7
            4, 1, 5, 8];

figure(1)
ph=patch(cube);
ph.EdgeColor=[1.0000,0.8667,0];
ph.FaceColor=[0.3098,0.1608,0.5176];
ph.LineWidth=2;
axis equal
view(3)
```