Starting With MATLAB

By

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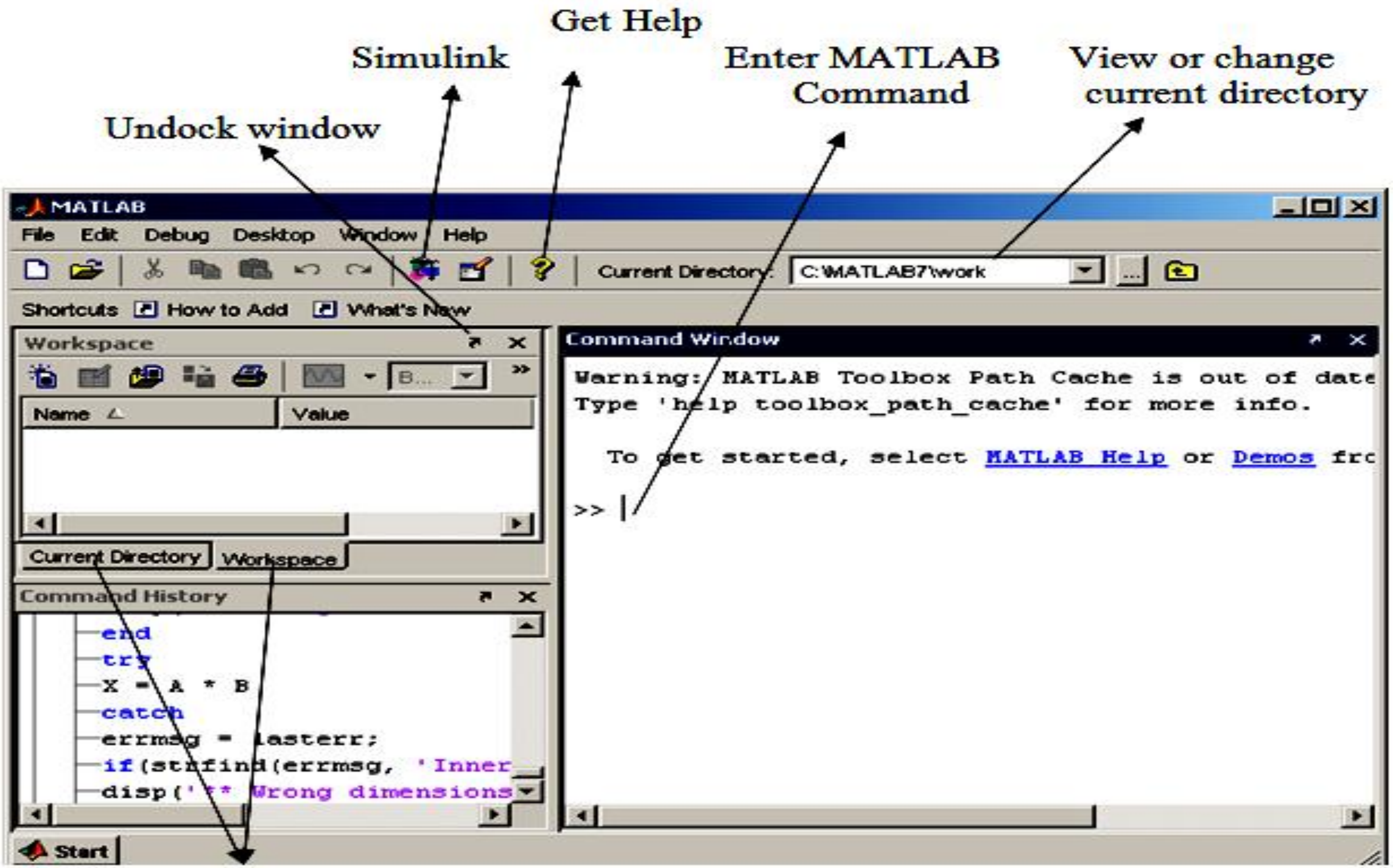
Objectives

- Introduction
- Basic Commands
- Variables
- Keywords
- Numbers
- Vector and Matrices
- Multidimensional Array
- Summery

Introduction



```
Warning: MATLAB Toolbox Path Cache is out of date
Type 'help toolbox_path_cache' for more info.

  To get started, select MATLAB Help or Demos fro

>> |
```

```
  end
  try
  X = A * B
  catch
  errmsg = lasterr;
  if(strfind(errmsg, 'Inner
  disp('** Wrong dimensions
```

Use tab to change workspace or current directory browser.

Cont..

- Start Button( ): -

Start button works like the start button on windows desktop. It allows us to access MATLAB tool, desktop tools, demos, block sets, help files, and toolboxes etc. To select a particular tool, click on start button, select the appropriate tool for required submenu.

Cont..

- Desktop Preferences:

  You can specify certain characteristics for the desktop tools by selecting Preferences from the File menu. For example, you can specify the font characteristics for Command Window text, font color etc. For more information, click the Help button in the Preferences dialog box.

Cont..

- The following tools are managed by the MATLAB desktop:

 * Command window

 * Command History

 * Current Directory Browser

 * Workspace Browser

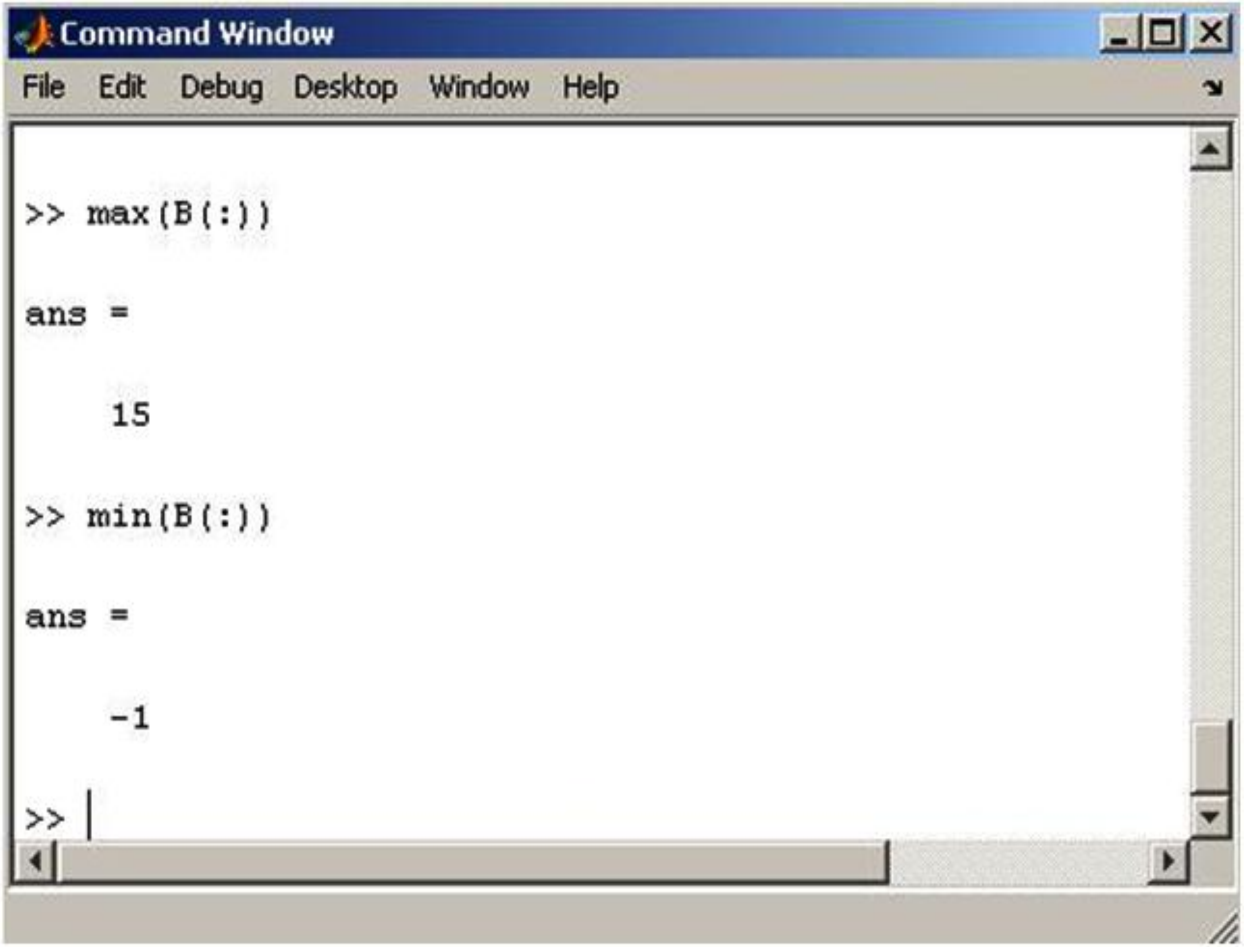
 * Array editor

 * Help Browser

 * Editor/Debugger

Cont..

- Command window:



```
>> max(B(:))

ans =

    15

>> min(B(:))

ans =

    -1

>> 
```

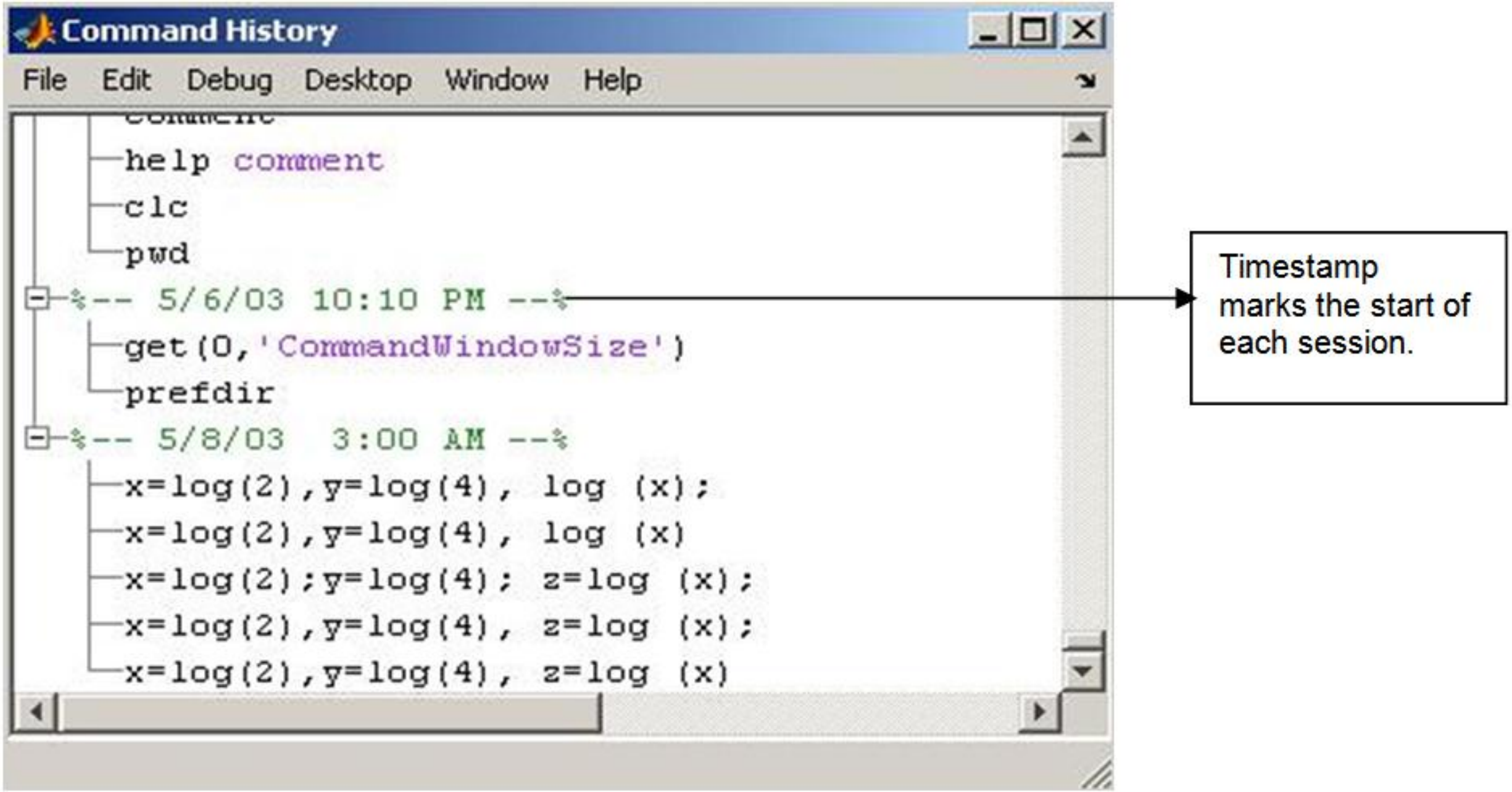
Cont..

- Command Window:

Command window is the main window, which displays command prompt to interact with user by the symbol >> (greater than greater than). On this prompt the MATLAB Commands and M-files run and display appropriate results.

Cont..

- Command History:



```
comment
help comment
clc
pwd
%-- 5/6/03 10:10 PM --%
get(0,'CommandWindowSize')
prefdir
%-- 5/8/03  3:00 AM --%
x=log(2),y=log(4), log (x);
x=log(2),y=log(4), log (x)
x=log(2);y=log(4); z=log (x);
x=log(2),y=log(4), z=log (x);
x=log(2),y=log(4), z=log (x)
```

Timestamp marks the start of each session.

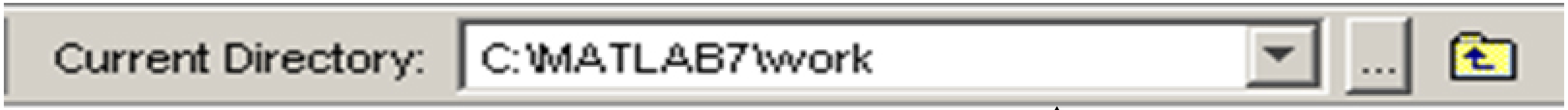
Cont..

- Command History:

This window stores the session wise command history in the command window. You can view all commands or lines or functions to execute in command window by using up and down arrow keys. The command presents in command history window can directly run in command window by selecting and double clicking. The command to be run, can also be selected, by giving first character of command name and up and down arrow keys.

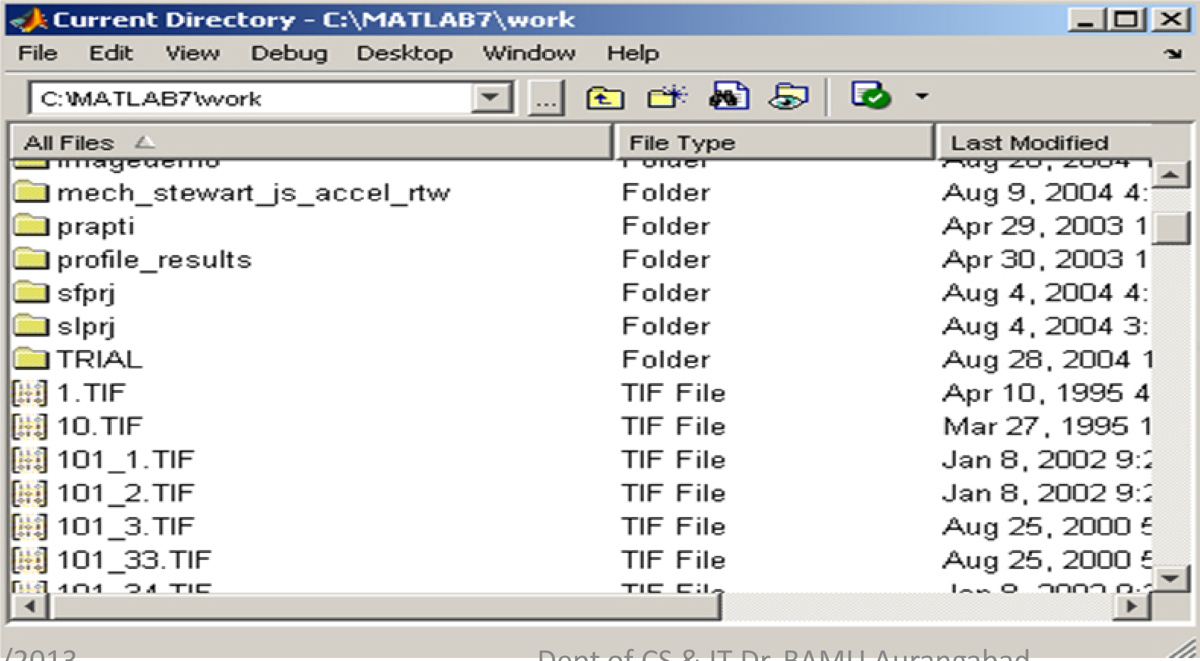
Cont..

- Current directory Browser:



Current Directory: C:\MATLAB7\work

Current Directory Field



Current Directory - C:\MATLAB7\work

C:\MATLAB7\work

All Files	File Type	Last Modified
imagedemo	Folder	Aug 26, 2004
mech_stewart_js_accel_rtw	Folder	Aug 9, 2004 4:
prapti	Folder	Apr 29, 2003 1
profile_results	Folder	Apr 30, 2003 1
sfprj	Folder	Aug 4, 2004 4:
slprj	Folder	Aug 4, 2004 3:
TRIAL	Folder	Aug 28, 2004 1
1.TIF	TIF File	Apr 10, 1995 4
10.TIF	TIF File	Mar 27, 1995 1
101_1.TIF	TIF File	Jan 8, 2002 9:
101_2.TIF	TIF File	Jan 8, 2002 9:
101_3.TIF	TIF File	Aug 25, 2000 5
101_33.TIF	TIF File	Aug 25, 2000 5
101_34.TIF	TIF File	Jan 8, 2002 9:

Current Directory Browser

Cont..

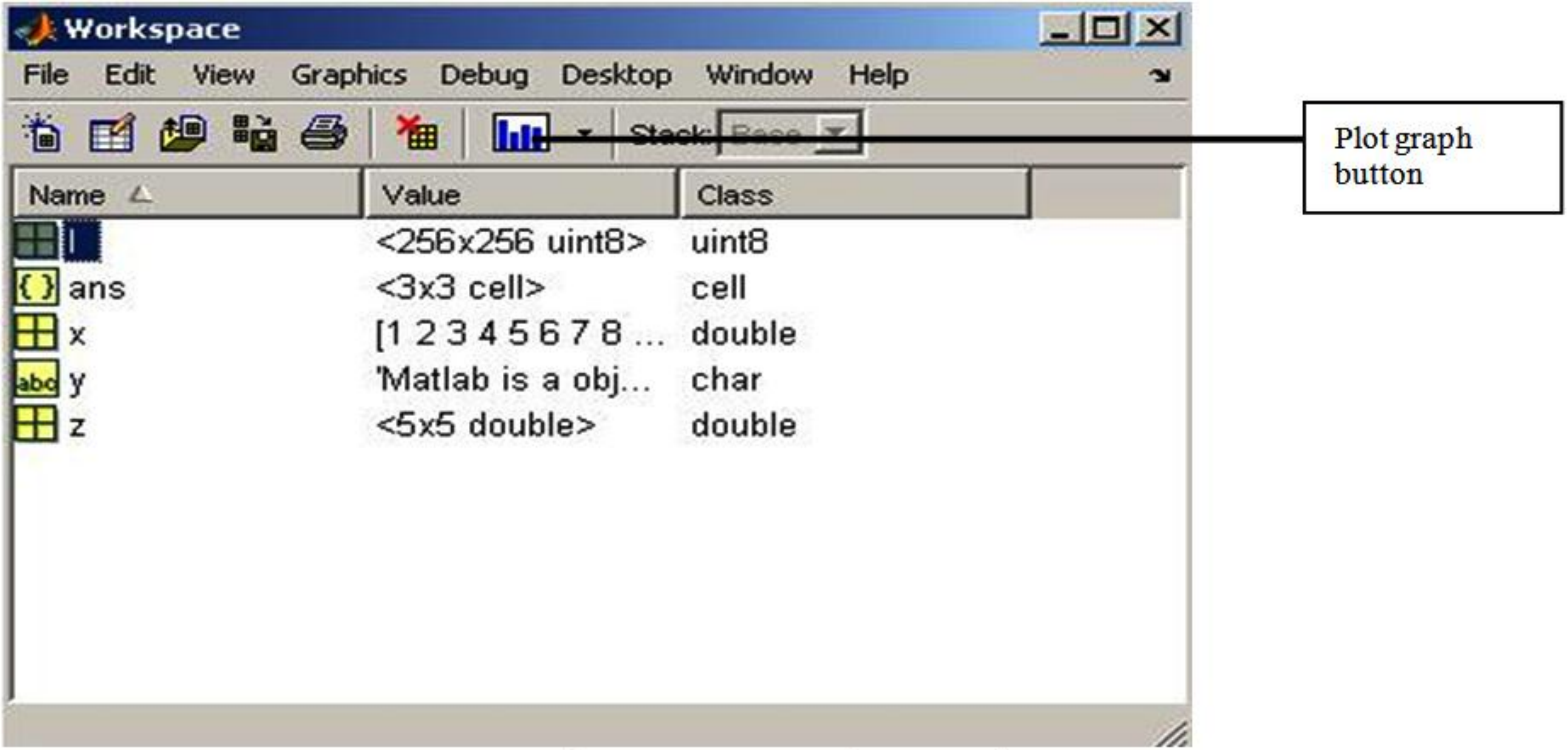
- Current directory Browser:

MATLAB file operations use the current directory and the search path as reference points. Any file that you want to run must either be in the current directory or on the search path. You can also change the current working directory. MATLAB's default working directory is work.

Any file that you want to run in MATLAB must reside in the current directory or in a directory that is on the search path. By default the files supplied with MATLAB and toolboxes are included in the search path.

Cont..

- Workspace Browser:



Name	Value	Class
I	<256x256 uint8>	uint8
ans	<3x3 cell>	cell
x	[1 2 3 4 5 6 7 8 ...	double
y	'Matlab is a obj...	char
z	<5x5 double>	double

Plot graph button

Cont..

- Workspace Browser:

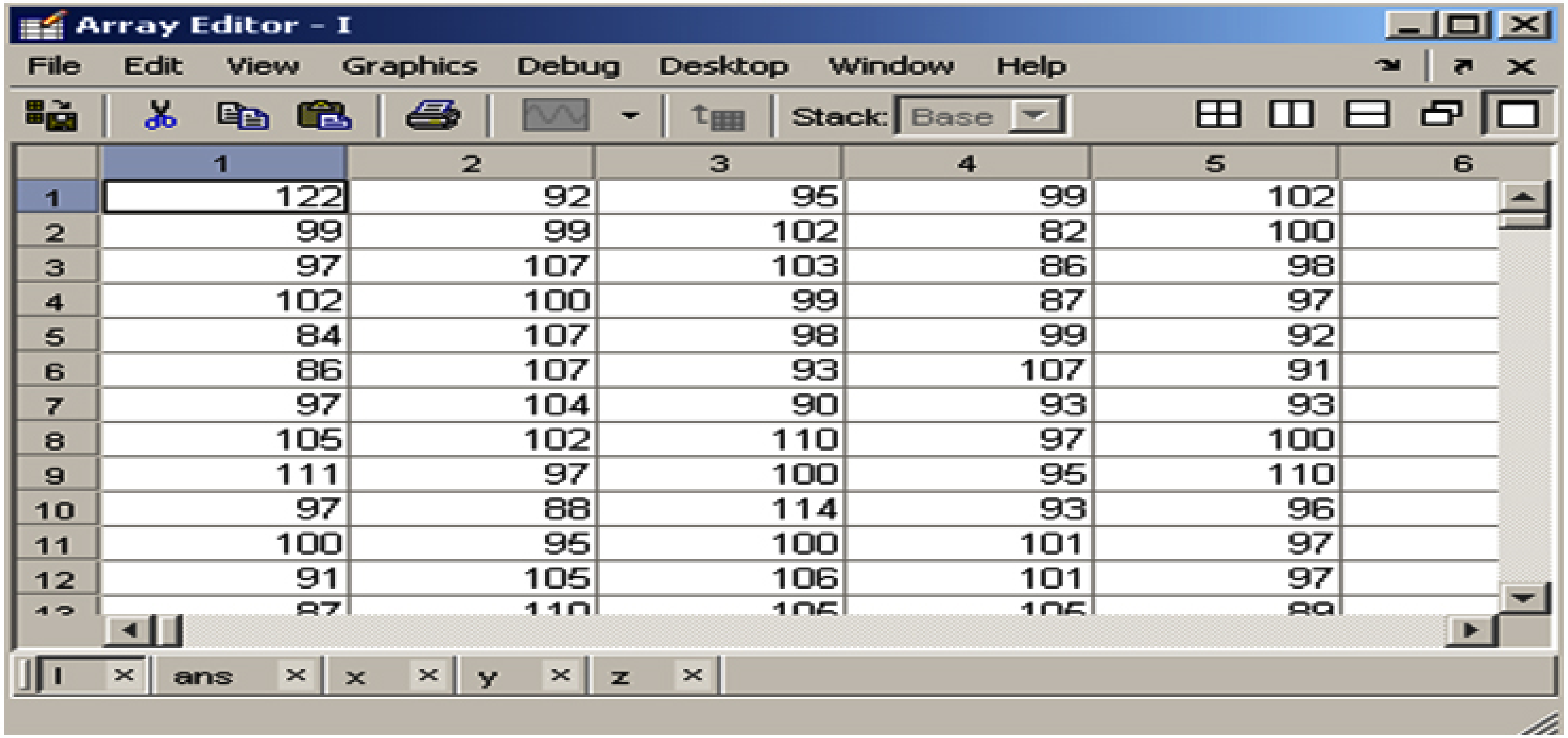
  The MATLAB Workspace consists of the complete collection of variables or set of variables created during the MATLAB session and stored in memory called as arrays.

  Workspace browser is used to view the workspace variables.

  The workspace browser shows the variable name, array size, its storage bytes and class. To view the workspace variables type the command who or whos.

Cont..

- Array Editor:



	1	2	3	4	5	6
1	122	92	95	99	102	
2	99	99	102	82	100	
3	97	107	103	86	98	
4	102	100	99	87	97	
5	84	107	98	99	92	
6	86	107	93	107	91	
7	97	104	90	93	93	
8	105	102	110	97	100	
9	111	97	100	95	110	
10	97	88	114	93	96	
11	100	95	100	101	97	
12	91	105	106	101	97	
13	87	110	106	106	89	

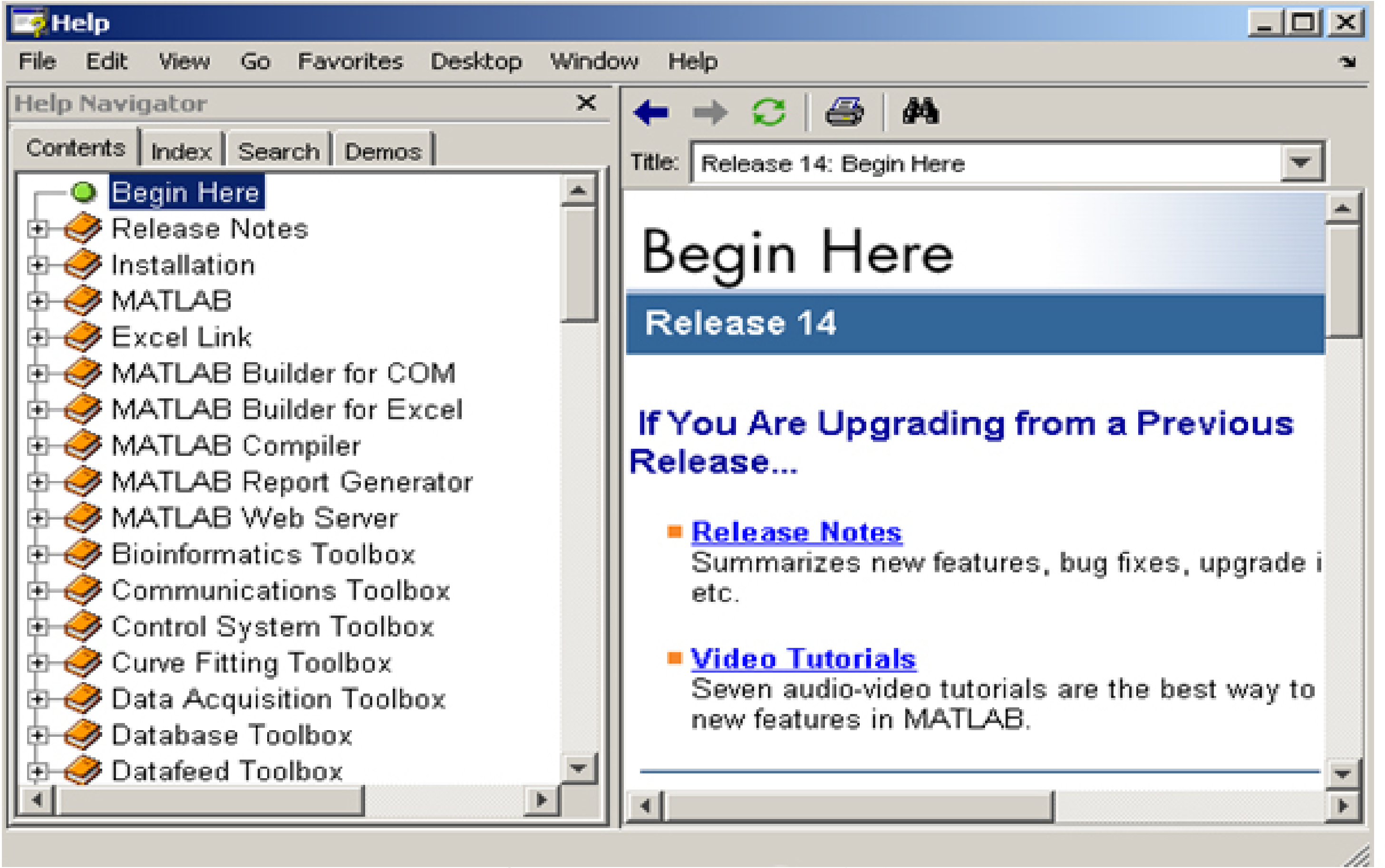
Cont..

- Array Editor:

  For viewing the Array editor double click on the variable in the workspace browser. Array Editor is used for the view and edits a visual representation of one or two dimensional numeric arrays, strings, and cell arrays of strings and structures that are in the workspace.

Cont..

- Help Browser:



Begin Here

Release 14

If You Are Upgrading from a Previous Release...

- Release Notes
  Summarizes new features, bug fixes, upgrade i
  etc.
- Video Tutorials
  Seven audio-video tutorials are the best way to
  new features in MATLAB.

Cont..

- Help Browser:

  Help Navigator consists of the following information:

  Contents: view the titles and tables of contents of documentation for your product

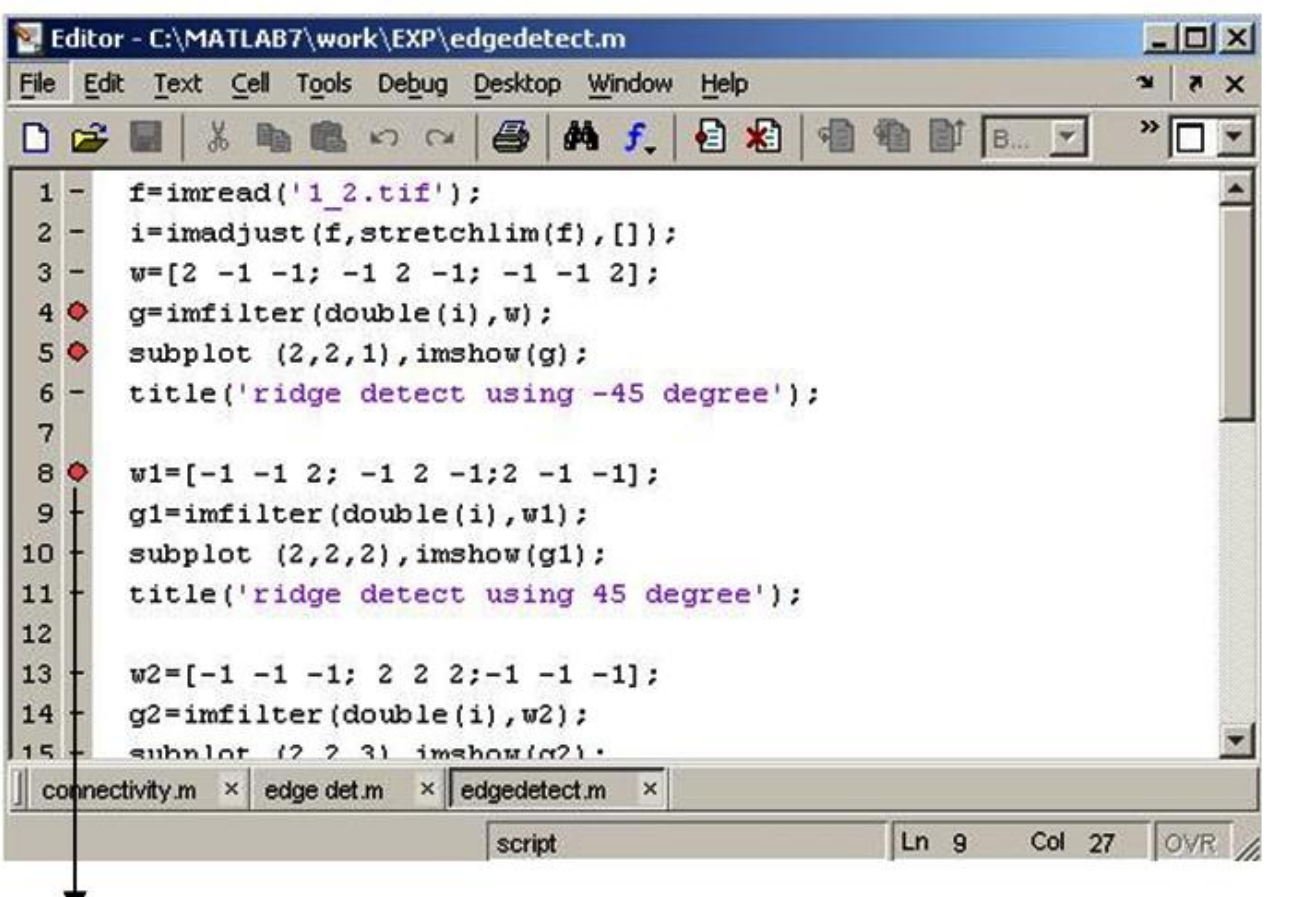
  Index: Find specific index entries of your products

  Search: search for a specific phrase in the documentation, get help of functions

  Demo: View the demos of the related toolboxes.

Cont..

- Editor/Debugger:


Editor - C:\MATLAB7\work\EXP\edgedetect.m
File Edit Text Cell Tools Debug Desktop Window Help
B...
connectivity.m
edge det.m
edgedetect.m
script
Ln 9
Col 27
OVR

```
f=imread('1_2.tif');
i=imadjust(f,stretchlim(f),[]);
w=[2 -1 -1; -1 2 -1; -1 -1 2];
g=imfilter(double(i),w);
subplot (2,2,1),imshow(g);
title('ridge detect using -45 degree');

w1=[-1 -1 2; -1 2 -1;2 -1 -1];
g1=imfilter(double(i),w1);
subplot (2,2,2),imshow(g1);
title('ridge detect using 45 degree');

w2=[-1 -1 -1; 2 2 2;-1 -1 -1];
g2=imfilter(double(i),w2);
subplot (2,2,3),imshow(g2);
```

Break points selection

Cont..

- Editor/Debugger:

The MATLAB Editor and Debugger are used to create an M-file or function and debug the M-file; this facility provides graphical user interface for the user. You can run the M-file by using the F5 function key or select the run option from the Debug menu. You can use any text editor to create the M-file. In any editor use the debugging commands to debug the M-files. In this editor you can select the brake points where you want execution to be paused so you can examine variable.

Basic Commands

Command	Syntax	Purpose
clc	>> clc	This command is used to clear the screen.
quit	>>quit	This command quits or ends the MATLAB session.
help	>>help fft	Display list of all topics and functions name in command window. To see detailed help of a specific function use help with function name.
helpwin	>>helpwin	Display help browser in new window.
doc	>>doc clc	Display complete online help in the help browser.
ver	>> ver	It gives information about toolboxes.
version	>>version	It gives only information about MATLAB version.
pwd	>> pwd ans = C:\MATLAB7\work	This command is used for printing of current working directory.
cd	C:\MATLAB7\ >>cd c:\matlab7\work	This command is used for changing current working directory.
copyfile	>>copyfile sourcefile destinationfule	This command is used for copying a file or directory.
dir	>>dir	This command displays the list of files or directories in working directory.

Cont..

Command	Syntax	Purpose
who	>>who	Display the list of current variables in the workspace.
whos	>>whos	Display the list of current variables along with the size, bytes and data type or the class of the variable.
clear	>>clear	This command clears the variables in the workspace.
save	>>save [‘filename’, ‘ver1’,..]	This command saves the workspace on disk or file.
load	>>load [filename]	This command loads the workspace from disk or file.
what	>>what	Display list of MATLAB specific files in directory.
edit	>>edit or >>edit filename	This command opens the MATLAB editor.
type	>>type filename	This command views the M-file like MS-DOS.
path	>>path c:\deirectory name	By using this command you can set the search path.
format	>>format options	Set the MATLAB output format.
diary	>>diary [on] [off]	Save the text of MATLAB session.

Variables

- There are three types of variables:

1) Local Variables:

The local variables are those variables declared within a function and access by that function only.

2) Global Variables:

This variable can be accessed by all functions in MATLAB and they also appear in the workspace of MATLAB.

3) Persistent Variables:

This variable is like a local variable except that this variable remains in memory after closing the function in which it is declared.

Keywords

```
>> iskeyword
 ans =
```

- 'break'
- 'case'
- 'catch'
- 'continue'
- 'else'
- 'elseif'
- 'end'
- 'for‘
- 'function'

- 'global'
- 'if'
- 'otherwise'
- 'persistent'
- 'return'
- 'switch'
- 'try'
- 'while'

Numbers

- To represent numeric data in MATLAB, decimal numbers are used. For fractional numbers floating points and for sign numbers, plus or minus symbols can be used. For power of ten scales factor e notation is used and for imaginary numbers i or j is used as suffix. According to standard of IEEE floating point all numbers have been internally stored.

- Ex: 20, -30, 41.53, 5.71e-102, -42.72i, etc.

Vectors and Matrices

- Variables in MATLAB are just like variables in any other programming languages (C, C++ etc.); only difference is that you do not have to define them by indicating the type etc. In the MATLAB, Matrix is a rectangular array of numbers. 1-by-1 matrix is called as the scalar and matrices with only one row or one column is called as the row vector or column vector respectively. Vector is an ordered list of numbers. You can enter a vector of any length by using a list of numbers and separated by commas or spaces inside the square brackets.

Multidimensional Array

- Those arrays that have more than two directions are called as Multidimensional arrays. MATLAB has one or more dimensions; for some type of data, we need more than two dimensions for storing the data effectively like storing of color image or true image.

```
>> M(:,:,1)=[1 2 3;3 4 5; 5 6 7];
>> M(:,:,2)=[1 2 3;2 3 4; 3 4 5];
>> M(:,:,3)=[1 2 3;4 5 6; 7 8 9];
```

- To view the elements of multidimensional array,

```
>> M(:,:,3)
ans =
   1    2    3
   4    5    6
   7    8    9
```

Summary

- The MATLAB Development Environment consists of various tools to make user task simpler. These tools are Command window, Command History, Current Directory Browser, Workspace Browser, Array editor, Help Browser, Editor/Debugger. MATLAB also has a special path to find the working place of user area called as MATLAB search path. Commands of the MATLAB can also be executed from its prompt; due to this user can immediately see the result. Users can store their data in different identifiers via variables and numbers. Some special keywords are also inbuilt there to increase the usability of user. Users can store their data in one or multi dimensional arrays. Vector and Matrices have good capability of MATLAB to handle multiple data values. Specially these features are useful for signal and image processing applications.

Thank You