Graphical User Interafeces (GUI)

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- GUI concepts

- Event-based programming

- GUIDE: MATLAB's tool for building an event-based GUI

- Callback function model

- Using callbacks to respond to events such as mouse clicks and key presses

- Example GUI

Graphical User Interface (GUI)

- In general, the scheme of interaction that a program presents to its users through keyboard characters, mouse clicks or screen touches is called its Graphical User Interface (GUI).

- Traditional GUIs running on PCs etc utilize mouse and keyboard input to let you interact with buttons, menus and other GUI features and such a feature is called a GUI control or widget.

Event-based User Interfaces

- Operating system dependency

- Programming languages: no built in support for GUI development

- Integrated Development Environment (IDE)

  - Funtion library, set of tools (GUI Libraries)

- Common characteristic of GUI libraries is event-based programming

Event-based User Interfaces

Event-based programming

- During normal operation the GUI sits idle waiting for events

- An event is caused by a user action (clicking on a button, pressing a key on the keyboard, moving a mouse etc)

- Actions cause and event that the GUI will react to. Each event has

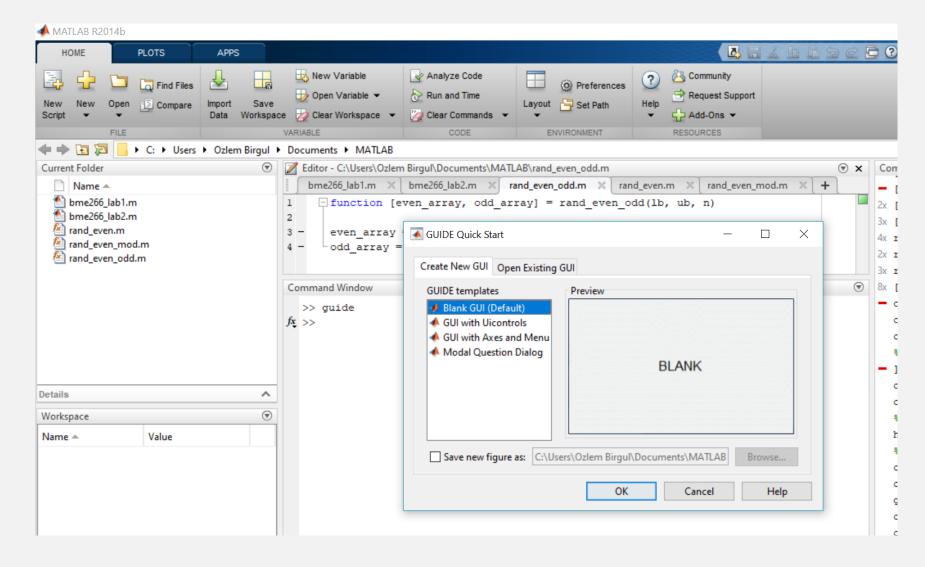 - an event handler; also called a callback function

The MATLAB GUIDE

- GUIDE: acronym for Graphical User Interface Development Environment

- GUIDE itself is a MATLAB GUI.

- It created two files

  - .fig file (graphical aspects of your GUI)

  - .m file (initializes the GUI and defines the callback functions)
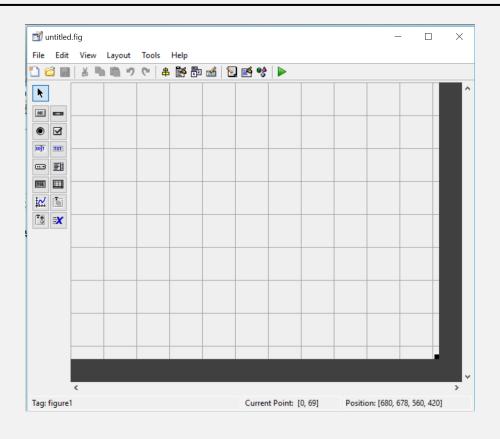
- Started by typing `guide` in the command window
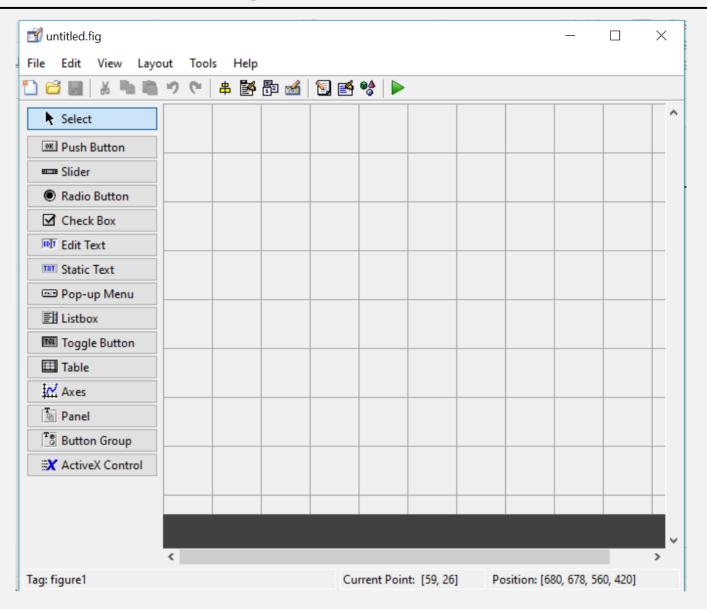
Starting GUIDE

Blank GUI design

- To see full names of widgets
  - File -> Preferences -> Show names in component palette

Blank GUI design

Definitions of Widgets

- Push button
- Slider
- Radio button
- Check box
- Edit Text Box
- Static Text
- Pop-up Menu
- List Box

- Toggle Button
- Table
- Axes
- Panel
- Button Group

Example GUI

- Placing objects on Canvas

- Property Inspector

- Structure of the .m file

- Adding code to callback functions

- `hObject` handle

- `handles` structure

- Sharing data using function

  - `guidata(hObject,handles)` command