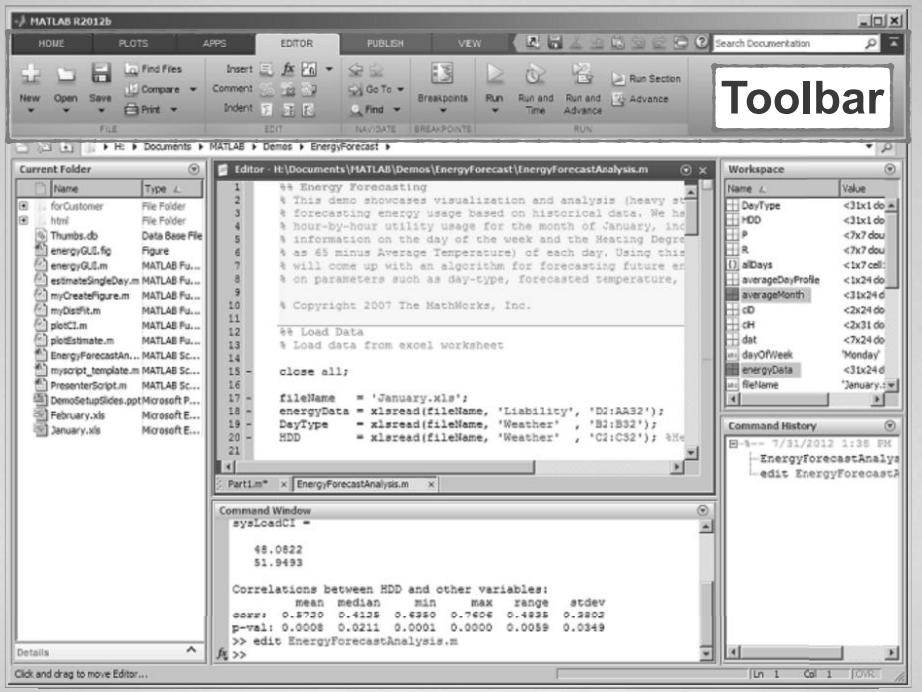
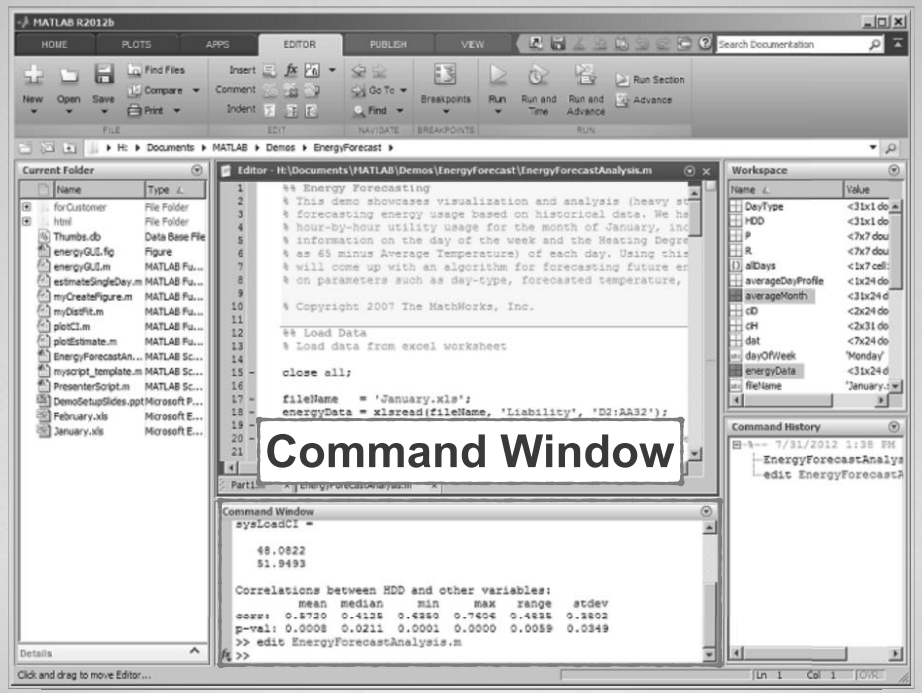
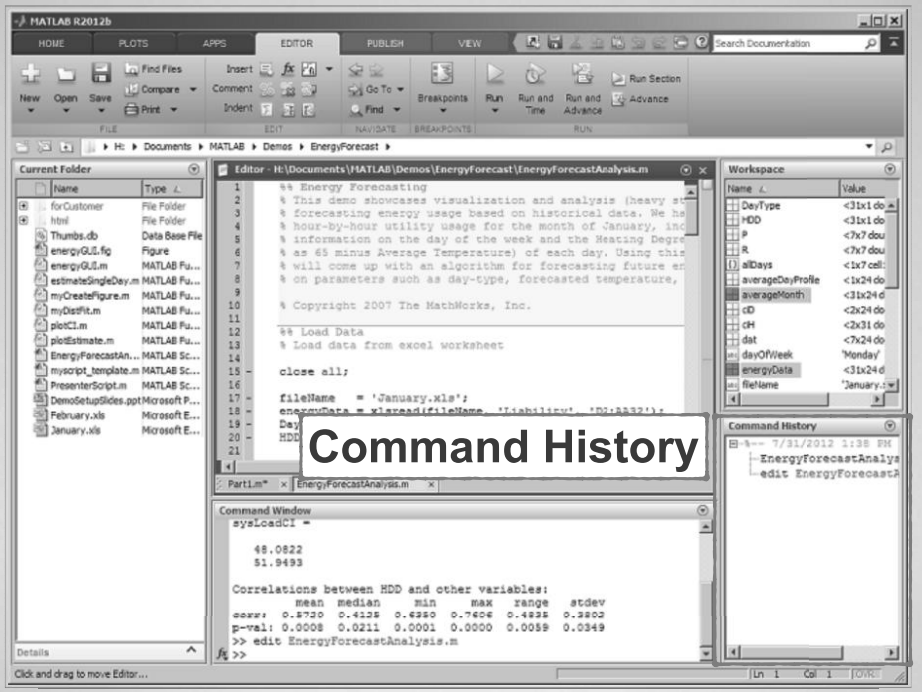
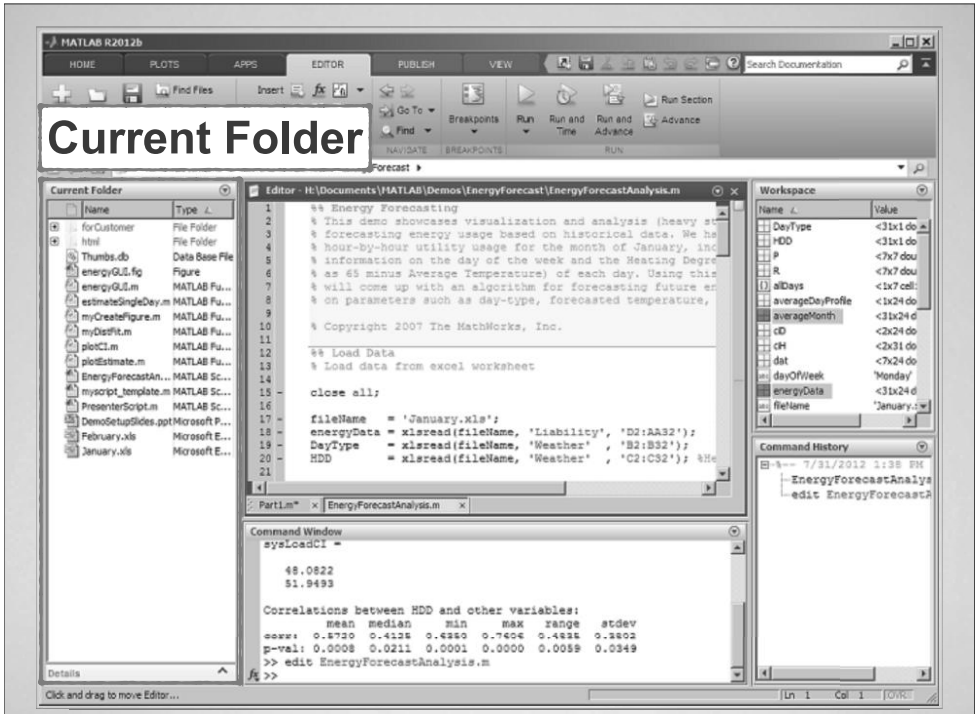
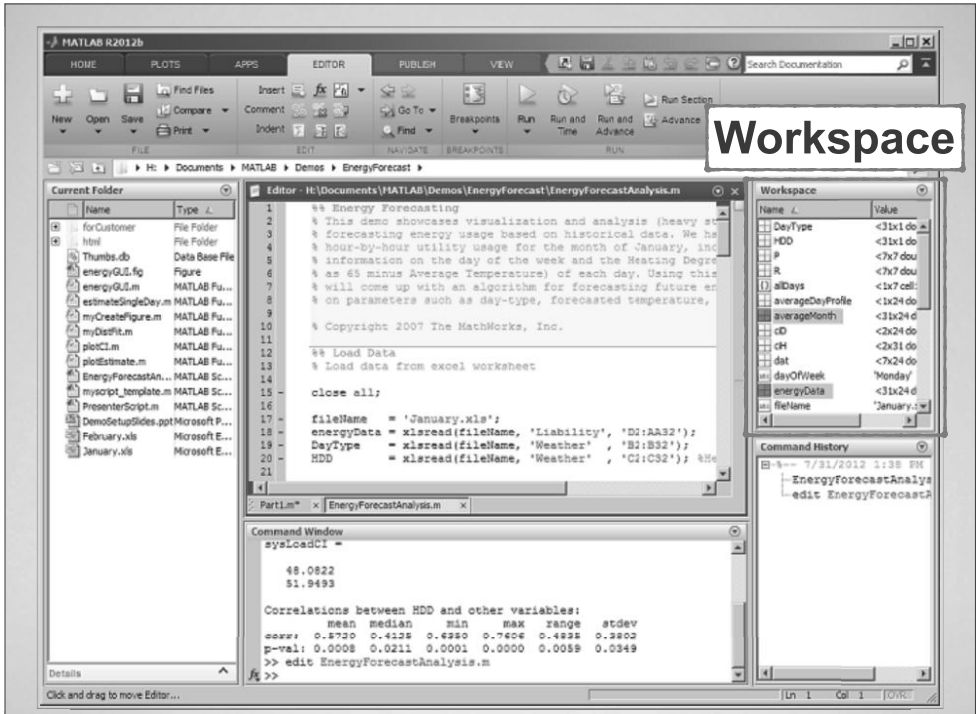
Matlab

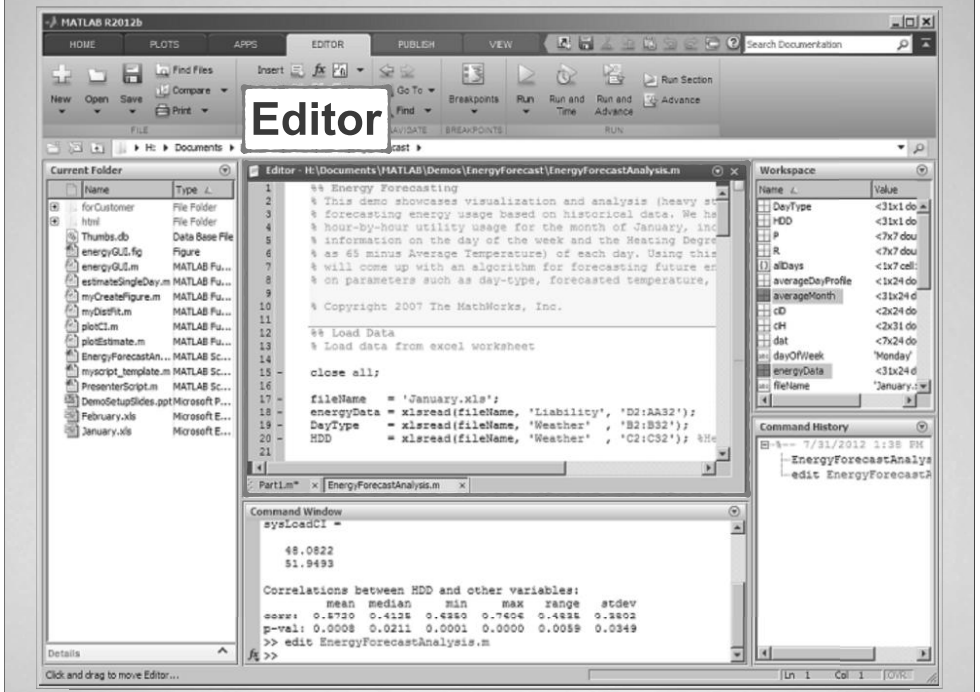


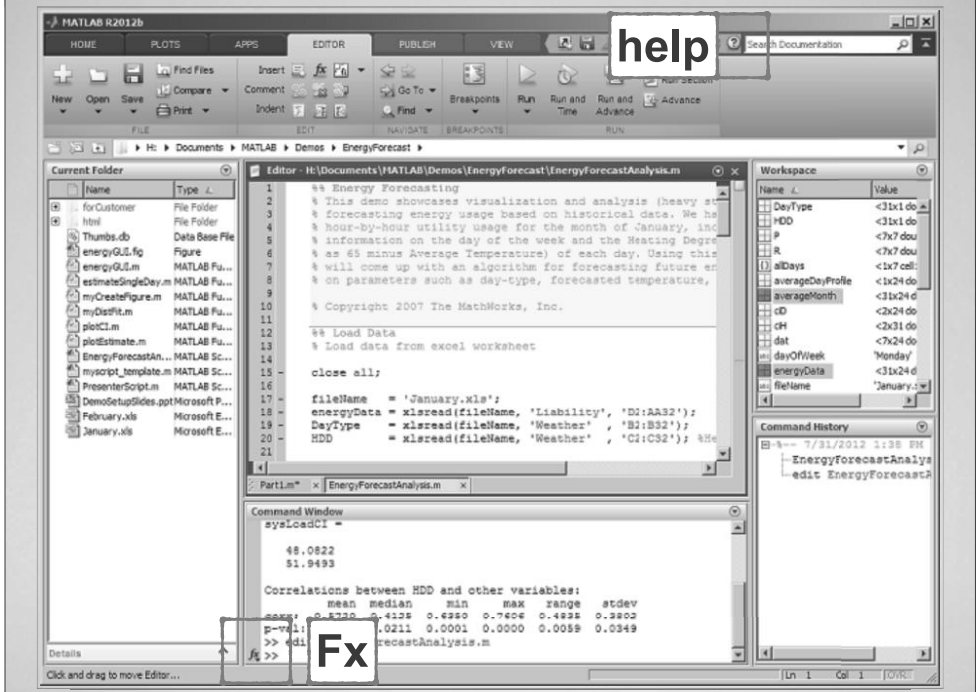




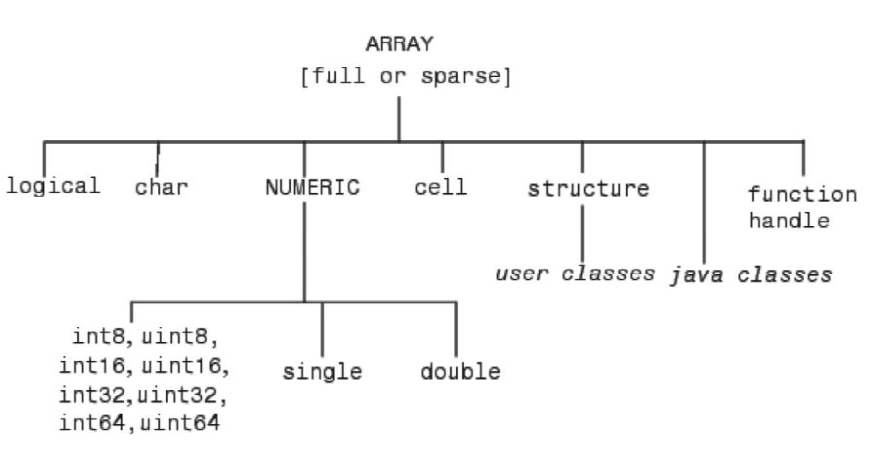

Current Folder


Workspace


Editor


help
Fx

ชนิดของข้อมูล



การสร้างตัวแปร

```
>> a = 5
a =
     5
```

```
>> c = uint8(a)
a =
     5
```

```
>> b = 'text'
a =
text
```

```
>> d = uint8('a')
a =
    97
```

>> whos % แสดงรายละเอียดตัวแปรใน Workspace

การสร้างอาร์เรย์ 1 มิติ

```
>> x = [1 2 3 4]
x =
     1   2   3   4
```

```
>> x = [1,2,3,4]
x =
     1   2   3   4
```

```
>> x = [1;2;3;4]
x =
     1
     2
     3
     4
```

การสร้างอาร์เรย์ 2 มิติ

```
>> y = [1,2,3; 4,5,6]
y =
     1   2   3
     4   5   6
```

```
>> y(3) = 7
y =
     1   7   3
     4   5   6
```

```
>> y(3)
ans =
     2
```

```
>> y(2,3) = 10
y =
     1   7   3
     4   5  10
```

* จะใช้ commas (,) และ semicolons (;)

การสร้างอาร์เรย์ 3 มิติ

```
>> z(:,:,1) = [1,2; 3,4];
>> z(:,:,2) = [5,6; 7,8];
>> z(:,:,3) = [9,10; 11,12];
```

```
z(:,:,1) =
     1     2
     3     4
z(:,:,2) =
     5     6
     7     8
z(:,:,3) =
     9    10
    11    12
```

ขนาดของมิติ

```
>> a = [1 2 3; 4 5 6]
a =
     1     2     3
     4     5     6
```

```
>> [x, y] = size(a)
x =
     2
y =
     3
```

```
>> size(a,1)
ans =
     2
```

```
>> size(a,2)
ans =
     3
```

Arithmetic Operators

Assignment =	`a = b` (assign `b` to `a`)
Addition +	`a+b`
Subtraction –	`a-b`
Multiplication * or .*	`a*b` or `a.*b`
Division / or ./	`a/b` or `a./b`
Power ^ or .^	`a^b` or `a.^b`

การคูณและหารในเวคเตอร์

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

```
c = b*b
c =
     7    10
    15    22
```

```
d = b.*b
d =
     1     4
     9    16
```

```
e = b./b
e =
     1     1
     1     1
```

Comparison Operators

Less Than	<
Less Than or Equal	<=
Greater Than	>
Greater Than or Equal	>=
Equal To	==
Not Equal To	~=

Logical Operators

not	~
and	&&
or	||

Conditional Structures

```
if expression cond.
   sentences
elseif expr. cond.
   sentences
else
   sentences
end
```

```
a = input('a = ');
b = input('b = ');
if a == b,
   fprintf('a is equal to b\n');
elseif a > 0 && b > 0
   fprintf('both positive\n');
else
   fprintf('other case\n');
end
```

Conditional Structures

```
for variable = expr
   sentence;
   ...
   sentence;
end
```

```
M = rand(4,4);
suma = 0;

for i = 1:4
   for j = 1:4
      suma = suma + M(i,j);
   end
end

fprintf('sum = %d\n',suma);
```

Conditional Structures

```
while expr
   sentence;
   ...
   sentence;
end
```

```
M = rand(4,4);
i = 1; j = 1; suma = 0;

while i <= 4
   while j <= 4
      suma = suma + M(i,j);
      j = j+1;
   end
   i = i+1;
end

fprintf('suma = %f\n',suma);
```

M-files

Text files containing Matlab programs. Can be called form the command line or from other M-files

- Present ".m" extension
- Two kind of M-files:
  - Scripts
  - Functions

M-files: Script

- Without input arguments, they do not return any value

filename.m

```
x = [4 3 2 10 -1];
n = length(x);
suma1 = 0; suma2 = 0;
for i=1:n
   suma1 = suma1 + x(i);
   suma2 = suma2 + x(i)*x(i);
end
promig = suma1/n;
desvia = sqrt(suma2/n – promig*promig);
```

M-files: Function

```
function [out1, out2, ..., outN] = name-function (par1, par2, ..., parM)
   sentence;
   ....
   sentence;
end
```

fn_sum.m

```
function [x,y] = fn_sum(a,n)
   x = 0; y = 0;
   for i=1:n
      x = x + a(i); % sum ai
      y = y + a(i)*a(i); % sum ai^2
   end
end
```

Image Processing Toolbox

imread Read image from graphics file

imread(filename)

imshow Display image

imshow(filename)

```
A = imread('tire.tif');
imshow(A)
```

tire.tif

Image Processing Toolbox

imwrite Write image to graphics file

imwrite(A,filename)

imfinfo Information about graphics file

info = imfinfo(filename)

```
imwrite(A, 'tire.jpg');
imfinfo('tire.jpg');
```

tire.jpg

Image Processing Toolbox

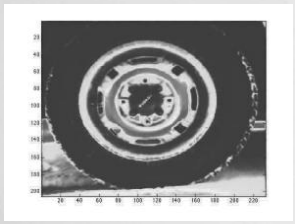
imagesc Scale data and display image object

imagesc(C)

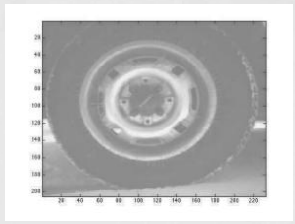
colormap Set and get current colormap

colormap(map)

```
imagesc(A);
colormap(summer);
```



imagesc



colormap

map

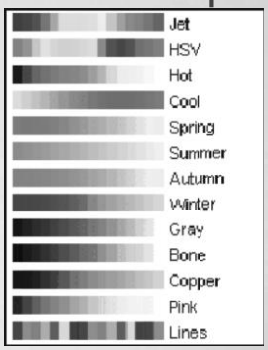


Image Processing Toolbox

rgb2gray Convert RGB image or colormap to grayscale

I = rgb2gray(RGB)

im2bw Convert image to binary image, based on threshold

BW = im2bw(I, level)

```
Acolor = imread('peppers.png');
imshow(Acolor);
```

```
Agray = rgb2gray(Acolor);
imshow(Agray);
```

```
Abw = im2bw(Agray);
imshow(Abw);
```

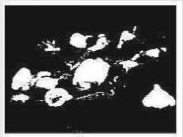


Image Processing Toolbox

subplot Create axes in tiled positions

subplot(m,n,p)

title Add title to current axes

title(str)

```
subplot(1,3,1);
imshow(Acolor); title('Color Image');
subplot(1,3,2);
imshow(Agray); title('Gray Image');
subplot(1,3,3);
imshow(Abw); title('Binary Image');
```