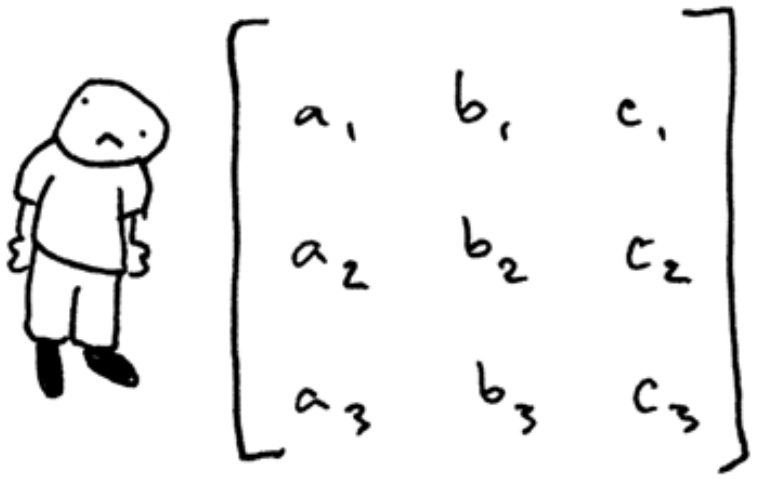

By dr. ali ahmed

What is MATRIX

"A matrix is a collection of numbers arranged into a fixed number of rows and columns"

MATRIX
INPUT

Storage place → Variables

Basic Types of variables in MATLAB?

MATRIX INPUT

Matrices can be stored by;

- Direct input
- By using a loop
- By reading from a file

Matrix Input
Direct Tech.

Basic input technique:

Variable = input ('message');

*message cosmetics???

Try:

```
a = [ 1 2 3 4 5; 2 3 4 5 6; 3 4 5 6 7; 4 5 6 7 8];
disp(a)
```

Matrix Input
By Using Loop

For Loop Syntax;

```
for i = 1:5
    {code} → This code runs 5 times
end
```

Matrix Input
By Using Loop

Try;

```
clear all

for i = 1:3;
  for j = 1:3;
    mat(i,j) = input (['Value ( ',num2str(i),' , ',num2str(j),' ) = ']);
  end
end

disp(mat);
```

Matrix Input
Read from file

IMP: There are a no. of functions to take input from a file.

>> fscanf <<

fscanf(fileID,formatSpec,sizeA)

Size of the data to read
n INF – Read to end (n is columns for numeric data)

Name of the file

Format of the data
%d – base 10
%f – floating point no.s
%s – string values

Matrix Input
Read from file

Try;

```
x = 1:1:5;
y = [x;rand(1,5)];
fileID = fopen('nums2.txt','w');
fprintf(fileID,'%d %4.4f\n',y);
fclose(fileID);
```

Matrix Input
Read from file

Now Try this;

```
fileID = fopen('nums2.txt','r');
formatSpec = '%d %f';
sizeA = [2 Inf];
A = fscanf(fileID,formatSpec,sizeA)
fclose(fileID);
A = A'
```

Matrix Referencing

To read a particular value;

```
Matrix-name(i,j)
```

To read a row or column value;

```
var = mat(:,m) or var = mat(n,:)
```

Matrix Referencing

To multiple column value;

```
var = mat(:,m:n) or var = mat(n,:)
```

To delete a row;

```
mat( m , : ) = []
```

Matrix Addition/Subtraction

```
a = [ 1 2 3 ; 4 5 6; 7 8 9];
b = [ 7 5 6 ; 2 0 8; 5 7 1];
c = a + b
d = a - b
```

Matrix Multiplication

```
a = [ 1 2 3; 2 3 4; 1 2 5]
b = [ 2 1 3 ; 5 0 -2; 2 3 -1]
prod = a * b
```

Matrix Division

```
a = [ 1 2 3 ; 4 5 6; 7 8 9];
b = [ 7 5 6 ; 2 0 8; 5 7 1];
c = a / b
```

Matrix
Scalar Operations

```
a = [ 10 12 23 ; 14 8 6; 27 8 9];
b = 2;
c = a + b
d = a - b
e = a * b
f = a / b
```

Matrix Transpose

```
a = [ 10 12 23 ; 14 8 6; 27 8 9]
b = a'
```

Matrix Determinant

```
a = [ 1 2 3; 2 3 4; 1 2 5]
det(a)
```

Matrix Inverse

Try-1

```
a = [ 1 2 3; 2 3 4; 1 2 5]
inv(a)
```

Try-2

```
a = [ 1 2 3; 2 3 4; 1 2 5]
b = inv(a)
c = a*b
```

Matrix
Joining

```
a = [ 10 12 23 ; 14 8 6; 27 8 9]
b = [ 12 31 45 ; 8 0 -9; 45 2 11]
c = [a, b]
d = [a; b]
```