**Introduction to matlab**

* MATLAB stands for MATrix LABoratory
* Interpreted language
* Scientific programming environment
* Very good tool for the manipulation of matrices
* Great visualisation capabilities
* Loads of built-in functions
* Easy to learn and simple to use
* Variable names ARE case sensitive
* MATLAB Special Variables
  + ans Default variable name for results
  + pi Value of pi
  + eps Smallest incremental number
  + inf Infinity
  + NaN Not a number e.g. 0/0
  + i and j i = j = square root of -1
* Other MATLAB Symbols
  + >> prompt
  + … continue statement on next line
  + , separate statements and data
  + % start comment which ends at the end of line
  + ; (1) suppress output

(2) used as a row separator in a matrix

* + : specify range

**VARIABLES**

* Don’t have to declare data type
* Don’t even have to initialise
* Just assign in command window

>> a = 12; %variable a is assigned 12

* No need for types
* All variables are created with double precision unless specified they are matrices.
* MATLAB treats all variables as matrices. For our purposes a matrix can be thought of as an array, in fact, that is how it is stored.
* Vectors are special forms of matrices and contain only

**MATRICES**

* Don’t need to initialise type, or dimensions

>> A = [3 2 1; 5 1 0; 2 1 7]

A =

3 2 1

5 1 0

2 1 7

>>

* Manipulating matrices:
  + >> A’ % transpose
  + >> B\*A % matrix multiplication
  + >> B.\*A % element by element multiplication
  + >> B/A % matrix division
  + >> B./A % element by element division
  + >> [B A] % Join matrices (horizontally)
  + >> [B; A] % Join matrices (vertically)
* Access elements of a matrix

>> A(1,2)

ans=

2

* Remember Matrix(row, column)
* Naming convention Matrix variables start with a capital letter while vectors or scalar variable start with a simple letter

**THE : OPERATOR**

* VERY important operator in MATLAB
* Means ‘to’

>> 1:10

ans =

1 2 3 4 5 6 7 8 9 10

>> 1:2:10

ans =

1 3 5 7 9

>> A(3,2:3)

ans =

1. 7

>> A(:,2)

ans =

2

1

1