Lecture-1 (Introduction)

Matlab is interactive, which means it compiles right when the command is typed in.

Evaluation of arithmetic expression:

```matlab
>> 1+2  
an = 3
>> 1+2+4  
an =7
>> 1+4./2  
an = 3
>> 3-2+5./2.*2+1  
an =7
>> 2.^3  
an = 8
>> 1.*2.^2  
an = 4
>> 1+2.^2  
an = 5
>> 3-2+5.^2-4.*2+1  
an = 19
>> sqrt(16)  
an = 4
>> pi  
an = 3.1416 (All basic functions are built-in which makes Matlab a highly powerful tool)
>> sin(pi./3)  
an = 0.8660
>> 1+ans  
an = 1.8660 (The very last computation has stored in workspace)
```

Data types in Matlab (class)
Double (numbers)
Char (text)
Logical (true/false)

Variables:
Variables are used to store and retrieve values; consists of three parts: a name, a value and a data type.

```matlab
>> a=4 (a value of a given data type is assigned to a variable using the assignment operator =.)
a=4
cat
>> a='cat'
a = cat
>> a=4;
>> b=6;
>> a+b
```
ans = 10
>> 'cat'+1
ans = 100 98 117  (takes ASCII value of c, a, t and add 1 respectively)
>> iskeyword  (Keywords for Matlab)
ans =
  'break'
  'case'
  'catch'
  'classdef'
  'continue'
  'else'
  'elseif'
  'end'
  'for'
  'function'
  'global'
  'if'
  'otherwise'
  'parfor'
  'persistent'
  'return'
  'switch'
  'try'
  'while'

>> cat=4
cat = 4
>> dog=7
dog = 7
>> cat+dog
ans = 11

List:
A list of numbers or characters can be created by enclosing the list inside a pair of square brackets. The elements can be separated by either spaces or comma.

>> val=[1 3 5 7 2]
val = 1 3 5 7 2
>> val=[1 3 5 7 2]
val = 1 3 5 7 2
>> val(3)  (Retrieves the third elements of the list; 3 is the index number which refers to a position in a list.)
ans= 5
>> val+1
ans = 2 4 6 8 3
>> val.*2
ans = 2 6 10 14 4
>> val+val
ans =  2   6  10  14  4
>> val.^2
>> 2:5  (Colon operator refers to a range)
an =  2  3  4  5
>> 6:9
ans =  6  7  8  9
>> 2:2:11  (initial value, increment, final value)
an =  2  4  6  8  10
>> 3:.5:6
ans =  3.0000  3.5000  4.0000  4.5000  5.0000  5.5000  6.0000
>> 9:-1:4
ans =  9  8  7  6  5  4
>> val(1:3)
an =  1  3  5
>> val_2=1:14;  (Semicolon suppresses the output)
>> val_2=1:1001;
>> val_2(56:89)  (Retrieve a subset of a set)
an =
Columns 1 through 16
  56  57  58  59  60  61  62  63  64  65  66  67  68  69  70  71
Columns 17 through 32
  72  73  74  75  76  77  78  79  80  81  82  83  84  85  86  87
Columns 33 through 34
  88  89
>> x_val=1:1000;
>> y_val=x_val.^2;
>> y_val(21)
an = 441
>> plot(x_val,y_val)
>> title('square')
>> xlabel('x-axis')
>> ylabel('y-axis')
>> x_val=1:1000;
>> y_val=x_val.^3;
>> plot(x_val,y_val,'g')

>> title('function')

>> mylist=[3 4 7 -2 8]
mylist =  3  4  7  -2  8
>> mylist=[mylist,4 6 19]
mylist = 3 4 7 -2 8 4 6 19

>> mylist(5)=[] (Removes 5-th element)
mylist = 3 4 7 -2 4 6 19

>> big=find(mylist > 6)
big = 3 7 (positions where value is greater than 6)

>> big = mylist > 6
big = 0 0 1 0 0 0 1

>> mylist(big)=[]
mylist = 3 4 -2 4 6

>> mylist=ceil(rand(1,10)) (Randomly takes value; 1 row and 10 columns)
mylist = 1 1 1 1 1 1 1 1 1 1