MONASH University

MONASH
ENGINEERING
ENG1060

MATRICES: CREATING 2D MATRICES

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GROUP OF EIGHT AUSTRALIA

CREATING 2D MATRICES

- A two-dimensional matrix contains multiple rows and columns

- Use square brackets [ ] to create a two-dimensional matrix
  - MATLAB refers to the rows first, then the columns

    A = [1 2 3; 4 5 6] (2 × 3 matrix)

- Use the colon operator to create vectors within matrices

    A = [1:3; 4:6]

MATRIX CONCATENATION

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- Matrices can be concatenated to make larger matrices
  - Matrices can only join if one of their dimensions are the same
  - Dimension mismatch in MATLAB will give an error in red text

$$A = \begin{bmatrix} 7 & 7 \\ 7 & 7 \\ 7 & 7 \\ 7 & 7 \end{bmatrix} \qquad B = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \\ 1 & 1 & 1 \end{bmatrix} \qquad C = \begin{bmatrix} 9 & 9 & 9 & 9 & 9 & 9 & 9 \\ 9 & 9 & 9 & 9 & 9 & 9 & 9 \end{bmatrix}$$

- Are the following combinations possible?

  X = [A; B C] ?

  X = [A; B; C] ?

  X = [A B A; C] ?

BUILT-IN FUNCTIONS FOR MATRICES

- Similar to the colon operator and linspace

- Matrices can be created using:

```
A = zeros(rows, columns)
B = ones(rows, columns)
C = eye(rows, columns)
D = rand(rows, columns)
```

- Matrix properties can be obtained using

```
Longest_side = length(matrix)
[rows, columns] = size(matrix)
```

INFORMATION OVERLOAD

- We have already seen that matrices can contain *a lot* of information
  - How do we display the data? Is the entire matrix needed?

- What would Y = rand(1000, 1000) print to screen?
  - Not important to show but important for future calculations

- To suppress an output in MATLAB, place a semi-colon (;) after the command

```
Y = rand(1000, 1000);
```

THE SEMI-COLON

- The semi-colon is used to suppress the printing of outputs
  - Recall: semi-colon creates a new row in the matrix environment [ ]

- Example: We're only interested in the final result

```
distance = 10;
time = 40;
speed = distance/time;
speed_cubed = speed^3
```

SUMMARY

- Create two-dimensional matrices
- Concatenate matrices
- Suppress outputs

- Is it possible to use the linspace function inside a matrix environment?