MATLAB App and Toolbox Development

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Master class outline

- App development
  - Motivation
  - Design patterns
  - Object system technologies
  - Demonstrations

- Toolbox packaging
  - Motivation
  - Artifacts
  - Structure
  - Developer workflows
  - User workflows
App Development
Model-view-controller pattern

- Model updates View
- Model manipulates Controller
  - User sees Model
  - User uses Controller
Object system technologies

- Classes
  - Properties
  - Methods
  - Events
  - Attributes
- Listeners
- handle (and its derivatives)
- The reference counter
HeartRateHistogramView -> Model -> Event notification

StripChartView -> Model -> Property access, method call

Player -> Model -> Event notification

MapView -> Model -> Property access, method call
Demonstrations:

Model
Simple view
Graphical view
More class types

- A **chart** is an object that provides a specific type of visualization via a convenient API
- Charts be used in apps, reports, and for ad hoc visualization
- A **view** binds data to a chart
  - When the data changes, the chart updates
  - The data often lives in a model – as in model-view-controller – class
- Patterns
  - Chart: composite
  - View: observer
Demonstration:

Charts
Toolbox packaging
MATLAB Toolbox files (.mltbx)

- Available from R2014b
- Packs multiple files into a single file to be distributed
- Includes metadata and product dependencies
- Single step to install (or update)
- Configures MATLAB path
- Registers apps and documentation

Toolbox artifacts

- Code
- Apps
- Examples
- Documentation
- Tests
- Utilities
Suggested toolbox structure

/my.prj
/util.m
/tbx
  /my
   /fcn.m
   /Class.m
 /mydoc
   /howto.html
   /example.m
 /apps
  /app.m
/releases
/tests
Suggested toolbox structure

/my.prj
/util.m
/tbx
/releases
/tests

/tbx/my
/Contents.m
/fcn.m
/Class.m
/mydoc
/howto.html
/example.m
/apps
/app.m

where tbx is what is released, and contains...
Developer workflows

- Creating
- Packaging
- Testing
- Bundling apps
- Managing dependencies
- Distributing
Demonstration:

Toolbox packaging
User workflows

- Viewing what is installed
- Installing
- Uninstalling
- Updating
- Launching apps
- Viewing documentation
- Writing code
Demonstration:

Toolbox usage
Learn more

- Slides and some demos will be available
- Demo station: “Building MATLAB Apps to Visualize Complex Data”
- Training
  - Building interactive applications in MATLAB
  - Object-oriented programming in MATLAB
- Workshops by MathWorks Consulting
  - App development
  - Testing
Thank you.

Questions?