Large-Scale Development in MATLAB

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Challenge

How can you keep control of a large codebase of MATLAB code?

Measures of success:

- Easy to add new features
- Easy to qualify against new releases
- Easy for new staff to ramp up
- Fewer grey hairs
Themes

- Technologies
- Patterns
- Attention to detail
- Version control and testing
Demonstration

2500 lines of code
11 classes
6 helper functions
Themes

- Technologies
- Patterns
- Attention to detail
- Version control and testing
Handles and values

- Built-in types
- Mutability
- Life cycle
Events and listeners

- Built-in events
- Listener callbacks
- Custom events
- addEventListener or event.listener?
Themes

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Example component types

- Data
- Importer/exporter
- Chart
- Meter
- Model-view-controller
- Application launcher
- Algorithm
- Session
Custom chart

- Use object composition
- Hide low-level APIs behind dependent properties
- Manage object life cycle
- Expose layout properties (Parent, Units, Position)

Benefits:
- Presents a convenient API
- Enables use both interactively and within applications
Model-view-controller pattern
Model-view-controller pattern

- Model is a handle class
- Model exposes events
- View/controller is constructed with and stores listeners to a model

Benefits:
- Enables separation of logic and presentation
- Enables separation of parts of presentation
Application launcher

- Create model
- Create graphical container(s)
- Create and lay out views
- Create menus and toolbars

Benefits:
- Enables application content and layout to be changed easily
Layout management

- GUI Layout Toolbox

8: A complete example

The following example application uses many of the layout features discussed above in order to create a good-looking user interface that scales well when resized. It is not designed to showcase all the layout functionality, but shows how callbacks are added to provide user interaction. It also exemplifies separating the data from the GUI, a fundamental part of creating modular and maintainable applications.

The full application is available here:

- View demoBrowser.m
- Edit demoBrowser.m
- Run demoBrowser.m

Section contents:

- 8.1. Application structure
- 8.2. createInterface
- 8.3. updateInterface
- 8.4. onListSelection
- 8.5. Running it
- 8.6. Scalability
Themes

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Common pitfalls

- Combining components
- Not paying attention to shapes and sizes
- Obstructing object destruction
- Overusing public APIs privately
- Overusing events
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More resources

- Training
- Workshop
- Application design and development support
Thank you!

Questions?