Chapter 7

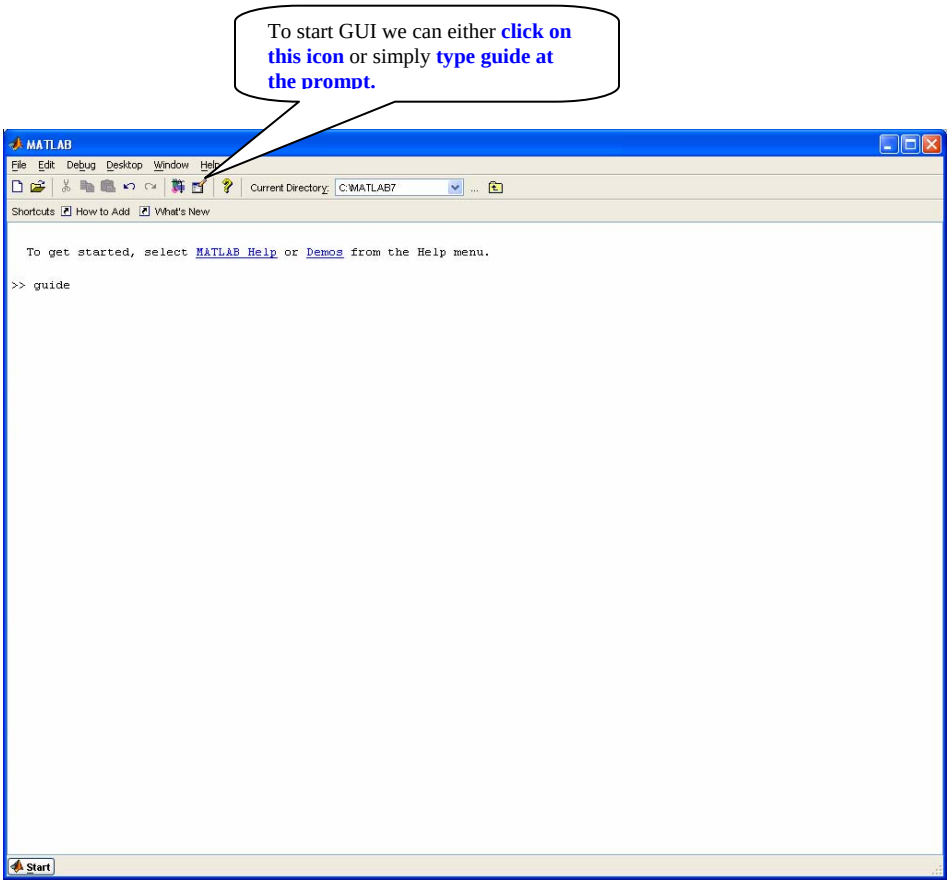
- Graphical User Interface with MATLAB -

How to get started?

There are two ways to launch Graphical User Interface (GUI). You can either

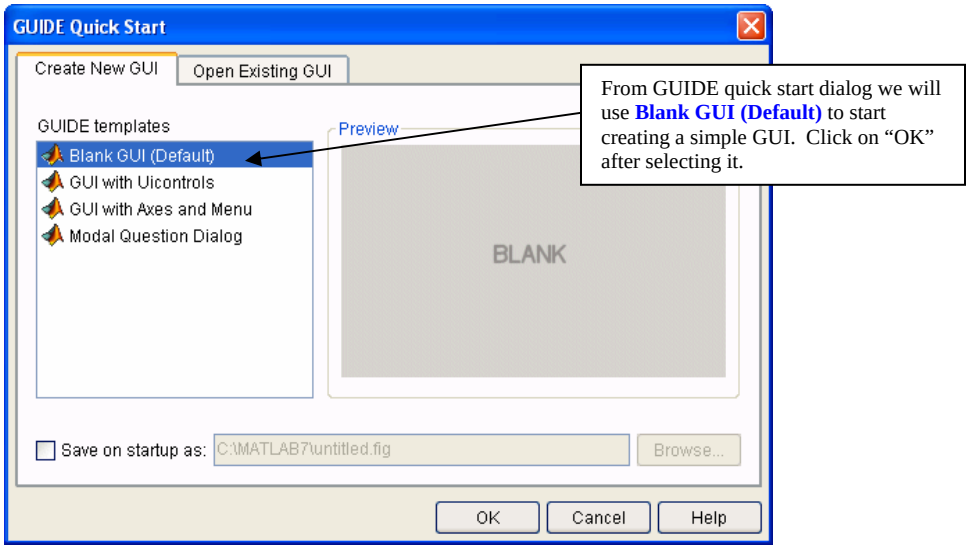
1. Click on the "Guide" icon
2. Type guide at the prompt

Just follow the instruction below:



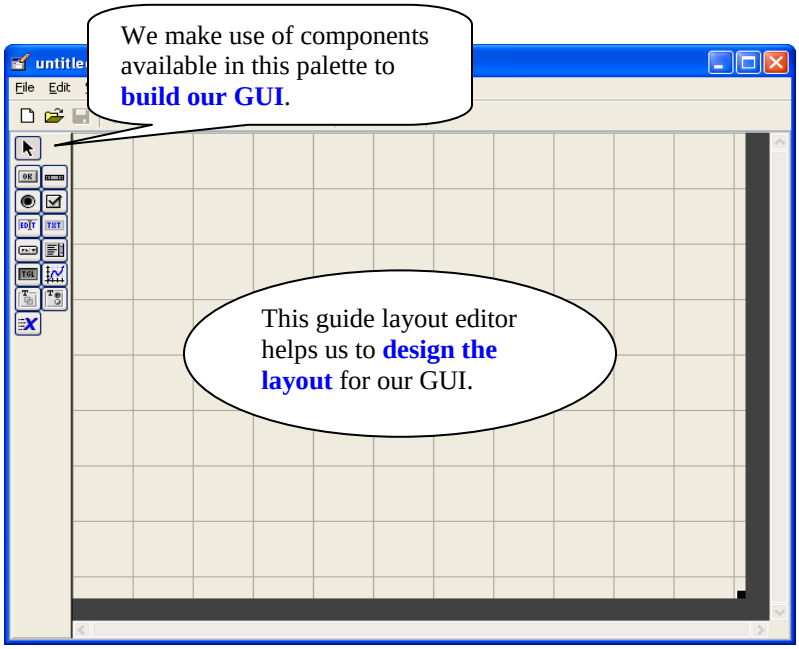
Got a "Guide Quick Start" Window?

Next, we are going to create a simple Guide User Interface.



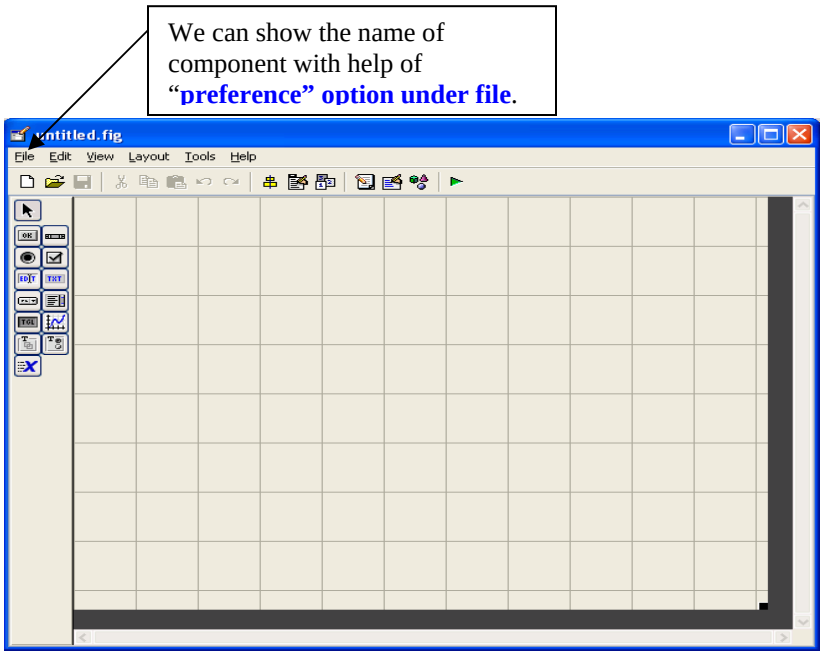
A New Untitled Window

How to deal with a new GUI window?
Use the icons on the left to design the layout of your GUI.

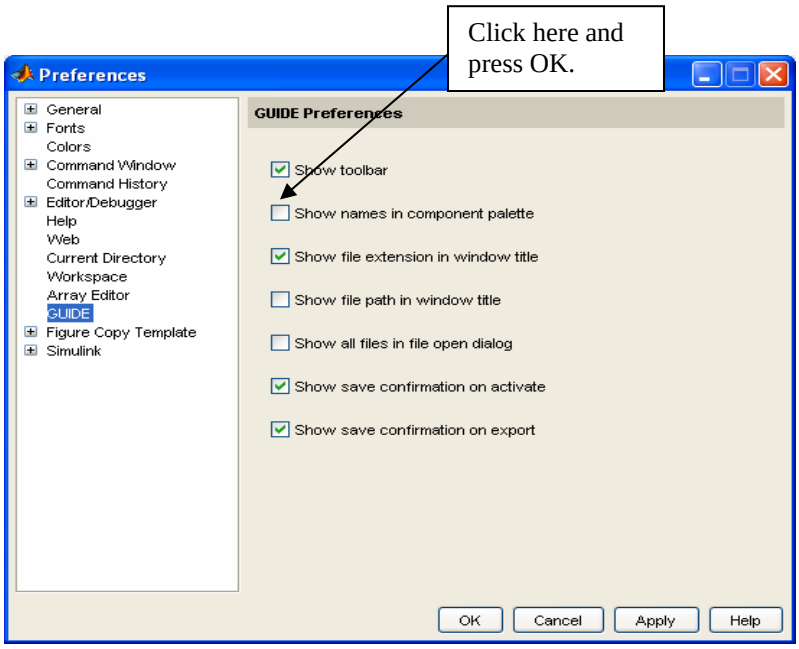


Component Palette

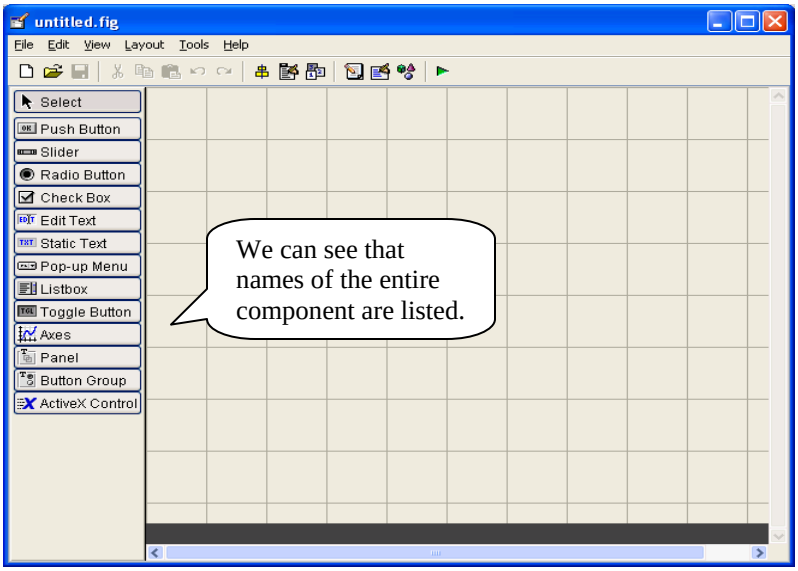
Want the names of these components to be shown?
You can do it by using the “preference” option under “file”.
Just follow the steps shown below:



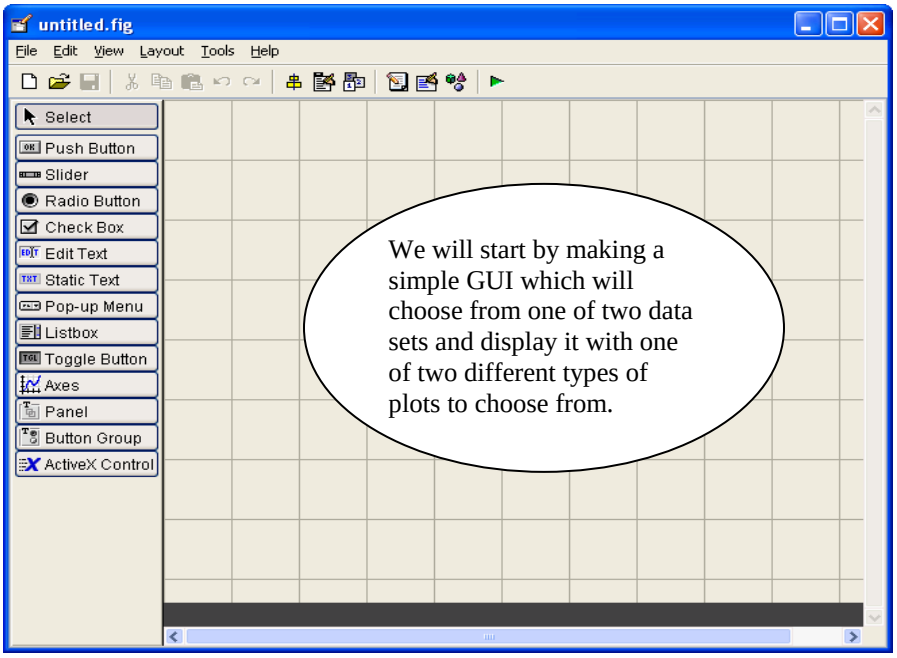
The Preferences window will pop up after you select “preference” option.



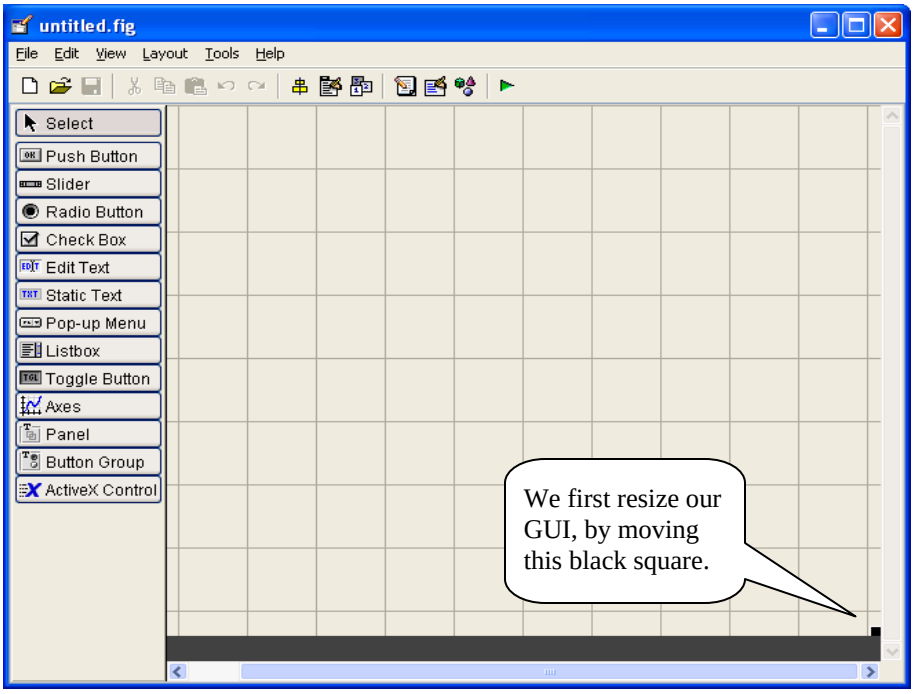
Now, you can see all the names of the components.



Let's Start Making a Simple GUI!

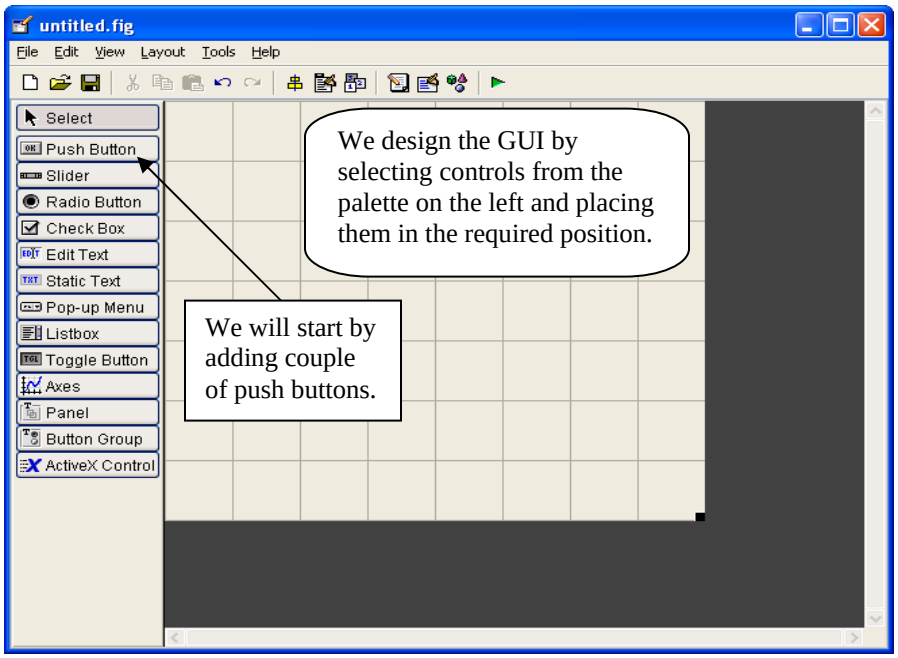


Step 1: Resize your GUI



Step 2: Adding "Push Buttons"

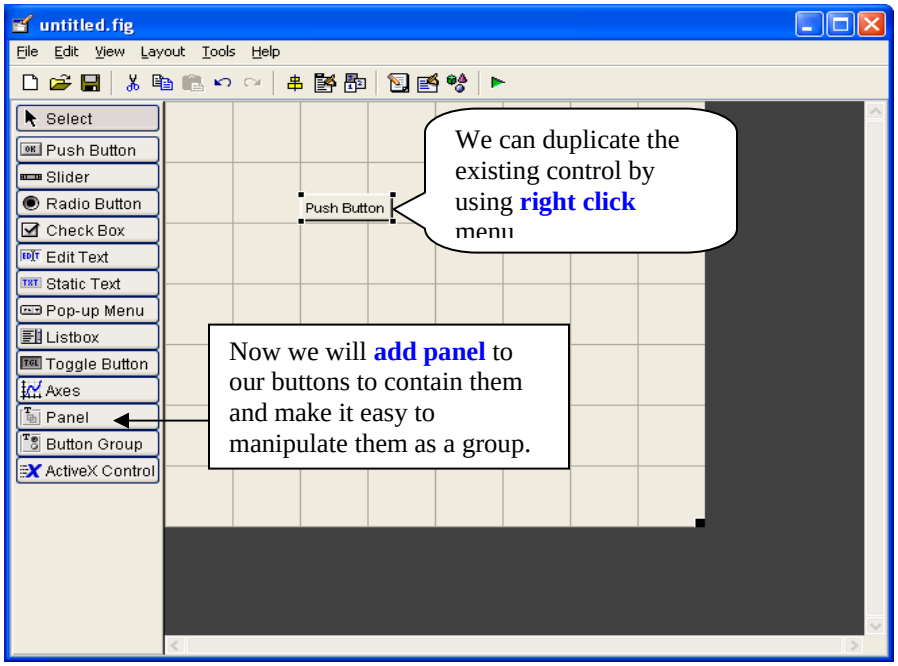
Simply drag the "Push Button" to the position that you want it to be appeared to.

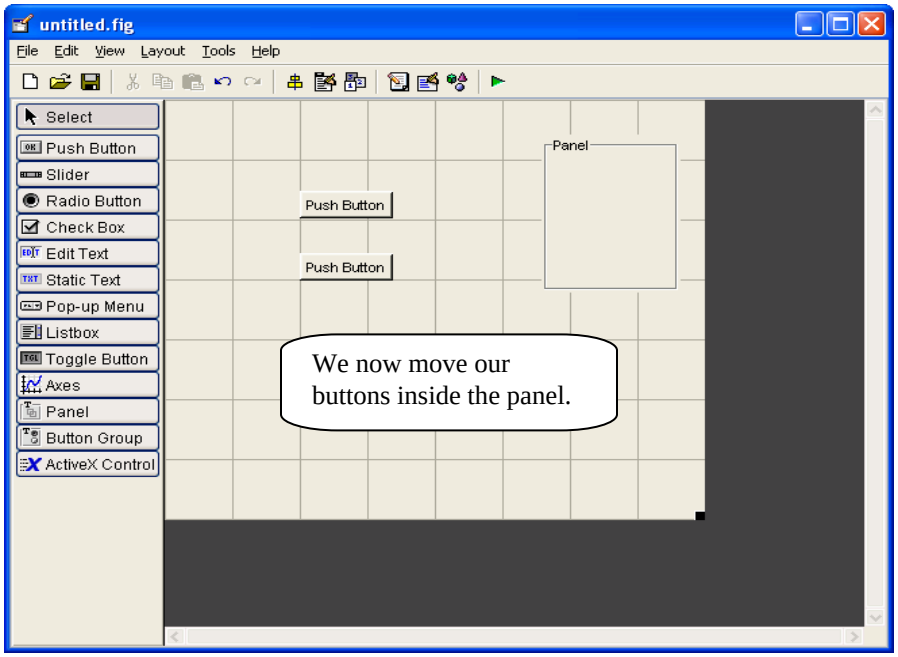


Step 3: Duplication & Adding a “Panel”

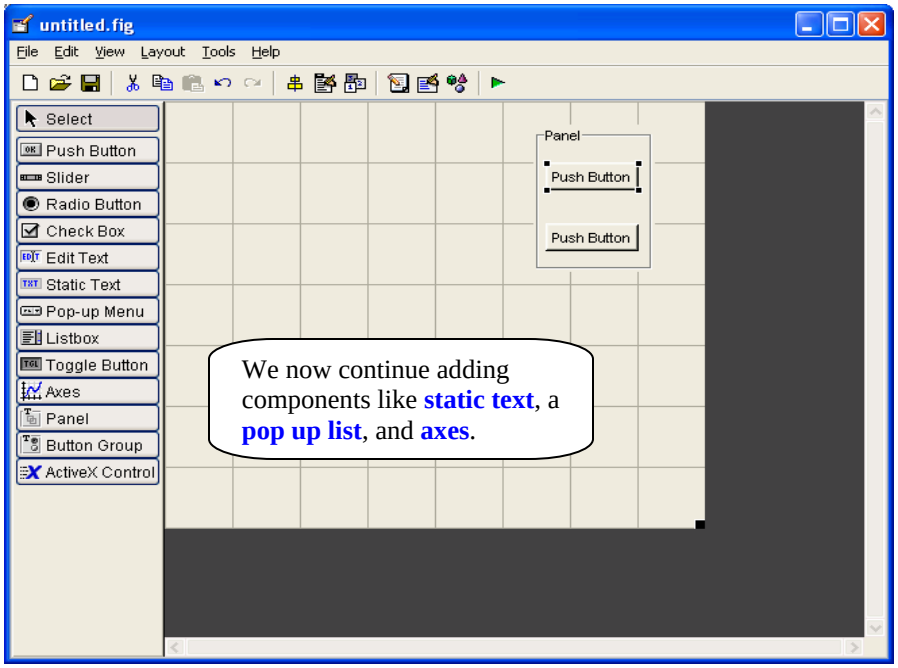
To duplicate another “push button”, simply “right click” on the one you just created and choose “Duplicate”.

Add a panel after duplicating the push button.

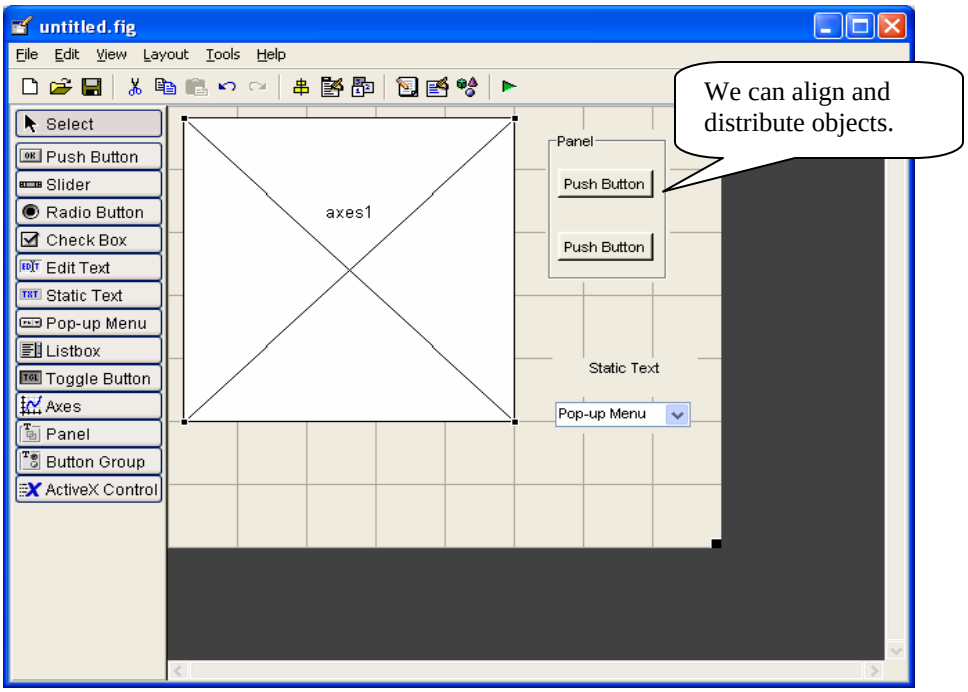




Step 4: Adding “Static Text”, “Pop-up Menu & “Axes”



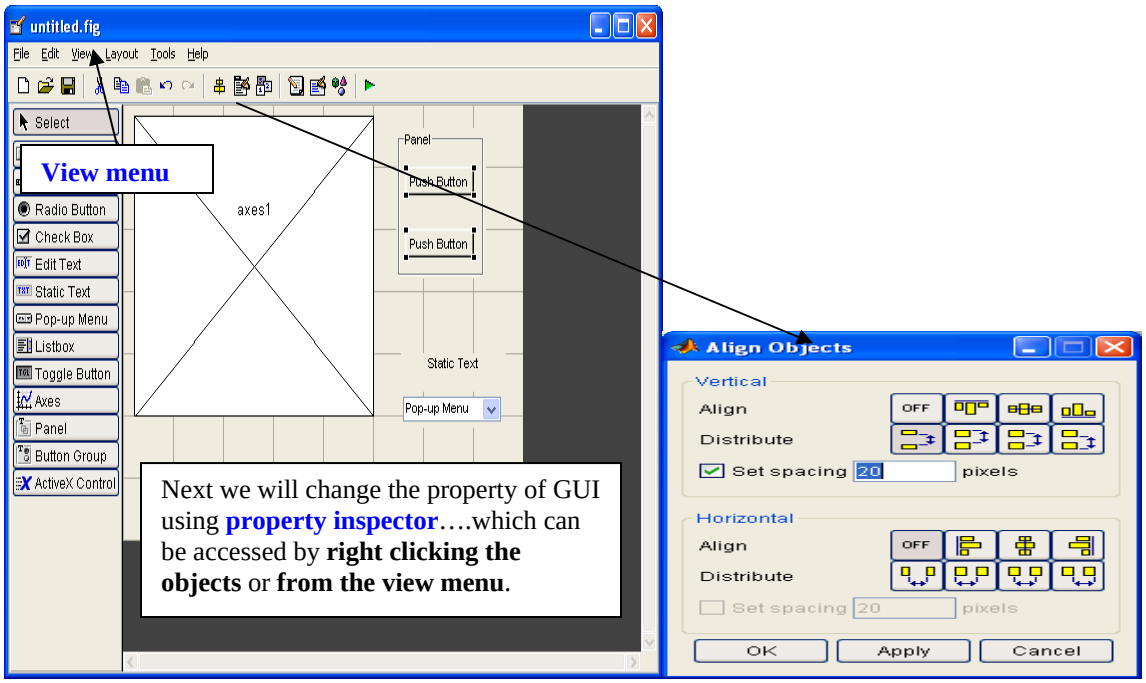
Step 5: Alignment & Setting up Objects



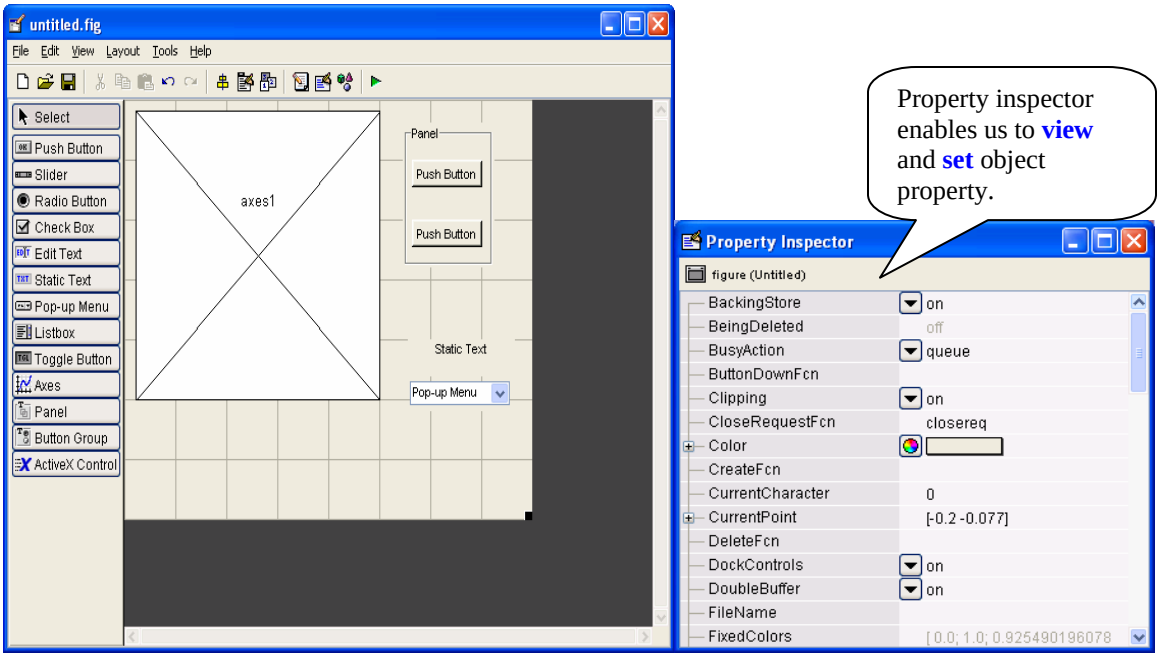
Step 5.1: “Property Inspector”

There are two ways to reach “**property inspector**”!

1. Right click on the object.
2. Select it from the “View” menu

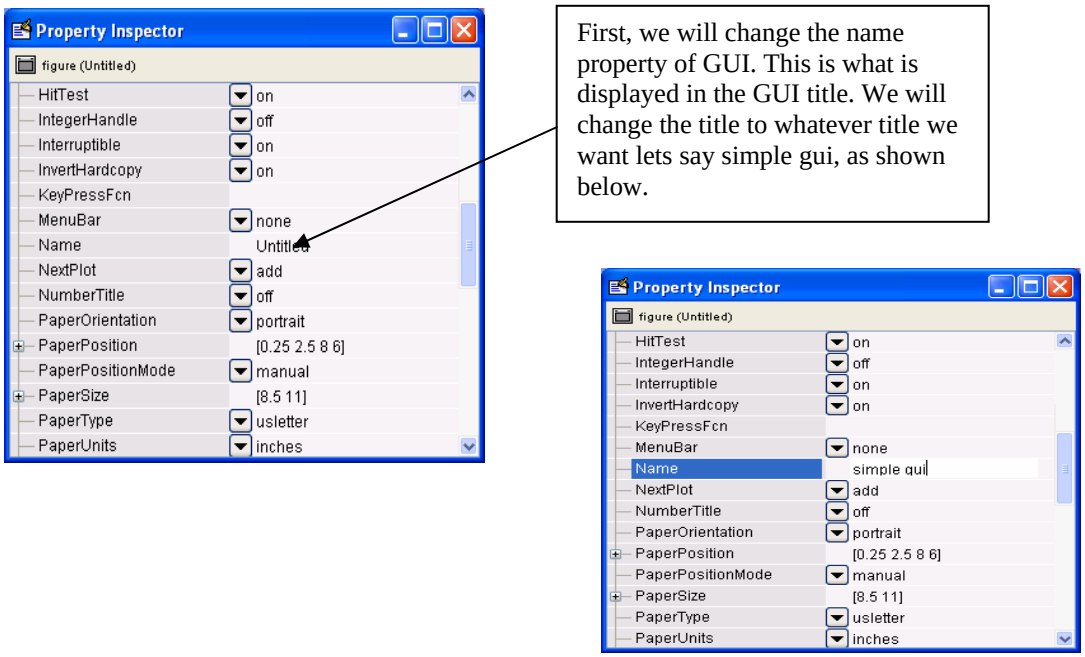


Functions of Property Inspector: View & Set object property



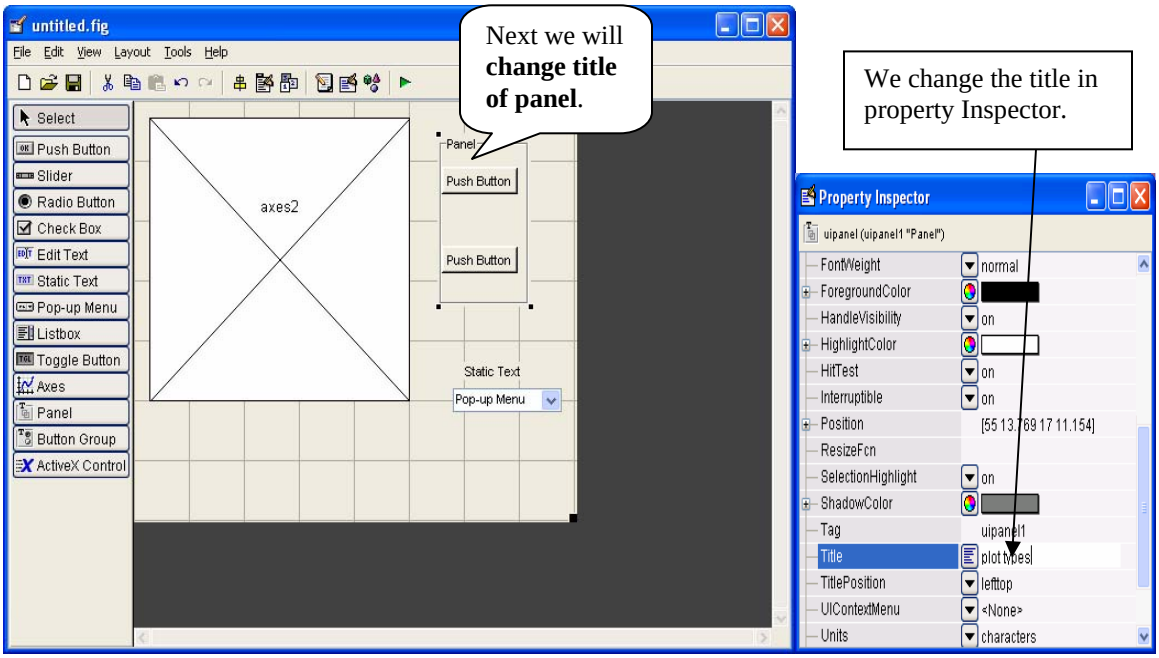
Rename the GUI from "Property Inspector"

Rename it from **"Untitle"** to **"simple gui"**



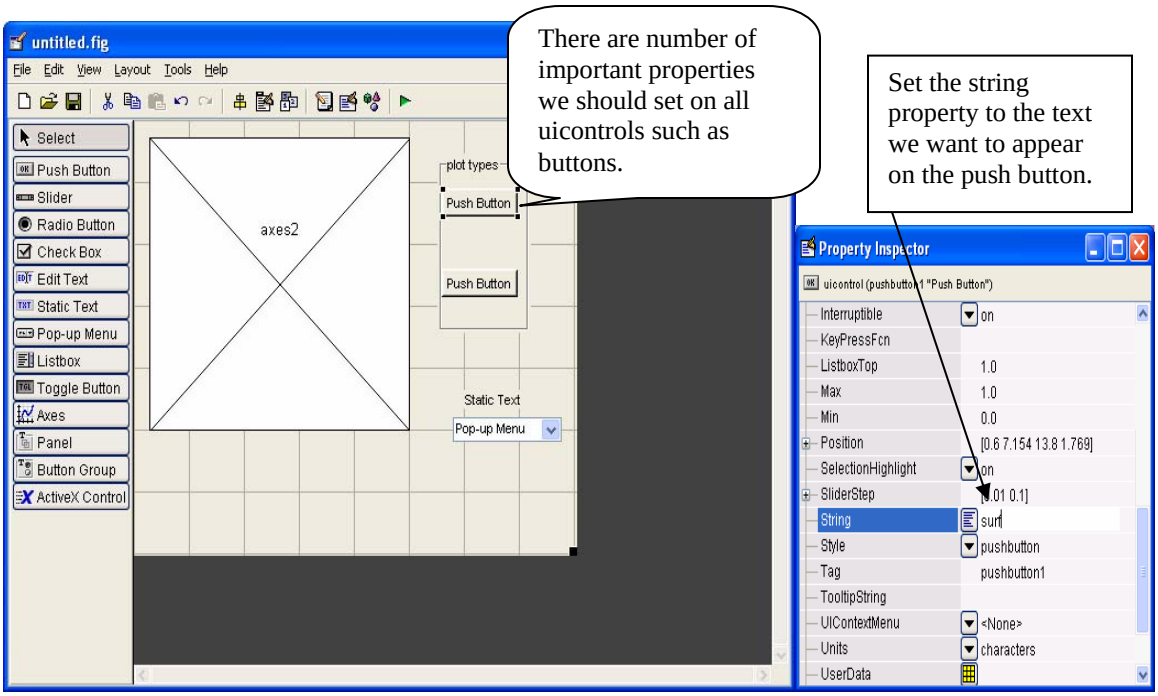
Rename the Panel

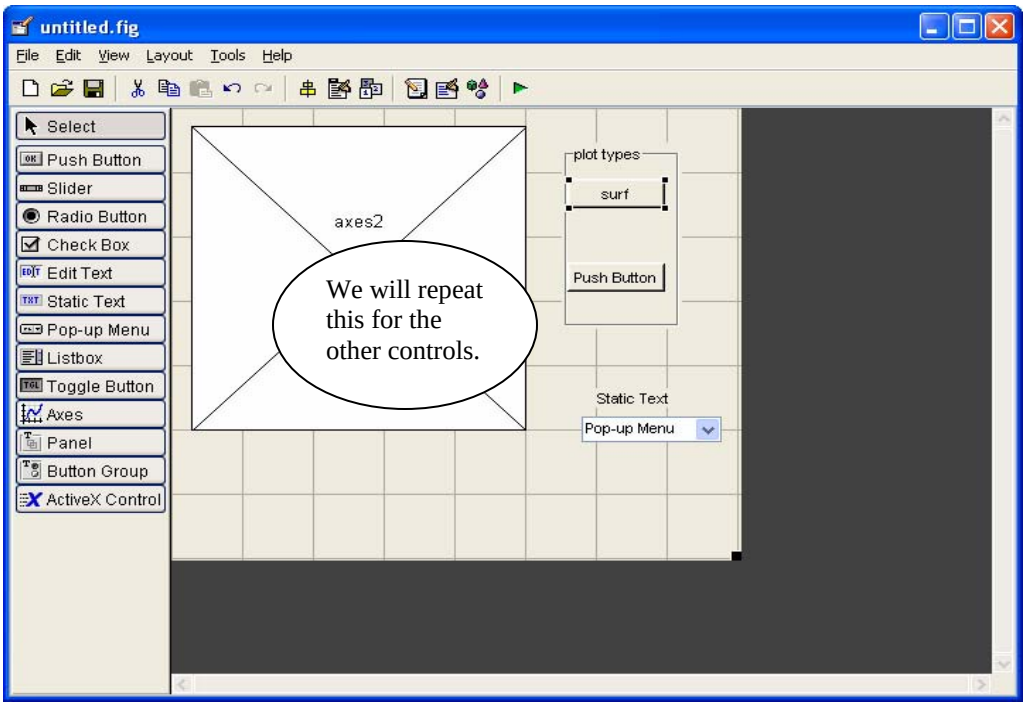
Change the **"title"** from "**Panel**" to "**Plot types**"!



Set up the "String Property"

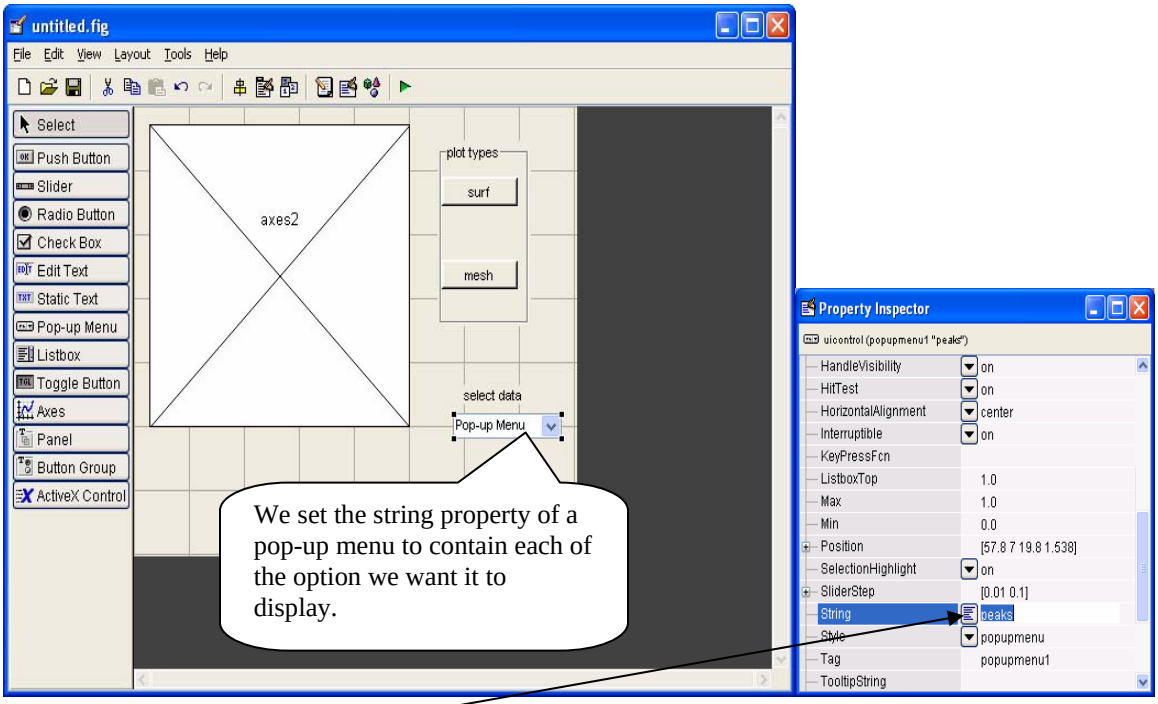
Change the **"string"** from "**Push Button**" to "**surf**".

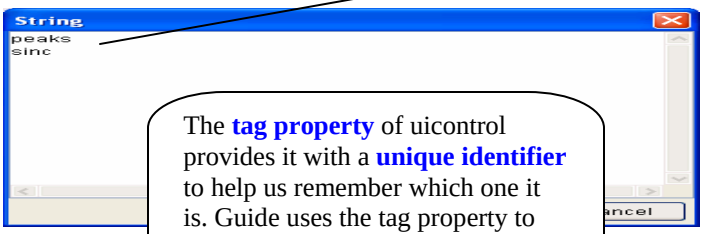




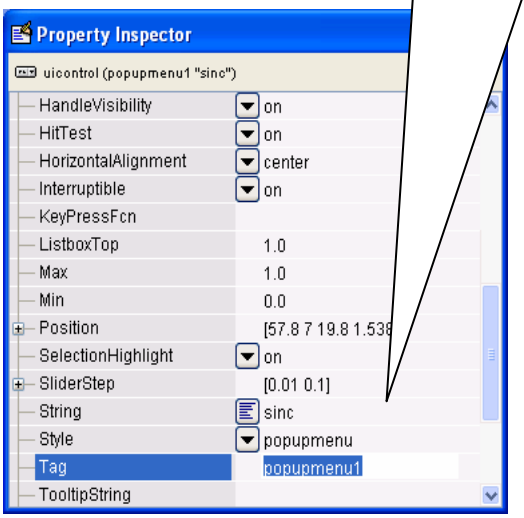
Set up the "Tag Property"

Change the "**String**" from "**Pop-up menu**" to "**peaks sinc**" as shown below.

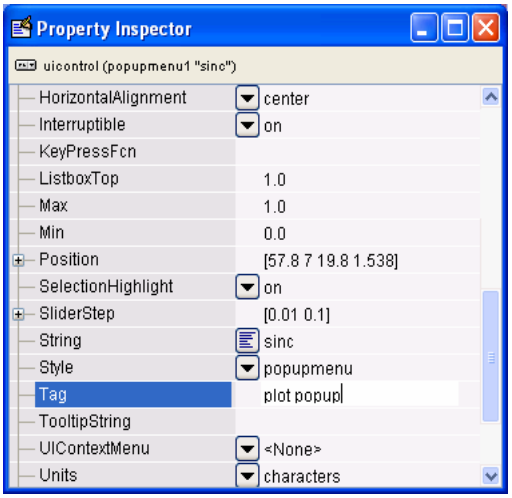


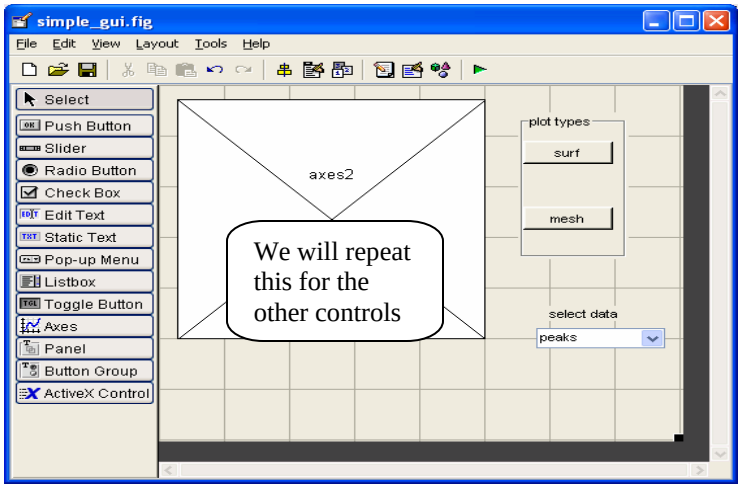


The **tag property** of uicontrol provides it with a **unique identifier** to help us remember which one it is. Guide uses the tag property to name the control's generated M-code function.

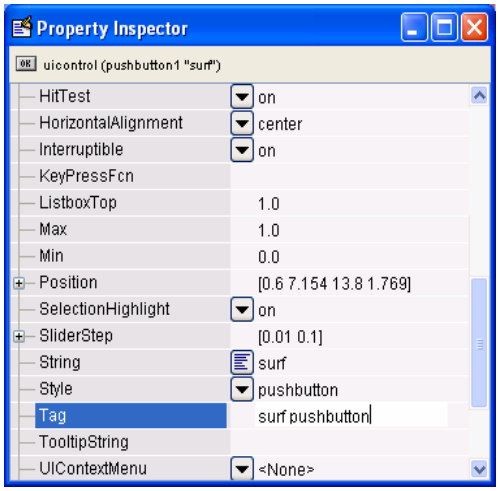


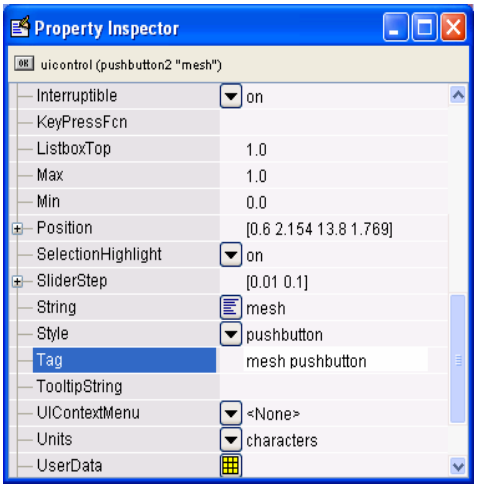
Change the "**Tag Property**" from "**popupmenu1**" to "**plot popup**"



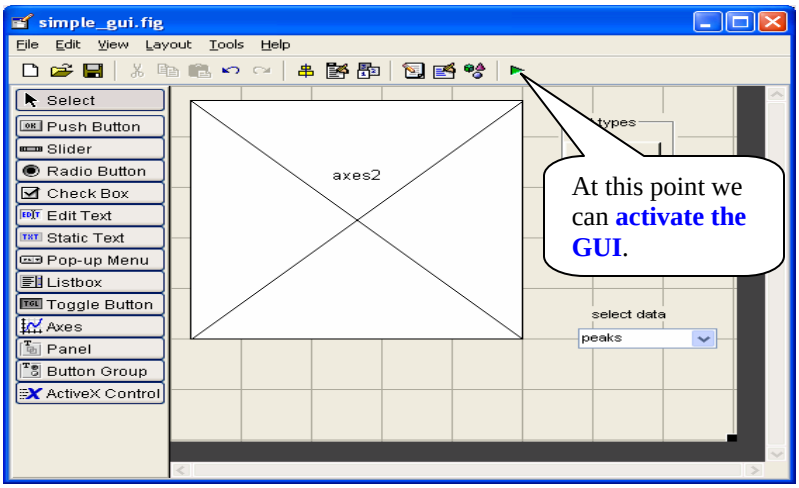


Change the "**Tag Property**" from "**pushbutton1**" to "**surf pushbutton**"
Change the "**Tag Property**" from "**pushbutton 2**" to "**mesh push button**"



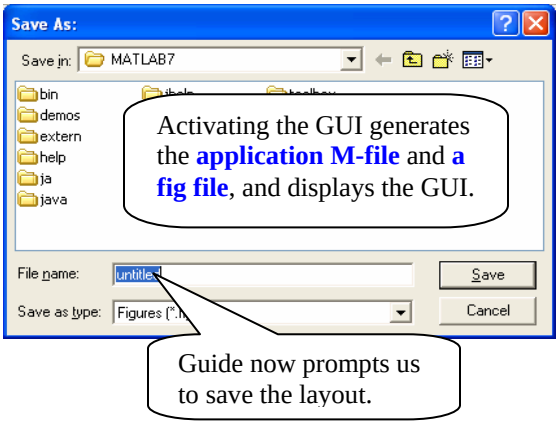


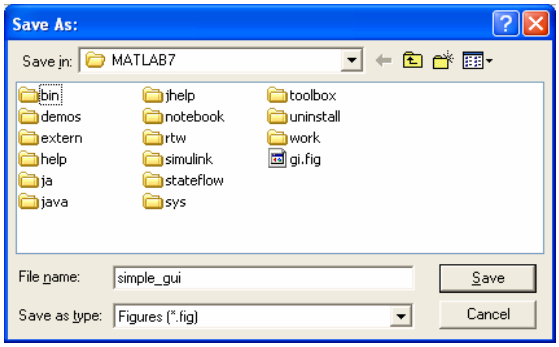
Step 6: Activate the GUI



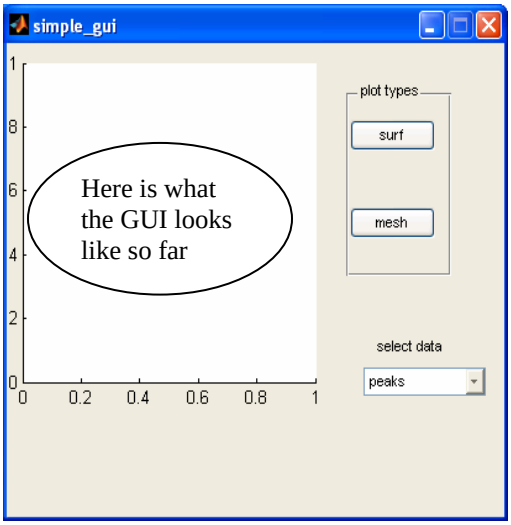
Step 6.1: Save the file

Save the file as “simple_gui”.

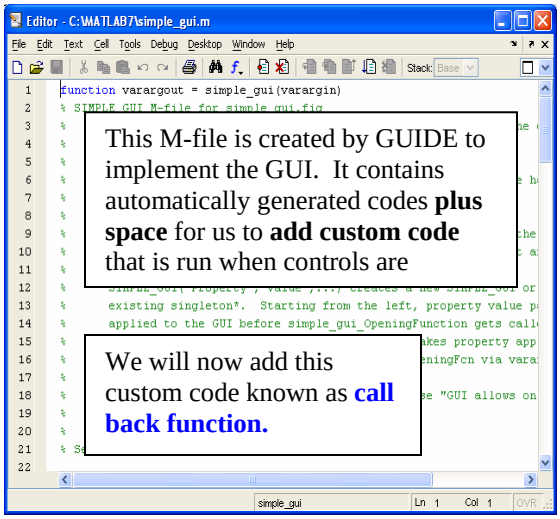




Step 6.2: How your GUI looks like?



Step 6.3: Your GUI codes



Step 7: Adding Custom Code (Call Back Function)

The "**show functions**" button will help us navigate the M-file to each callback.

We will go to the **openingFcn** routine which is called first when GUI runs.

Here we will define three data two data sets and create an initial plot.

In this function, we can **load or create data** which is used in the GUI and we can do some initial plotting.

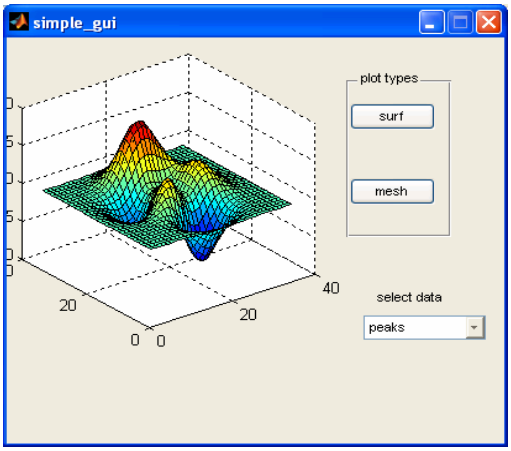
To share data within the GUI we use the **handles structure** which is passed between functions.

This auto generated lines **specifies what is returned as an output argument** when the GUI is called.

This line at the end **is required to update the handles data structure.**

We can look at the created GUI again

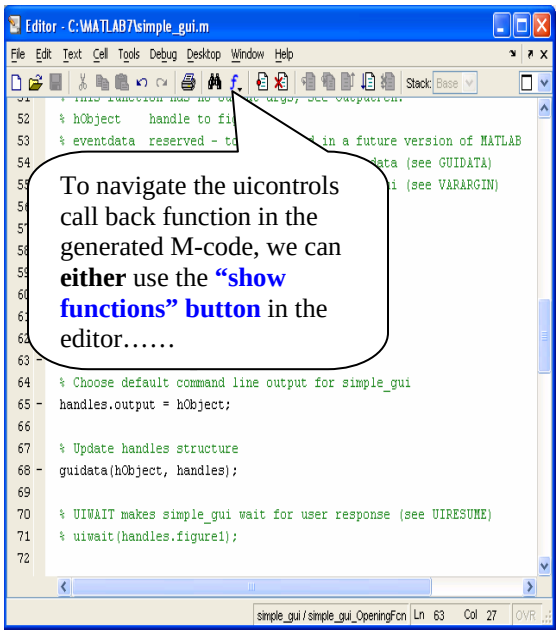
We will switch back to our layout editor.

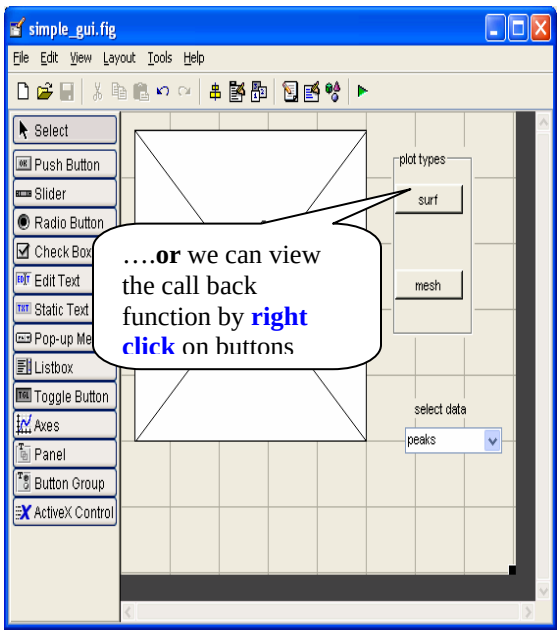


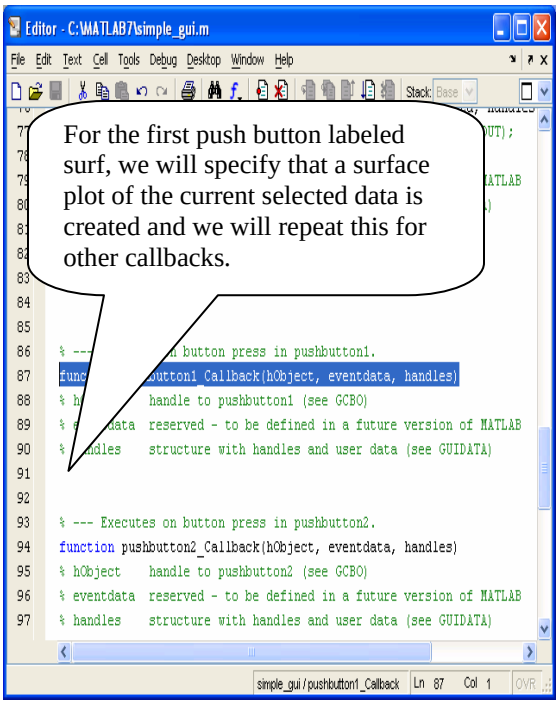
When a GUI is completed and running and we click on a **user interface control** such as a push button MATLAB executes the controls call back function

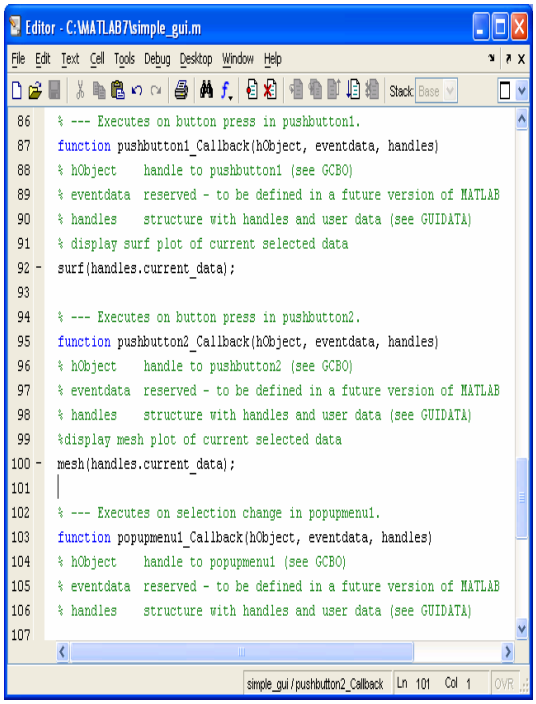
There are two ways to execute "**Call Back Function**".

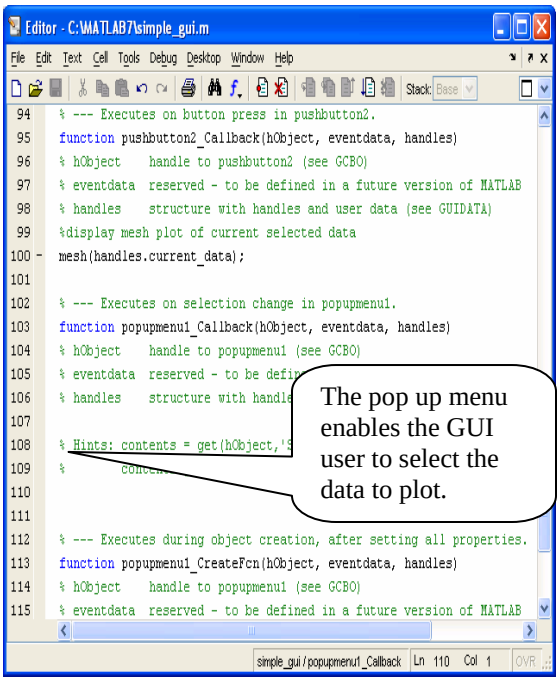
1. Click on "how functions" button
2. Right Click on the buttons that you want to call back.

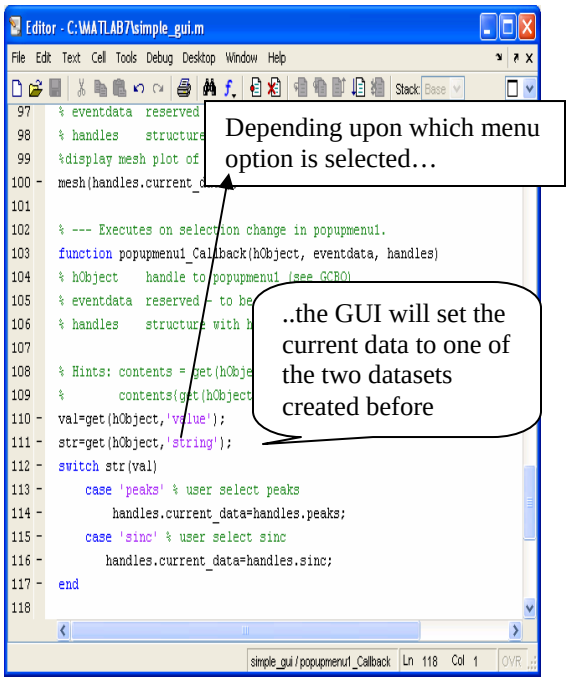


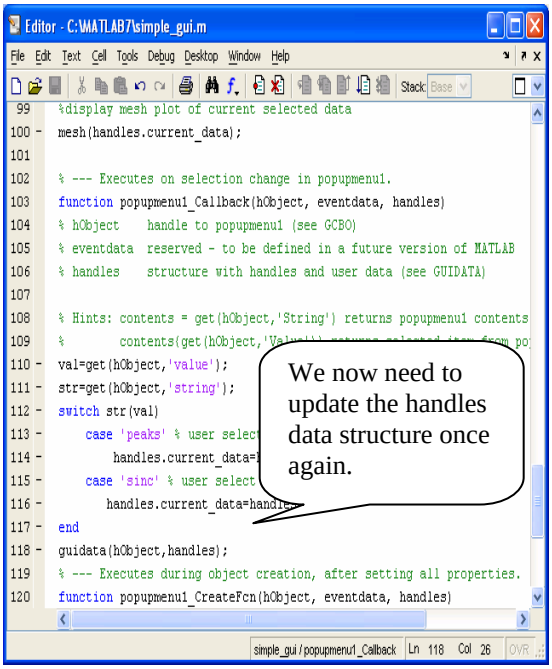


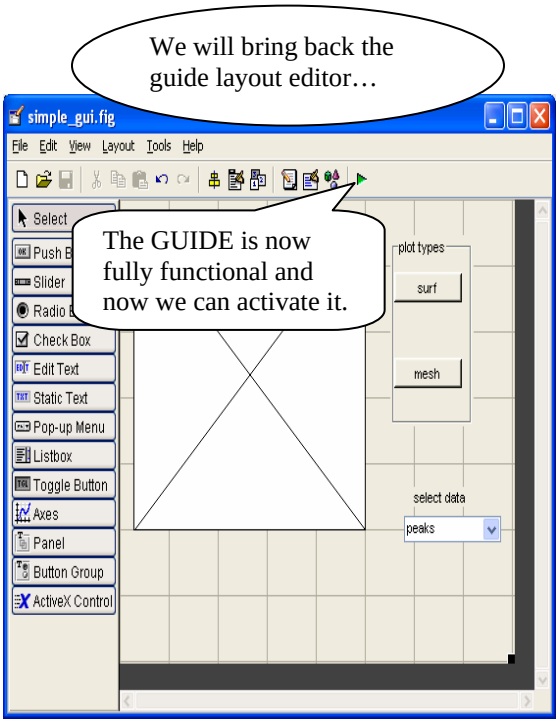

Editor - C:\MATLAB7\simple_gui.m
For the first push button labeled surf, we will specify that a surface plot of the current selected data is created and we will repeat this for other callbacks.
% --- Executes on button press in pushbutton1.
function pushbutton1_Callback(hObject, eventdata, handles)
% hObject handle to pushbutton1 (see GCBO)
% eventdata reserved - to be defined in a future version of MATLAB
% handles structure with handles and user data (see GUIDATA)
% --- Executes on button press in pushbutton2.
function pushbutton2_Callback(hObject, eventdata, handles)
% hObject handle to pushbutton2 (see GCBO)
% eventdata reserved - to be defined in a future version of MATLAB
% handles structure with handles and user data (see GUIDATA)
simple_gui / pushbutton1_Callback Ln 87 Col 1


Editor - C:\MATLAB7\simple_gui.m
% --- Executes on button press in pushbutton1.
function pushbutton1_Callback(hObject, eventdata, handles)
% hObject handle to pushbutton1 (see GCBO)
% eventdata reserved - to be defined in a future version of MATLAB
% handles structure with handles and user data (see GUIDATA)
% display surf plot of current selected data
surf(handles.current_data);
% --- Executes on button press in pushbutton2.
function pushbutton2_Callback(hObject, eventdata, handles)
% hObject handle to pushbutton2 (see GCBO)
% eventdata reserved - to be defined in a future version of MATLAB
% handles structure with handles and user data (see GUIDATA)
%display mesh plot of current selected data
mesh(handles.current_data);
% --- Executes on selection change in popupmenu1.
function popupmenu1_Callback(hObject, eventdata, handles)
% hObject handle to popupmenu1 (see GCBO)
% eventdata reserved - to be defined in a future version of MATLAB
% handles structure with handles and user data (see GUIDATA)
simple_gui / pushbutton2_Callback Ln 101 Col 1

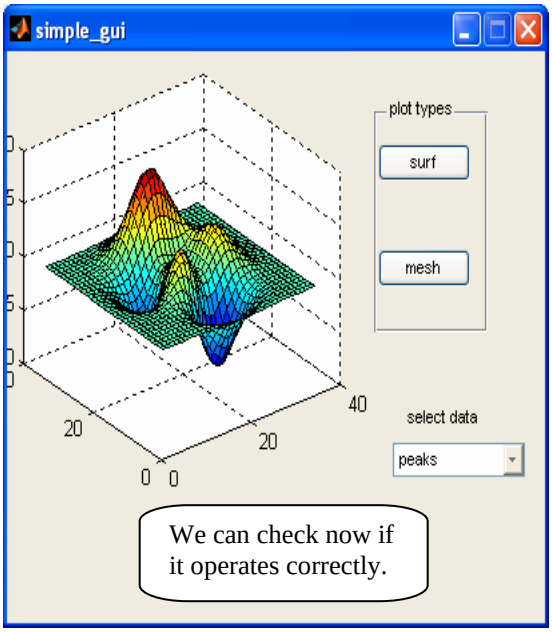

Editor - C:\MATLAB7\simple_gui.m
% --- Executes on button press in pushbutton2.
function pushbutton2_Callback(hObject, eventdata, handles)
% hObject handle to pushbutton2 (see GCBO)
% eventdata reserved - to be defined in a future version of MATLAB
% handles structure with handles and user data (see GUIDATA)
%display mesh plot of current selected data
mesh(handles.current_data);
% --- Executes on selection change in popupmenu1.
function popupmenu1_Callback(hObject, eventdata, handles)
% hObject handle to popupmenu1 (see GCBO)
The pop up menu enables the GUI user to select the data to plot.
% --- Executes during object creation, after setting all properties.
function popupmenu1_CreateFcn(hObject, eventdata, handles)
% hObject handle to popupmenu1 (see GCBO)
% eventdata reserved - to be defined in a future version of MATLAB
simple_gui / popupmenu1_Callback Ln 110 Col 1

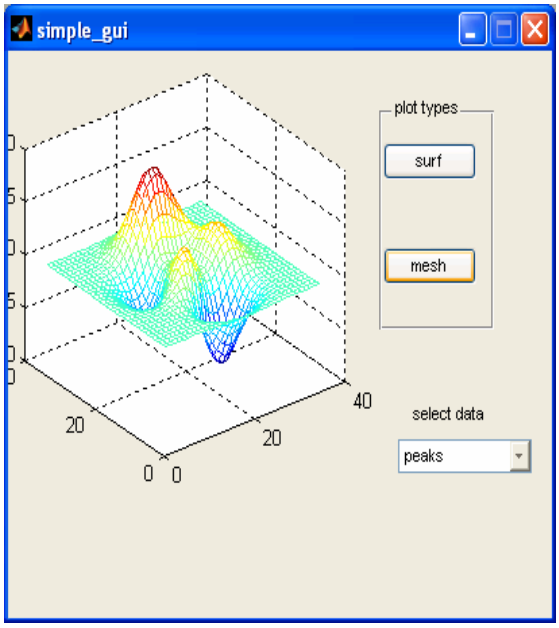

Editor - C:\MATLAB7\simple_gui.m
Depending upon which menu option is selected…
..the GUI will set the current data to one of the two datasets created before
% --- Executes on selection change in popupmenu1.
function popupmenu1_Callback(hObject, eventdata, handles)
% Hints: contents = get(hObject,'string');
val=get(hObject,'value');
str=get(hObject,'string');
switch str(val)
case 'peaks' % user select peaks
handles.current_data=handles.peaks;
case 'sinc' % user select sinc
handles.current_data=handles.sinc;
end
simple_gui / popupmenu1_Callback Ln 118 Col 1

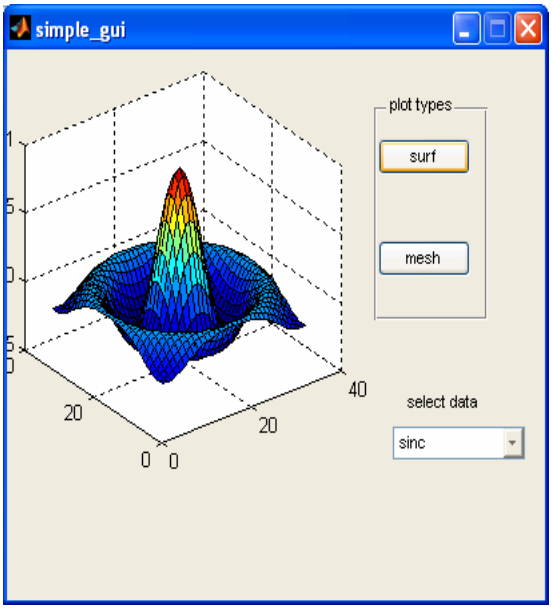


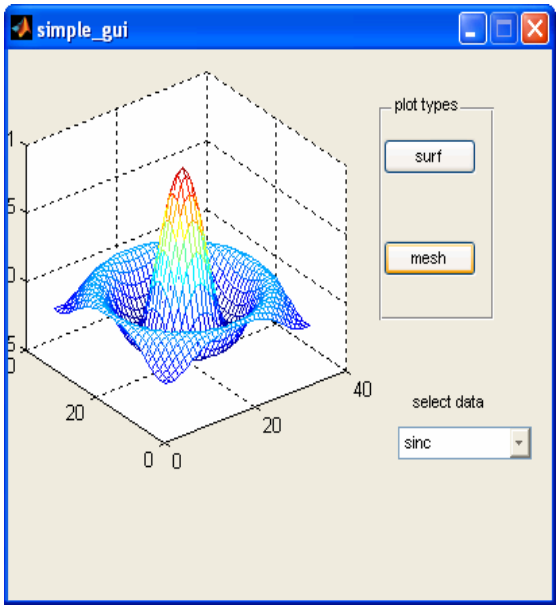


Final Step: Our GUI Outcome

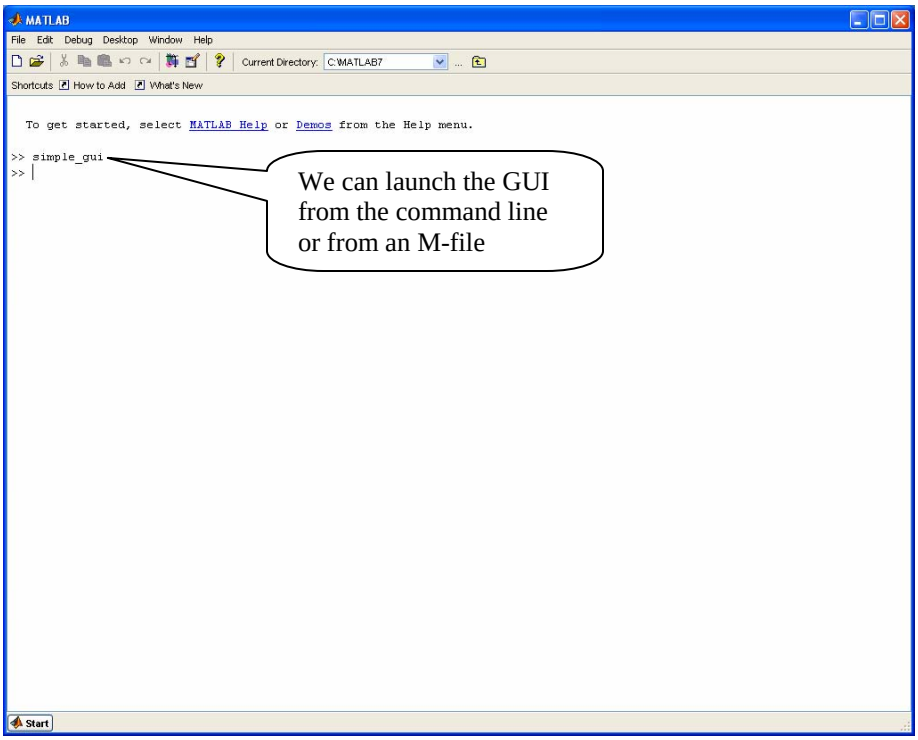








How to Launch GUI?



This concludes the simple demonstration how to create GUI.