Lecture 2

```
1\2
```

```
ans = 2
```

```
-5^2
```

```
ans = -25
```

```
(-5)^2
```

```
ans = 25
```

```
10-6/2
```

```
ans = 7
```

```
5*4/2*3
```

```
ans = 30
```

```
abs(-6)
```

```
ans = 6
```

```
abs = 11
```

```
abs = 11
```

```
clear abs
abs(-6)
```

```
ans = 6
```

```
plus(2,5)
```

```
ans = 7
```

```
3 == 5 + 2
```

```
ans = logical
   0
```

```
'b' < 'a'+1
```

```
ans = logical
   0
```

```
10 > 5 + 2
```

```
ans = logical
   1
```

```
(10 > 5) + 2
```

```
ans = 3
```

```
'c' == 'd' - 1 && 2 < 4
```

```
ans = logical
   1
```

```
'c' == 'd' - 1 || 2 > 4
```

```
ans = logical
   1
```

```
xor ( 'c' == 'd' - 1, 2> 4)
```

```
ans = logical
   1
```

```
xor ('c' == 'd' - 1, 2 <4)
```

```
ans = logical
   0
```

```
10 > 5> 2
```

```
ans = logical
   0
```

Lecture 3

```
v = [1 2 3 4]
```

```
v = 1×4
     1     2     3     4
```

```
v = [1,2,3,4]
```

```
v = 1×4
     1     2     3     4
```

```
vec = 2:6
```

```
vec = 1×5
     2     3     4     5     6
```

```
nv = 1:2:9
```

```
nv = 1×5
     1     3     5     7     9
```

```
ls = linspace(3,15,5)
```

```
ls = 1×5
     3     6     9    12    15
```

```
newvec = [nv ls]
```

```
newvec = 1×10
     1     3     5     7     9     3     6     9    12    15
```

```
logspace(1,4,4)
```

```
ans = 1×4
          10         100        1000       10000
```

Lecture 4

```
load('durer')
load('durer','X','map')
format short
x= (1:10)'
```

```
x = 10×1
     1
     2
     3
     4
     5
     6
     7
     8
     9
    10
```

```
logs = [x log10(x)]
```

```
logs = 10×2
    1.0000         0
    2.0000    0.3010
    3.0000    0.4771
    4.0000    0.6021
    5.0000    0.6990
    6.0000    0.7782
    7.0000    0.8451
    8.0000    0.9031
    9.0000    0.9542
   10.0000    1.0000
```

```
headers = ['Author Last Name, Author First Name,' ...
'Author Middle Initial']
```

```
headers =
'Author Last Name, Author First Name,Author Middle Initial'
```

Lecture 5

```
matrix = [1 2 3 ; 4 5 6 ; 7 8 9]
```

```
matrix = 3×3
     1     2     3
     4     5     6
     7     8     9
```

```
A = [2 -3 5; -1 4 5]
```

```
A = 2×3
     2    -3     5
    -1     4     5
```

```
x = [1 4 7]
```

```
x = 1×3
     1     4     7
```

```
x = [1;4;7]
```

```
x = 3×1
     1
     4
     7
```

```
cd=6; e=3; h=4;
Mat=[e cd*h cos(pi/3) ; h^2 sqrt(h*h/cd) 14]
```

```
Mat = 2×3
    3.0000   24.0000    0.5000
   16.0000    1.6330   14.0000
```

```
a = [1 2;3 4]
```

```
a = 2×2
     1     2
     3     4
```

```
b = [4 6;8 9]
```

```
b = 2×2
     4     6
     8     9
```

```
A = [a,b]
```

```
A = 2×4
     1     2     4     6
     3     4     8     9
```

```
B = [a;b]
```

```
B = 4×2
     1     2
     3     4
     4     6
     8     9
```

```
x = [1:2:10]
```

```
x = 1×5
     1     3     5     7     9
```

```
y = 1:5
```

```
y = 1×5
     1     2     3     4     5
```

```
x = 1:5:50
```

```
x = 1×10
     1     6    11    16    21    26    31    36    41    46
```

```
1:5:50
```

```
ans = 1×10
     1     6    11    16    21    26    31    36    41    46
```

```
x = 9:-2:1
```

```
x = 1×5
     9     7     5     3     1
```

```
a = zeros(4,3)
```

```
a = 4×3
     0     0     0
     0     0     0
     0     0     0
     0     0     0
```

```
b = ones(4,3)
```

```
b = 4×3
     1     1     1
     1     1     1
     1     1     1
     1     1     1
```

```
c = rand(4,3)
```

```
c = 4×3
    0.1966    0.3517    0.9172
    0.2511    0.8308    0.2858
    0.6160    0.5853    0.7572
    0.4733    0.5497    0.7537
```

```
d = eye(4)
```

```
d = 4×4
     1     0     0     0
     0     1     0     0
     0     0     1     0
     0     0     0     1
```

```
e = magic(4)
```

```
e = 4×4
    16     2     3    13
     5    11    10     8
     9     7     6    12
     4    14    15     1
```

```
mat = [4 3 1;2 5 6]
```

```
mat = 2×3
     4     3     1
     2     5     6
```

```
mat = [2:4;3:5]
```

```
mat = 2×3
     2     3     4
```

```
     3     4     5
```

```
intmat = [100 77;28 14]
```

```
intmat = 2×2
   100    77
    28    14
```

```
intmat(1)
```

```
ans = 100
```

```
intmat(2)
```

```
ans = 28
```

```
intmat(3)
```

```
ans = 77
```

```
intmat(4)
```

```
ans = 14
```

```
vec = -2:1
```

```
vec = 1×4
    -2    -1     0     1
```

```
length(vec)
```

```
ans = 4
```

```
size(vec)
```

```
ans = 1×2
     1     4
```

```
mat = [1:3;5:7]'
```

```
mat = 3×2
     1     5
     2     6
     3     7
```

```
[r,c] = size(mat)
```

```
r = 3
c = 2
```

```
size(mat)
```

```
ans = 1×2
     3     2
```

```
zeros(size(mat))
```

```
ans = 3×2
     0     0
```

```
     0     0
     0     0
```

```
v = 9:-2:1
```

```
v = 1×5
     9     7     5     3     1
```

```
numel(v)
```

```
ans = 5
```

```
mat = [1:3;44 9 2;5:-1:3]
```

```
mat = 3×3
     1     2     3
    44     9     2
     5     4     3
```

```
mat(3,2)
```

```
ans = 4
```

```
mat(2,:)
```

```
ans = 1×3
    44     9     2
```

```
size(mat)
```

```
ans = 1×2
     3     3
```

```
mat(:,4) = [8;11;33]
```

```
mat = 3×4
     1     2     3     8
    44     9     2    11
     5     4     3    33
```

```
numel(mat)
```

```
ans = 12
```

```
v = mat(3,:)
```

```
v = 1×4
     5     4     3    33
```

```
v(v(2))
```

```
ans = 33
```

```
v(1) = []
```

```
v = 1×3
     4     3    33
```

```
reshape(mat,2,6)
```

```
ans = 2×6
     1     5     9     3     3    11
    44     2     4     2     8    33
```

Lecture 6

```
mat = [1 :3; 44 9 2; 5:-1:3]
```

```
mat = 3×3
     1     2     3
    44     9     2
     5     4     3
```

```
max(mat)
```

```
ans = 1×3
    44     9     3
```

```
max(max(mat))
```

```
ans = 44
```

```
cumsum(mat)
```

```
ans = 3×3
     1     2     3
    45    11     5
    50    15     8
```

```
cummin(mat)
```

```
ans = 3×3
     1     2     3
     1     2     2
     1     2     2
```

```
cumprod(mat)
```

```
ans = 3×3
     1     2     3
    44    18     6
   220    72    18
```

```
mat = randi(20,2,3)
```

```
mat = 2×3
     8     9     5
    11     2     3
```

```
diff(mat)
```

```
ans = 1×3
     3    -7    -2
```

```
zeros(5)*10
```

```
ans = 5×5
     0     0     0     0     0
     0     0     0     0     0
```

```
     0     0     0     0     0
     0     0     0     0     0
     0     0     0     0     0
```

```
vec = [2:12]
```

```
vec = 1×11
     2     3     4     5     6     7     8     9    10    11    12
```

```
vec = vec - 3
```

```
vec = 1×11
    -1     0     1     2     3     4     5     6     7     8     9
```

```
mat = [1 :3; 44 9 2; 5:-1:3]
```

```
mat = 3×3
     1     2     3
    44     9     2
     5     4     3
```

```
mat/3
```

```
ans = 3×3
    0.3333    0.6667    1.0000
   14.6667    3.0000    0.6667
    1.6667    1.3333    1.0000
```

```
mat.^2
```

```
ans = 3×3
           1           4           9
        1936          81           4
          25          16           9
```

```
vec=[5 9 3 4 6 11]
```

```
vec = 1×6
     5     9     3     4     6    11
```

```
v = [0 1 0 0 1 1]
```

```
v = 1×6
     0     1     0     0     1     1
```

```
v = logical(v)
```

```
v = 1×6 logical array
   0   1   0   0   1   1
```

```
vec(v)
```

```
ans = 1×3
     9     6    11
```

```
find(vec>9)
```

```
ans = 6
```

```
find(vec<9)
```

```
ans = 1×4
     1     3     4     5
```

```
vec(vec<0) = []
```

```
vec = 1×6
     5     9     3     4     6    11
```

```
neg = find(vec<0)
```

```
neg =

  1×0 empty double row vector
```

```
vec(neg) = []
```

```
vec = 1×6
     5     9     3     4     6    11
```

```
A = [1 4;3 3]
```

```
A = 2×2
     1     4
     3     3
```

```
B = [1 2;-1 0]
```

```
B = 2×2
     1     2
    -1     0
```

```
A.*B
```

```
ans = 2×2
     1     8
    -3     0
```

```
A*B
```

```
ans = 2×2
    -3     2
     0     6
```

```
B*A
```

```
ans = 2×2
     7    10
    -1    -4
```

Lecture 7

```
mat = randi(100,3,4)
```

```
mat = 3×4
    89    17    51    69
     3    98    48     5
    49    72     6     8
```

```
rot90(mat)
```

```
ans = 4×3
    69     5     8
    51    48     6
    17    98    72
    89     3    49
```

```
rot90(mat,2)
```

```
ans = 3×4
     8     6    72    49
     5    48    98     3
    69    51    17    89
```

```
rot90(mat,-1)
```

```
ans = 4×3
    49     3    89
    72    98    17
     6    48    51
     8     5    69
```

```
fliplr(mat)
```

```
ans = 3×4
    69    51    17    89
     5    48    98     3
     8     6    72    49
```

```
flipud(mat)
```

```
ans = 3×4
    49    72     6     8
     3    98    48     5
    89    17    51    69
```

```
vec = []
```

```
vec =

     []
```

```
length(vec)
```

```
ans = 0
```

```
vec = 1:10
```

```
vec = 1×10
     1     2     3     4     5     6     7     8     9    10
```

```
vec(4) = []
```

```
vec = 1×9
     1     2     3     5     6     7     8     9    10
```

```
vec = 3:15
```

```
vec = 1×13
```

```
     3     4     5     6     7     8     9    10    11    12    13    14    15
```

```
vec(9:12) = []
```

```
vec = 1×9
     3     4     5     6     7     8     9    10    15
```

```
mat = randi(100,3,4)
```

```
mat = 3×4
    53    82    66    65
    10    73    52    81
    82    15    98    46
```

```
mat(:,2) = []
```

```
mat = 3×3
    53    66    65
    10    52    81
    82    98    46
```

```
vec = -5:1
```

```
vec = 1×7
    -5    -4    -3    -2    -1     0     1
```

```
abs(vec)
```

```
ans = 1×7
     5     4     3     2     1     0     1
```

```
mat = [-4 2 8;0 -10 -42;-9 15 0]
```

```
mat = 3×3
    -4     2     8
     0   -10   -42
    -9    15     0
```

```
sign(mat)
```

```
ans = 3×3
    -1     1     1
     0    -1    -1
    -1     1     0
```

```
str1 = "hello"
```

```
str1 =
"hello"
```

```
str2 = "howdy"
```

```
str2 =
"howdy"
```

```
str1 == str2
```

```
ans = logical
   0
```

```
A = [3 2 -1;2 -2 1;-1 -0.5 -1]
```

```
A = 3×3
    3.0000    2.0000   -1.0000
    2.0000   -2.0000    1.0000
   -1.0000   -0.5000   -1.0000
```

```
B = [1;-2;0]
```

```
B = 3×1
     1
    -2
     0
```

```
X = A\B
```

```
X = 3×1
   -0.2000
    0.7200
   -0.1600
```

```
C = A*X
```

```
C = 3×1
    1.0000
   -2.0000
    0.0000
```

```
A = [1 2 3;3 3 4;2 3 3]
```

```
A = 3×3
     1     2     3
     3     3     4
     2     3     3
```

```
B = [1;1;2]
```

```
B = 3×1
     1
     1
     2
```

```
C = B\A
```

```
C = 1×3
    1.3333    1.8333    2.1667
```

```
linsolve(A,B)
```

```
ans = 3×1
   -0.5000
    1.5000
   -0.5000
```

```
transpose(C)
```

```
ans = 3×1
    1.3333
```

```
    1.8333
    2.1667
```

```
A = [3 -3 4;2 -3 4;0 -1 1]
```

```
A = 3×3
     3    -3     4
     2    -3     4
     0    -1     1
```

```
[v,d] = eig(A)
```

```
v = 3×3 complex
   0.8944 + 0.0000i   0.3536 - 0.3536i   0.3536 + 0.3536i
  -0.0000 + 0.0000i   0.7071 + 0.0000i   0.7071 + 0.0000i
  -0.4472 + 0.0000i   0.3536 + 0.3536i   0.3536 - 0.3536i
d = 3×3 complex
   1.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 + 0.0000i
   0.0000 + 0.0000i  -0.0000 + 1.0000i   0.0000 + 0.0000i
   0.0000 + 0.0000i   0.0000 + 0.0000i  -0.0000 - 1.0000i
```

```
A = A.^2
```

```
A = 3×3
     9     9    16
     4     9    16
     0     1     1
```

```
[v,d] = eig(A)
```

```
v = 3×3
   -0.8242    0.9351   -0.0899
   -0.5651   -0.3322   -0.8440
   -0.0379   -0.1235    0.5287
d = 3×3
   15.9070         0         0
         0    3.6894         0
         0         0   -0.5964
```

```
round(rand*[20,35])
```

```
ans = 1×2
     3     4
```

```
x = 4
```

```
x = 4
```

```
3<x<5
```

```
ans = logical
   1
```

```
3 == 5+2
```

```
ans = logical
   0
```

```
'b' < 'a' + 1
```

```
ans = logical
   0
```

```
10 > 5 + 2
```

```
ans = logical
   1
```

```
(10>5) + 2
```

```
ans = 3
```

```
'c' == 'd' -1 && 2 < 4
```

```
ans = logical
   1
```

```
'c' == 'd' -1 | 2>4
```

```
ans = logical
   1
```

```
xor('c' == 'd' - 1, 2>4)
```

```
ans = logical
   1
```

```
xor('c' == 'd' - 1, 2<4)
```

```
ans = logical
   0
```

```
10>5> 2
```

```
ans = logical
   0
```

```
'b' >= 'c'- 1
```

```
ans = logical
   1
```

```
rand*(50-20)+20
```

```
ans = 47.4013
```

```
mat = [1 :3; 44 9 2; 5:-1:3]
```

```
mat = 3×3
     1     2     3
    44     9     2
     5     4     3
```

```
mat (3 , 2)
```

```
ans = 4
```

```
mat (2, : )
```

```
ans = 1×3
    44     9     2
```

```
size (mat)
```

```
ans = 1×2
     3     3
```

```
mat ( : , 4) = [8 ; 11;33]
```

```
mat = 3×4
     1     2     3     8
    44     9     2    11
     5     4     3    33
```

```
numel (mat )
```

```
ans = 12
```

```
v = mat (3, : )
```

```
v = 1×4
     5     4     3    33
```

```
v (v (2) )
```

```
ans = 33
```

```
v (1) = []
```

```
v = 1×3
     4     3    33
```

```
reshape (mat , 2 , 6)
```

```
ans = 2×6
     1     5     9     3     3    11
    44     2     4     2     8    33
```

```
ones(2)*10
```

```
ans = 2×2
    10    10
    10    10
```

```
A = [1,4;3,3]
```

```
A = 2×2
     1     4
     3     3
```

```
B = [1 2;-1 0]
```

```
B = 2×2
     1     2
    -1     0
```

```
A.*B
```

```
ans = 2×2
     1     8
    -3     0
```

```
A*B
```

```
ans = 2×2
    -3     2
     0     6
```

```
B*A
```

```
ans = 2×2
     7    10
    -1    -4
```

```
vec = 3:15
```

```
vec = 1×13
     3     4     5     6     7     8     9    10    11    12    13    14    15
```

```
vec(8:12) = []
```

```
vec = 1×8
     3     4     5     6     7     8     9    15
```

```
mat = [1:3;44 9 2; 5:-1:3]
```

```
mat = 3×3
     1     2     3
    44     9     2
     5     4     3
```

```
mat(:,2) = []
```

```
mat = 3×2
     1     3
    44     2
     5     3
```

```
vec = -5:1
```

```
vec = 1×7
    -5    -4    -3    -2    -1     0     1
```

```
abs(vec)
```

```
ans = 1×7
     5     4     3     2     1     0     1
```

```
mat = [-4 2 8;0 -10 -42;-9 15 0]
```

```
mat = 3×3
    -4     2     8
     0   -10   -42
    -9    15     0
```

```
sign(mat)
```

```
ans = 3×3
```

```
    -1     1     1
     0    -1    -1
    -1     1     0
```

```
str1 = "hello"
```

```
str1 =
"hello"
```

```
str2 = "howdy"
```

```
str2 =
"howdy"
```

```
str1 == str2
```

```
ans = logical
   0
```