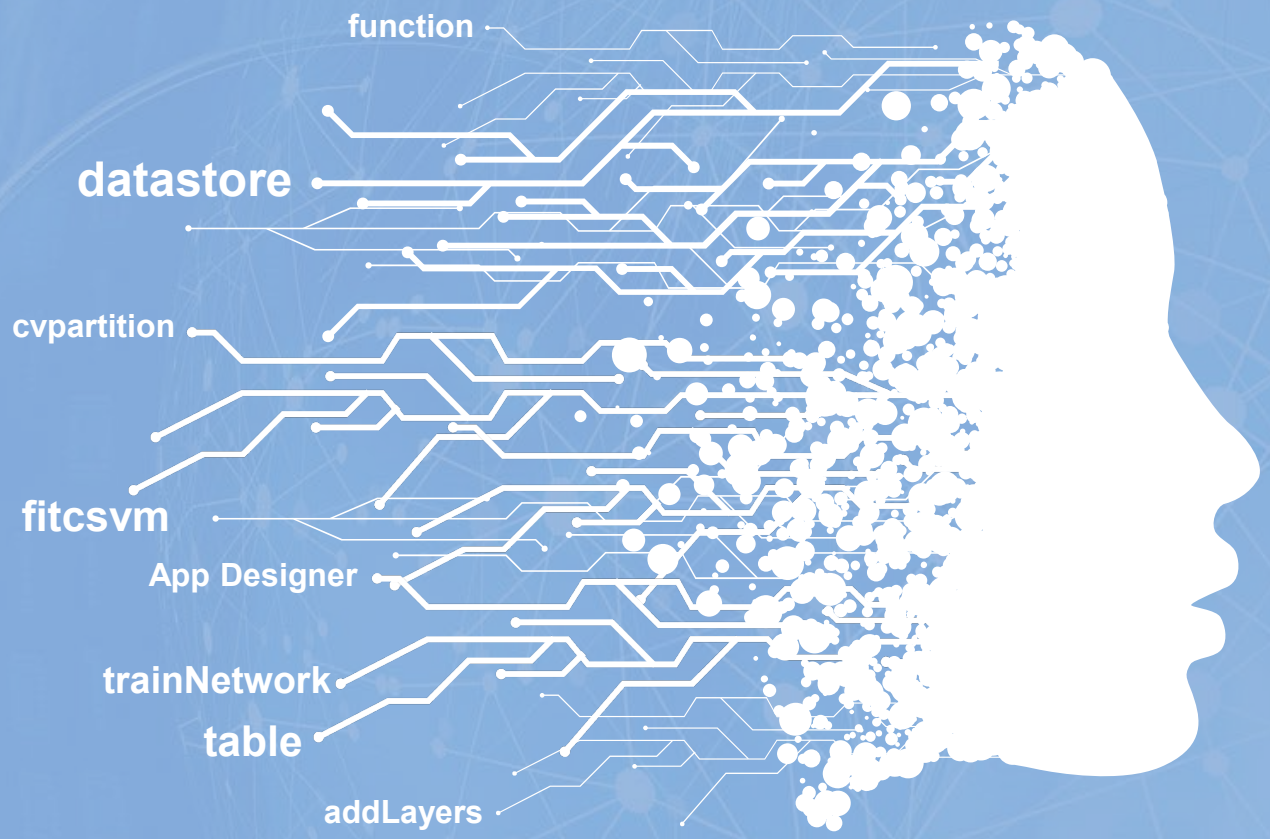
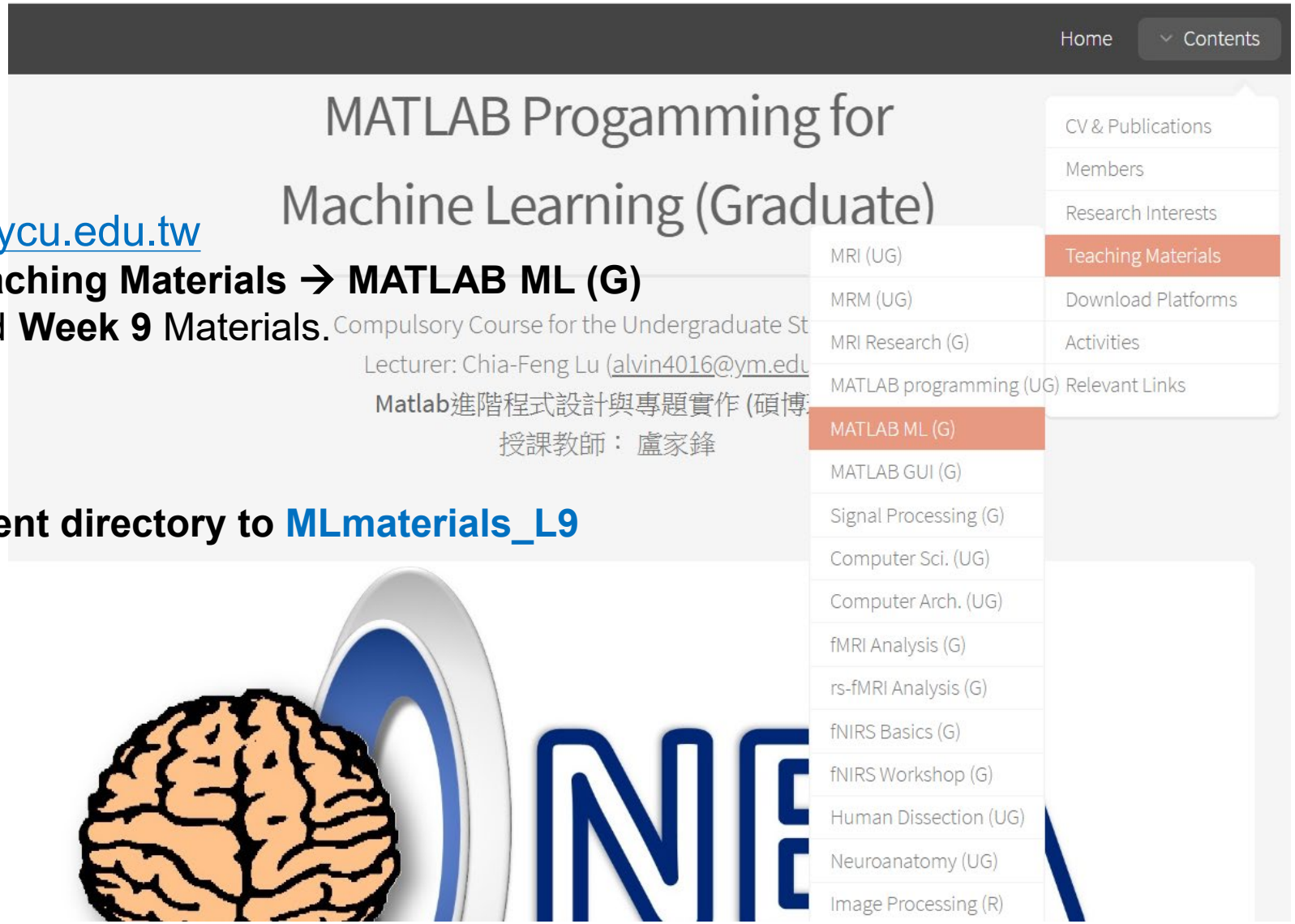


Graphic User Interface - App Designer

MATLAB進階程式語言與實作

盧家鋒 Chia-Feng Lu, Ph.D.
Department of Biomedical Imaging and Radiological Sciences, NYCU
alvin4016@nycu.edu.tw

Teaching Materials



http://cflu.lab.nycu.edu.tw

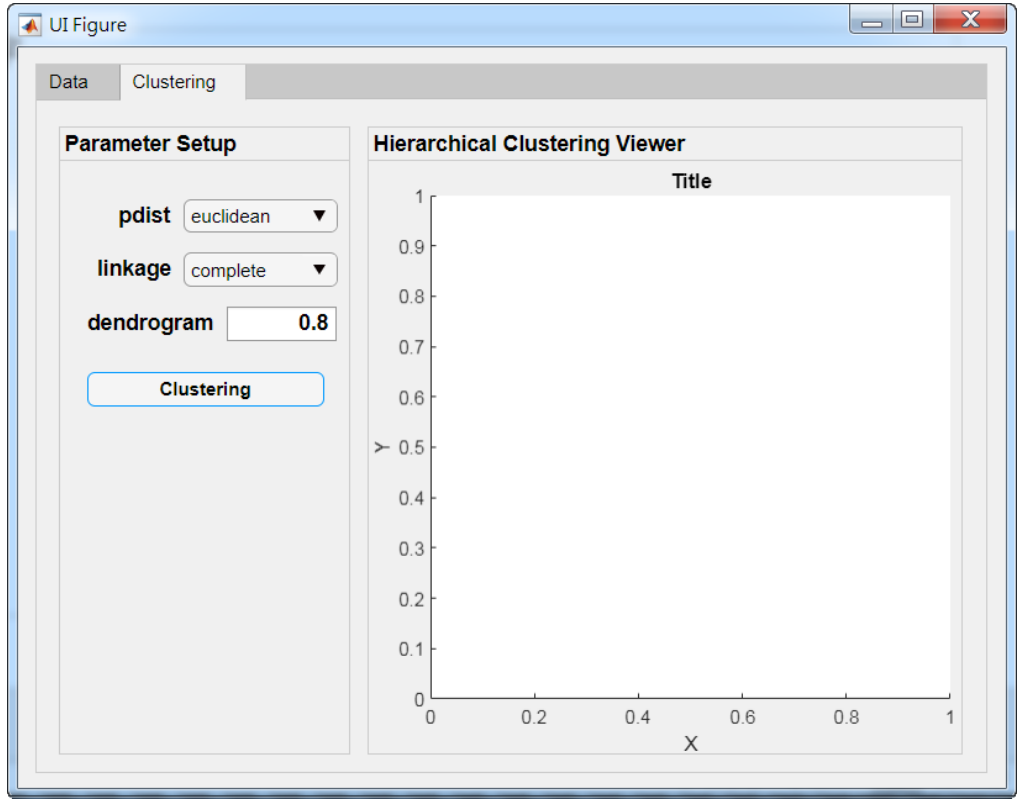
Contents → Teaching Materials → MATLAB ML (G)

Please download **Week 9** Materials.

Please set current directory to MLmaterials_L9

Team Project Proposal

- One to two A4 Pages
- Contents
  - Project title
  - Team members (names and student IDs)
  - Brief background and goals
  - Data (resources, types, and numbers)
  - Data preprocessing
  - Design of GUI (using appdesigner), including layouts and function descriptions
- Email to alvin4016@nycu.edu.tw **before 5/2**
  - Please name the email title as “Matlab project: Group #”



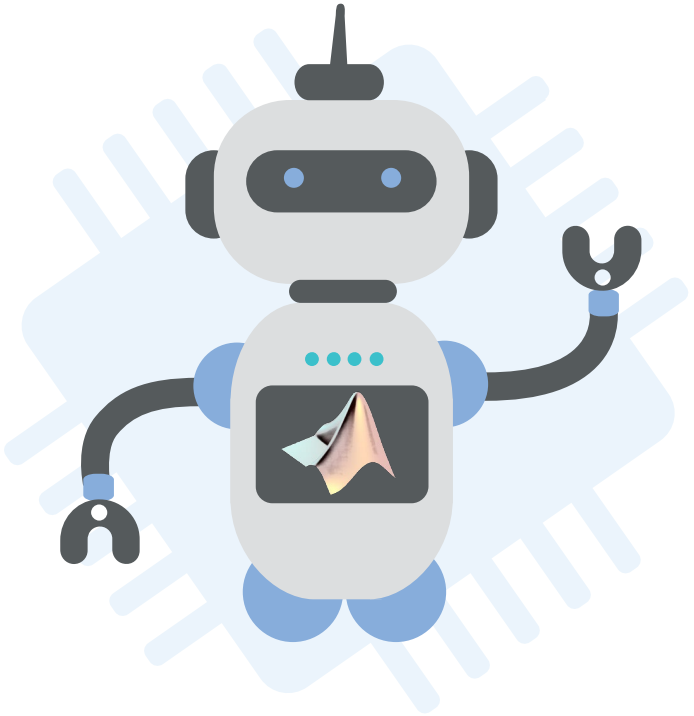
Contents in this Week

01 Introduction of App Designer

Build your very first App!

02 Advanced Usages of App Designer

Property and package of App



Introduction of App Designer

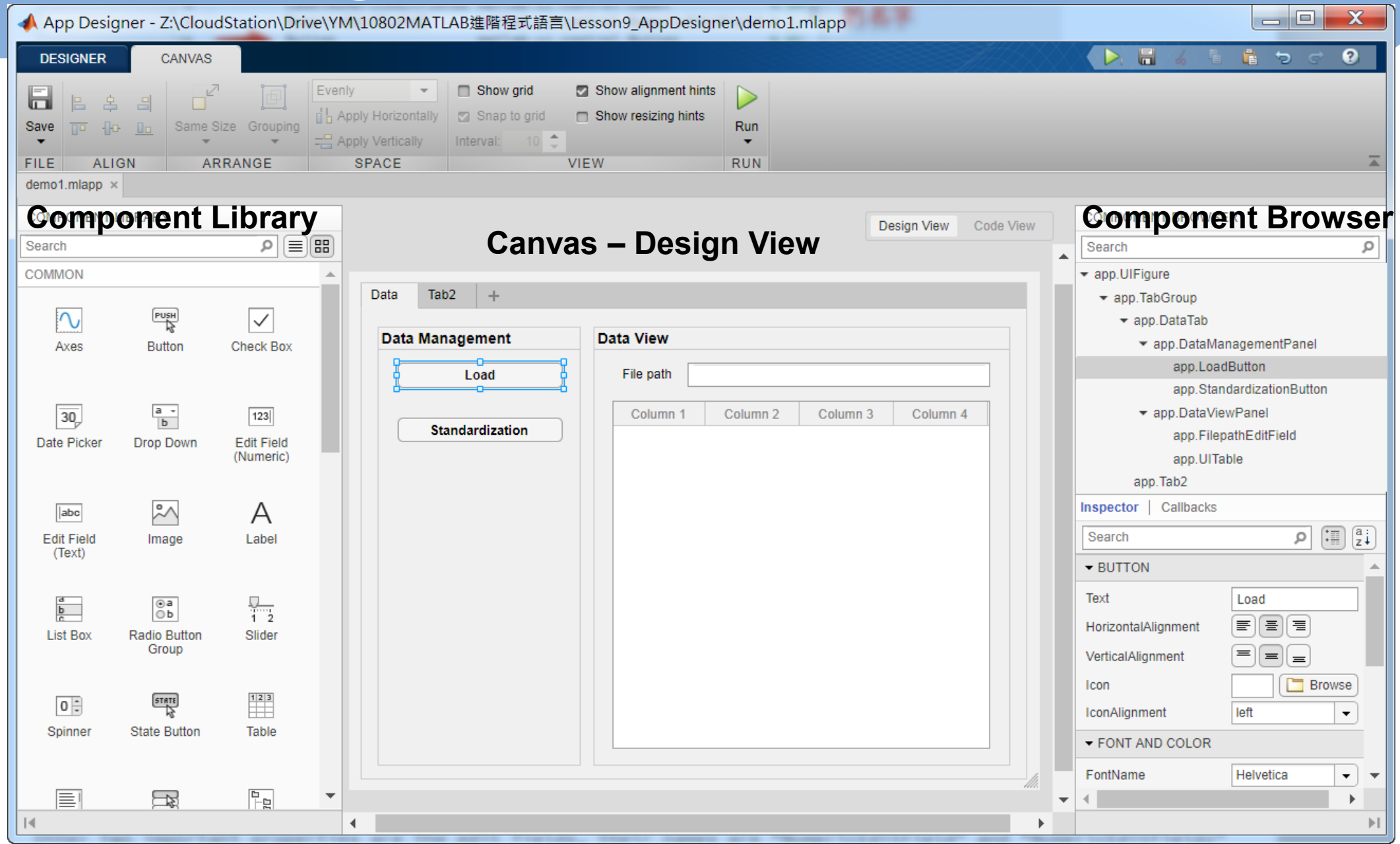
Build your very first App!

App Designer

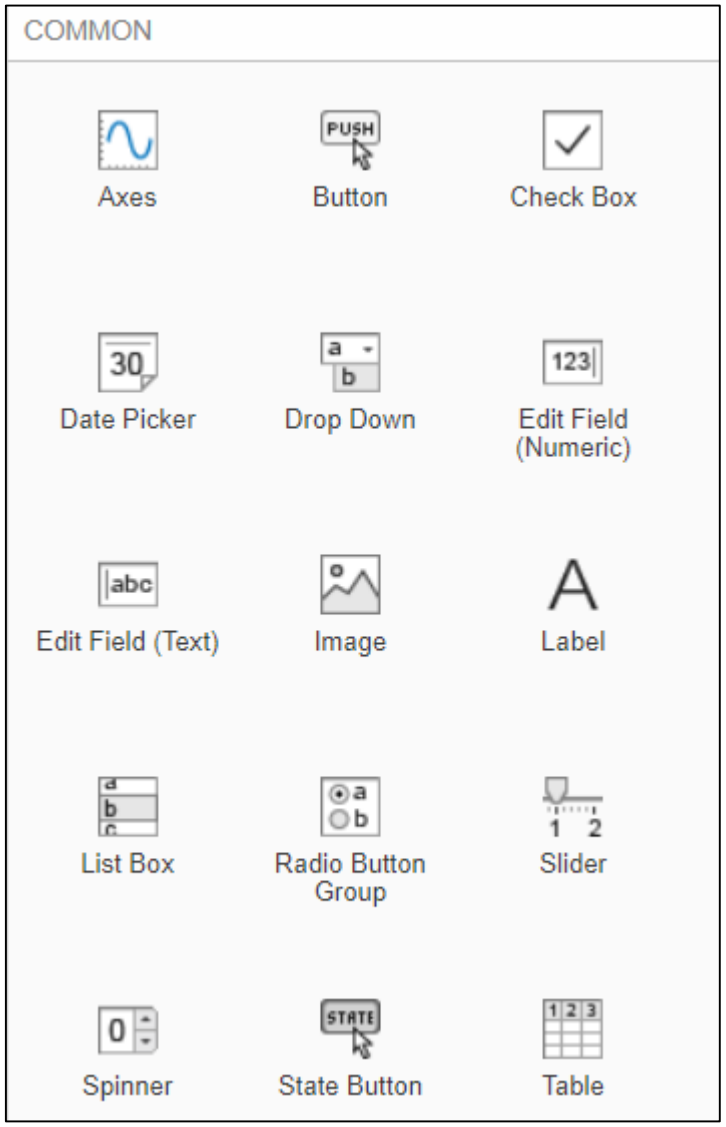
- Create professional apps without having to be a professional software developer.

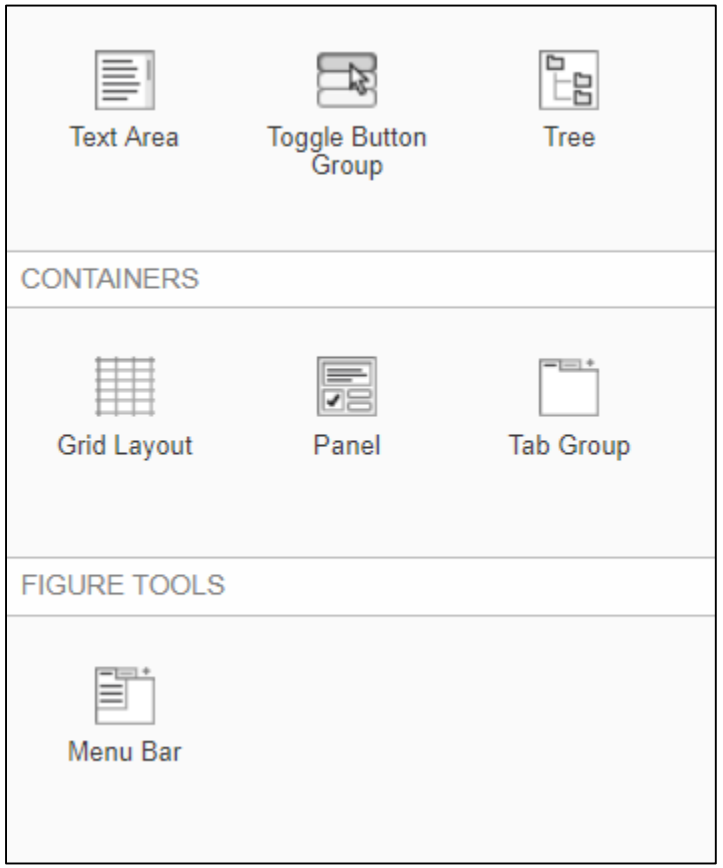
- Design a User Interface
  - Drag and drop visual components to lay out the design of your graphical user interface (GUI).
- Define App Behavior
  - Use the integrated editor to quickly program its behavior.
- Package Your App

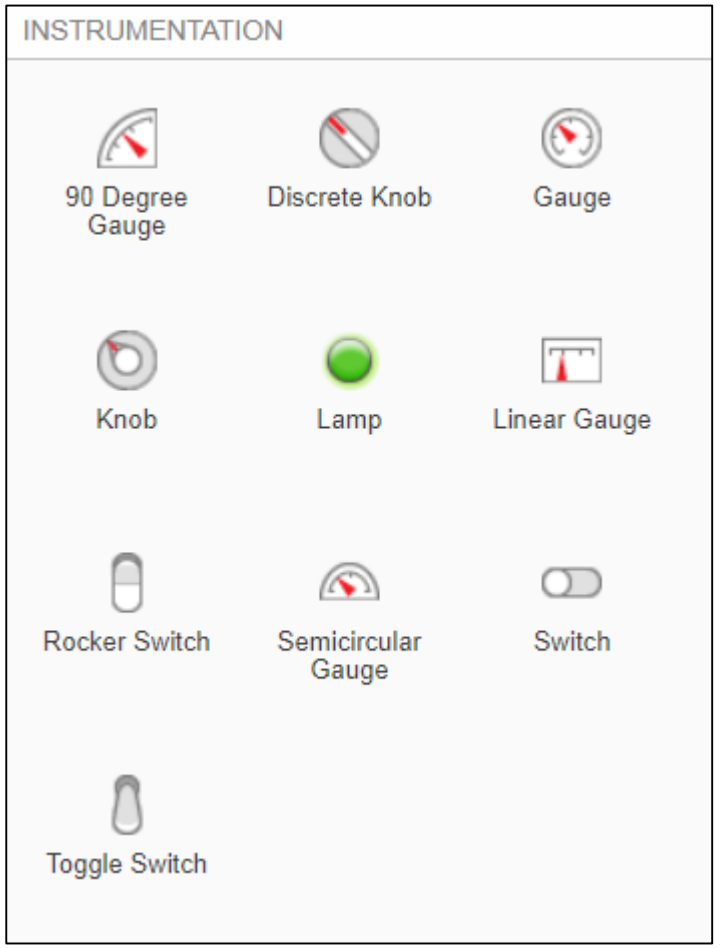
>> appdesigner



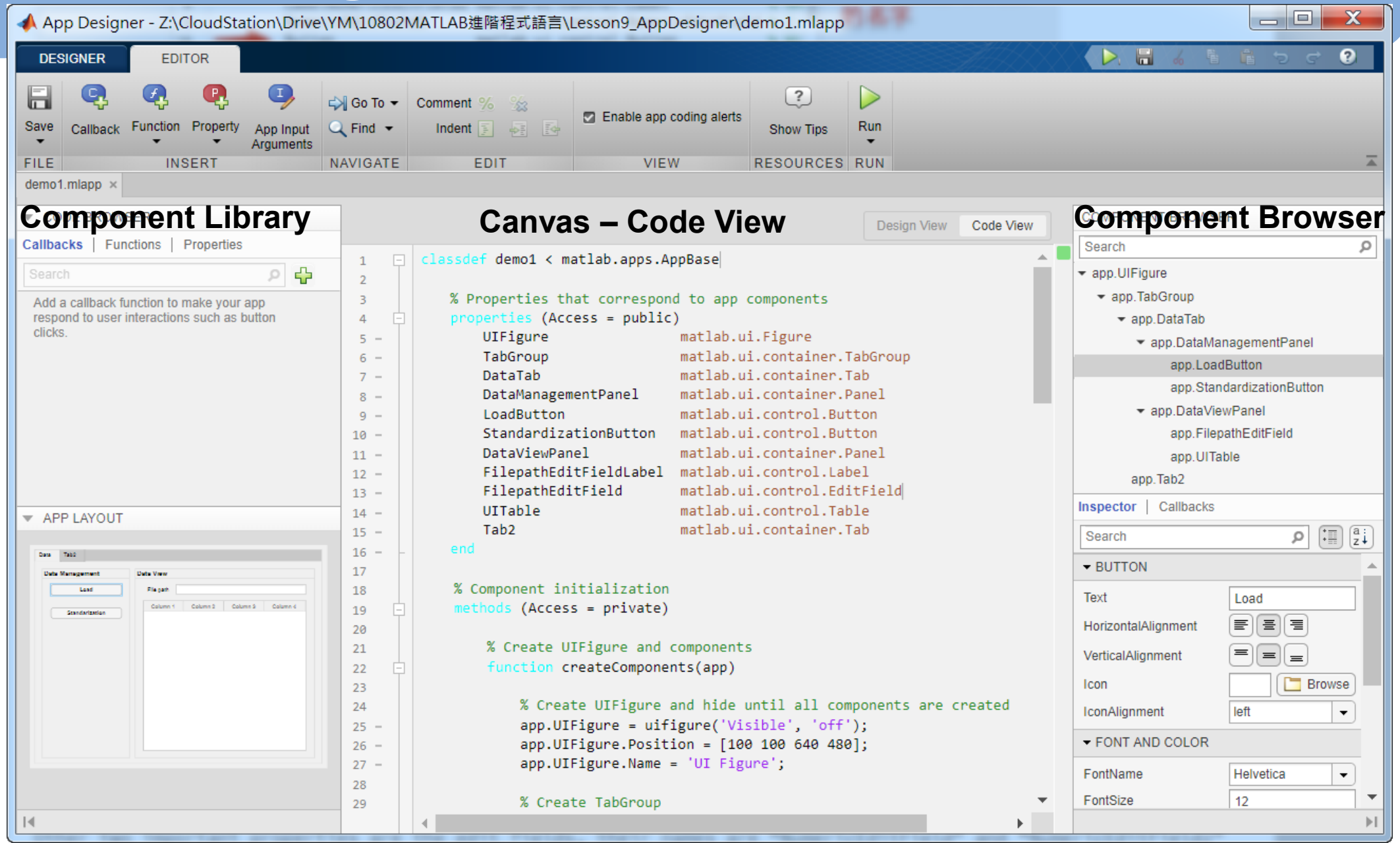
Component Library



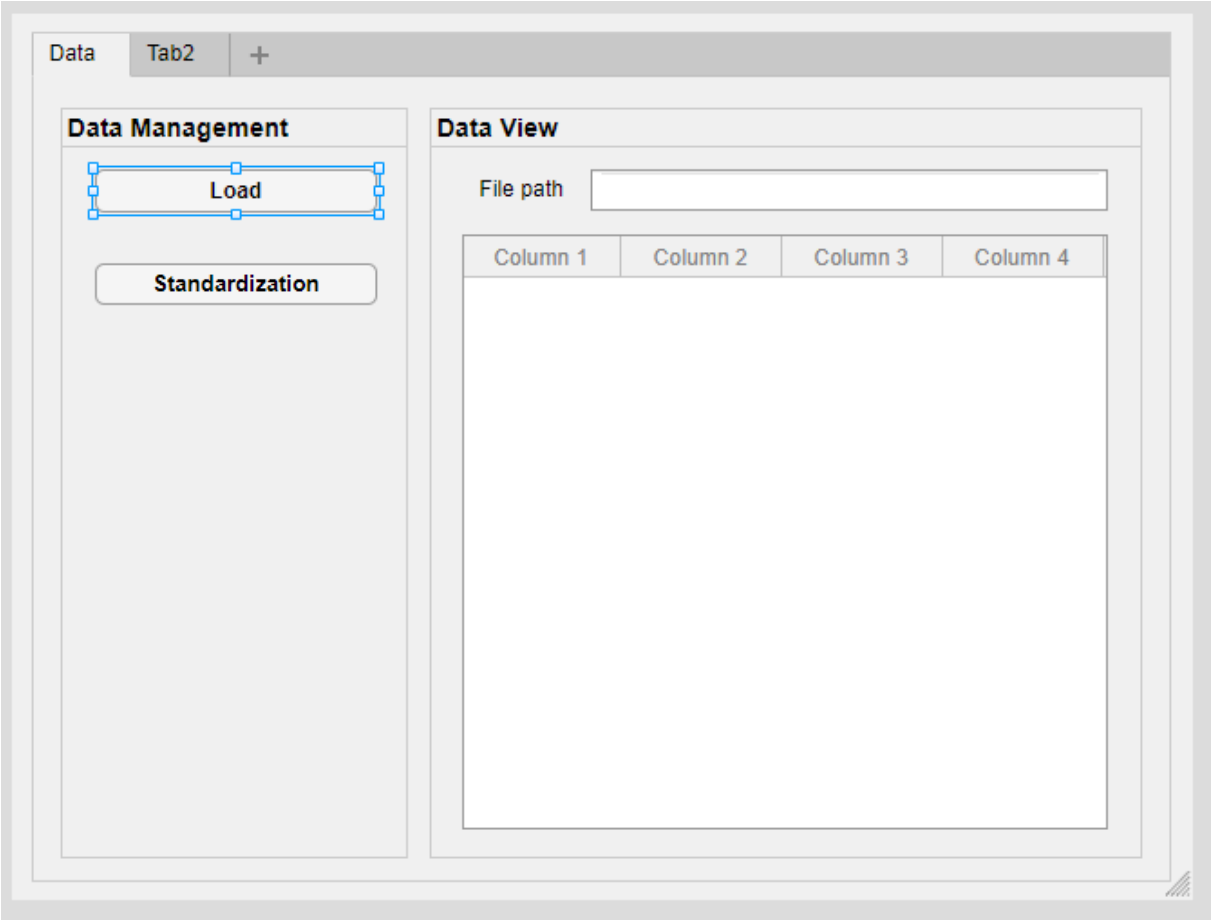


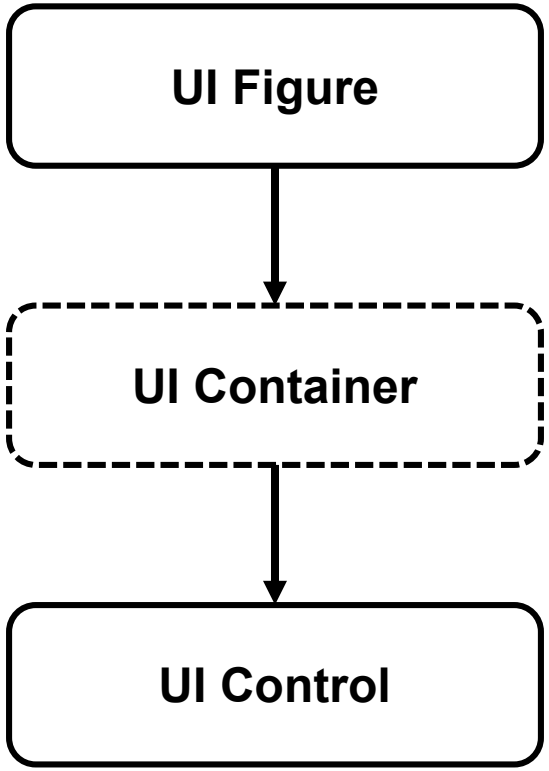


>> appdesigner

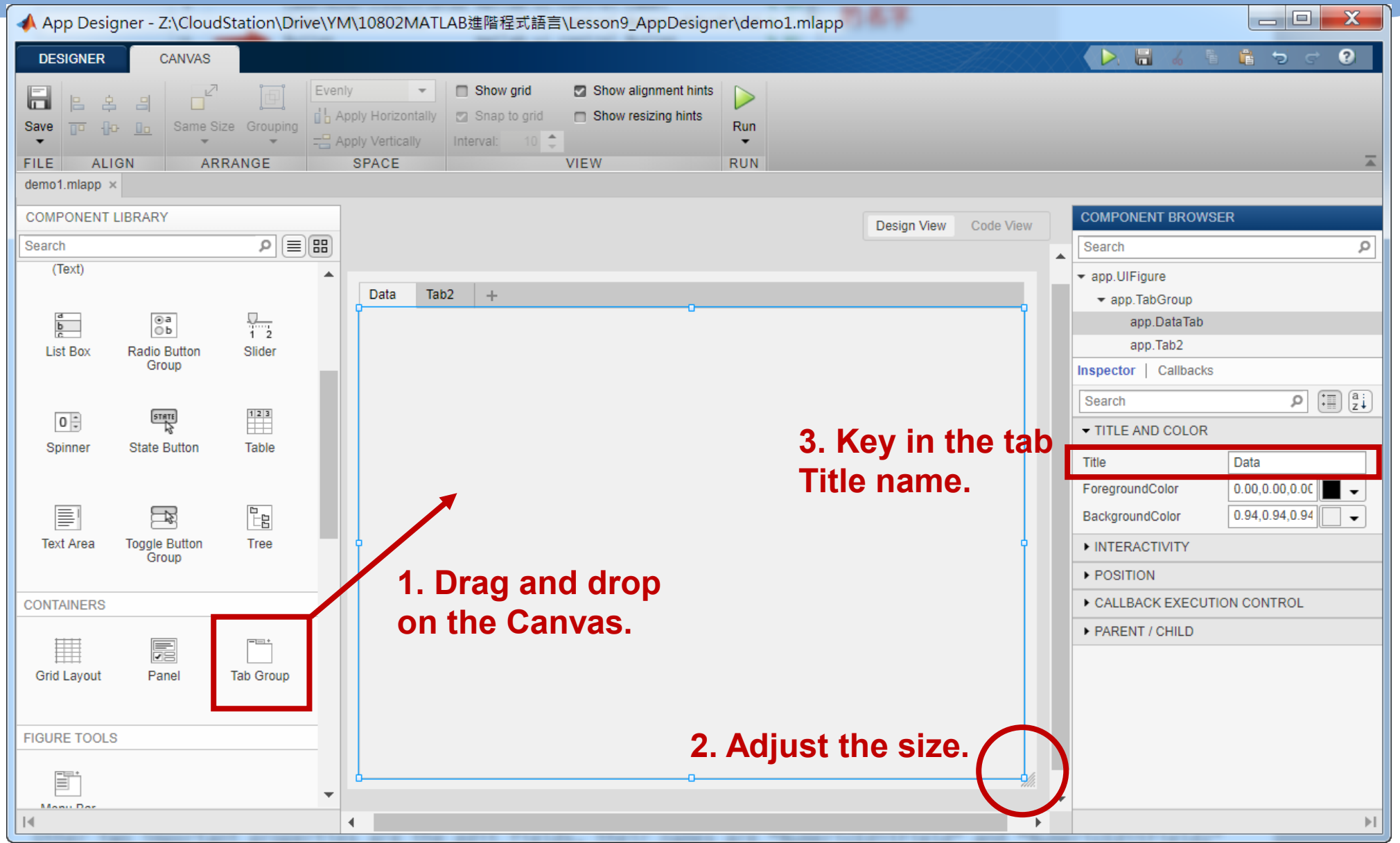


App Components

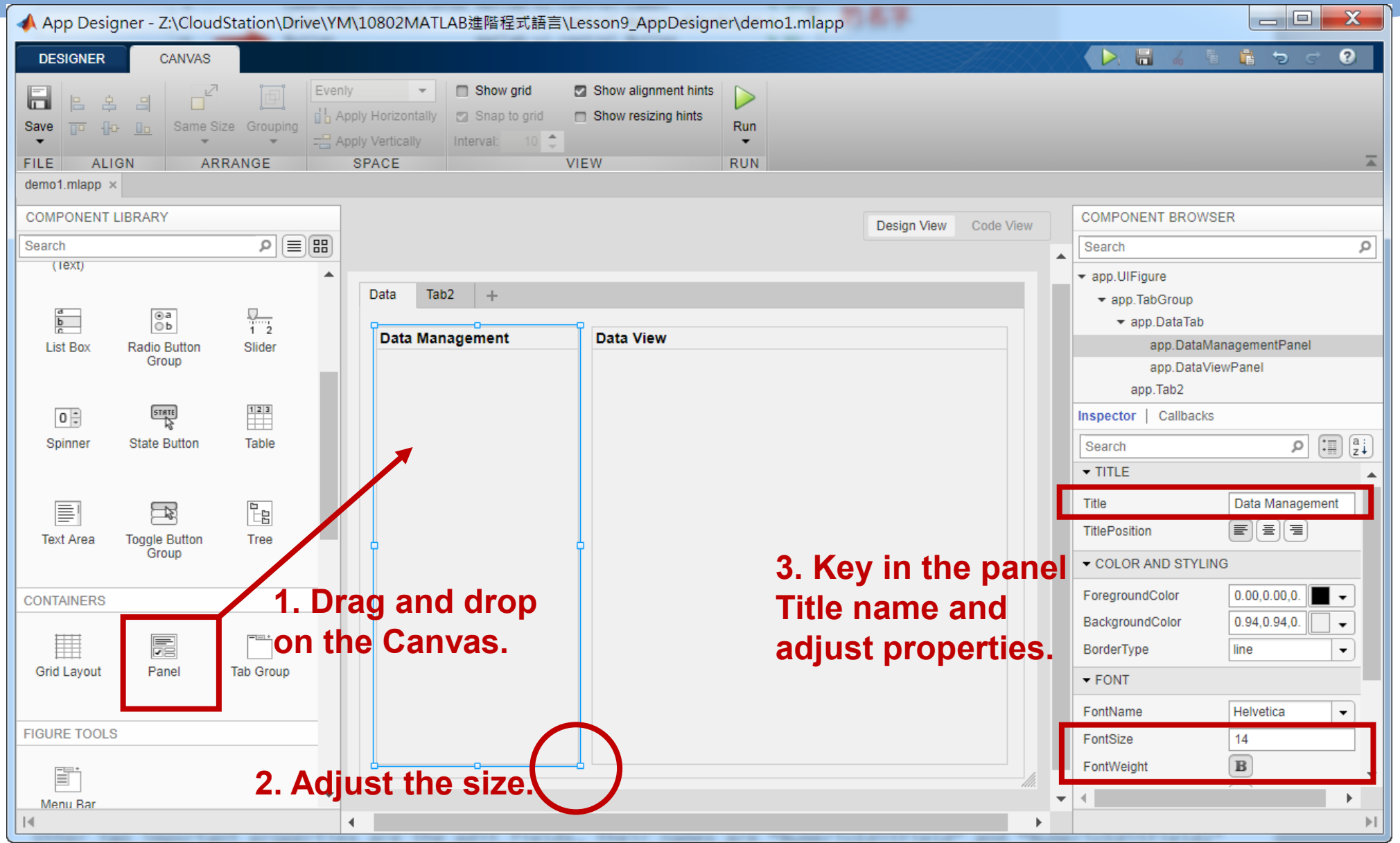




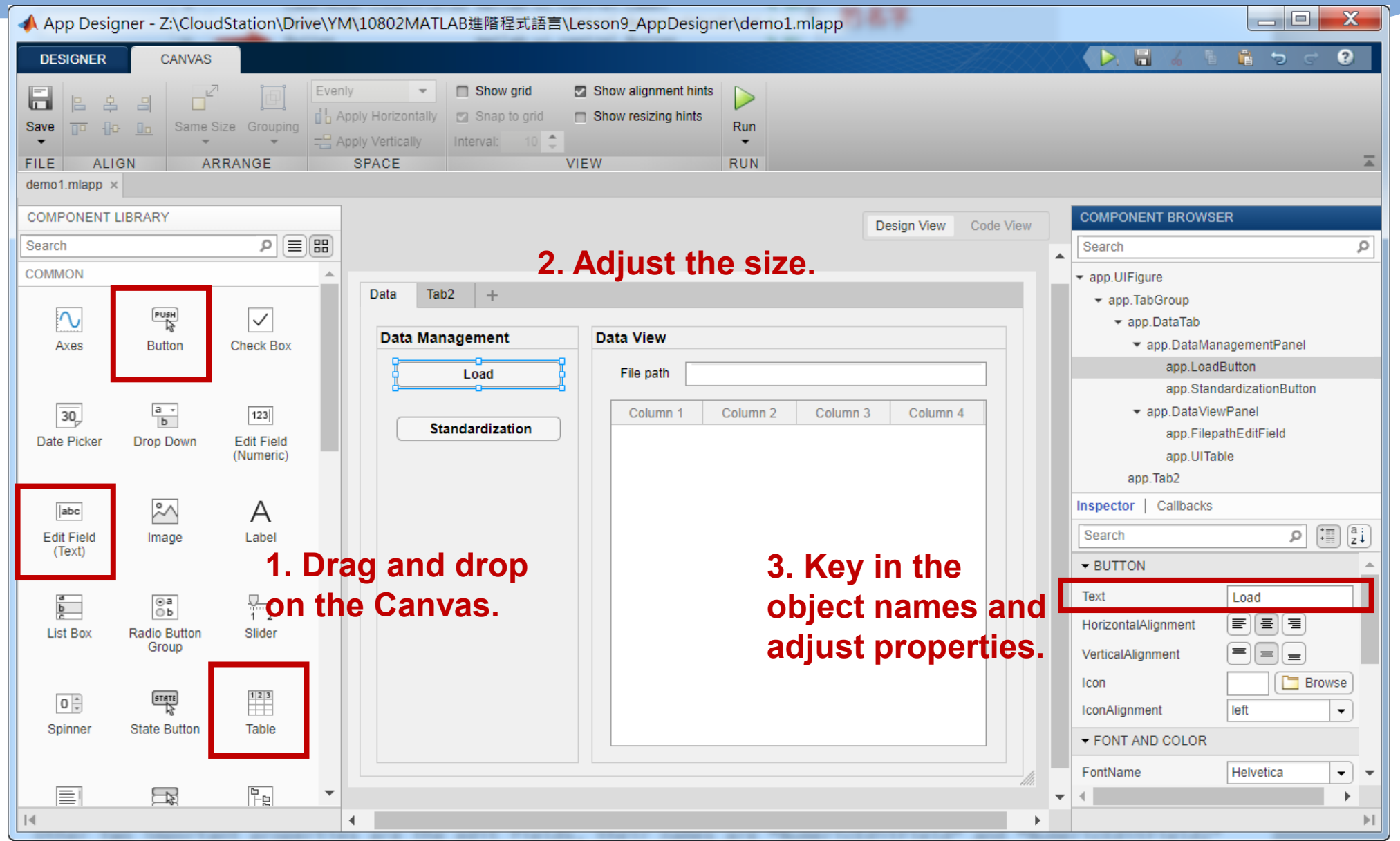
Create Your First App – UI Container



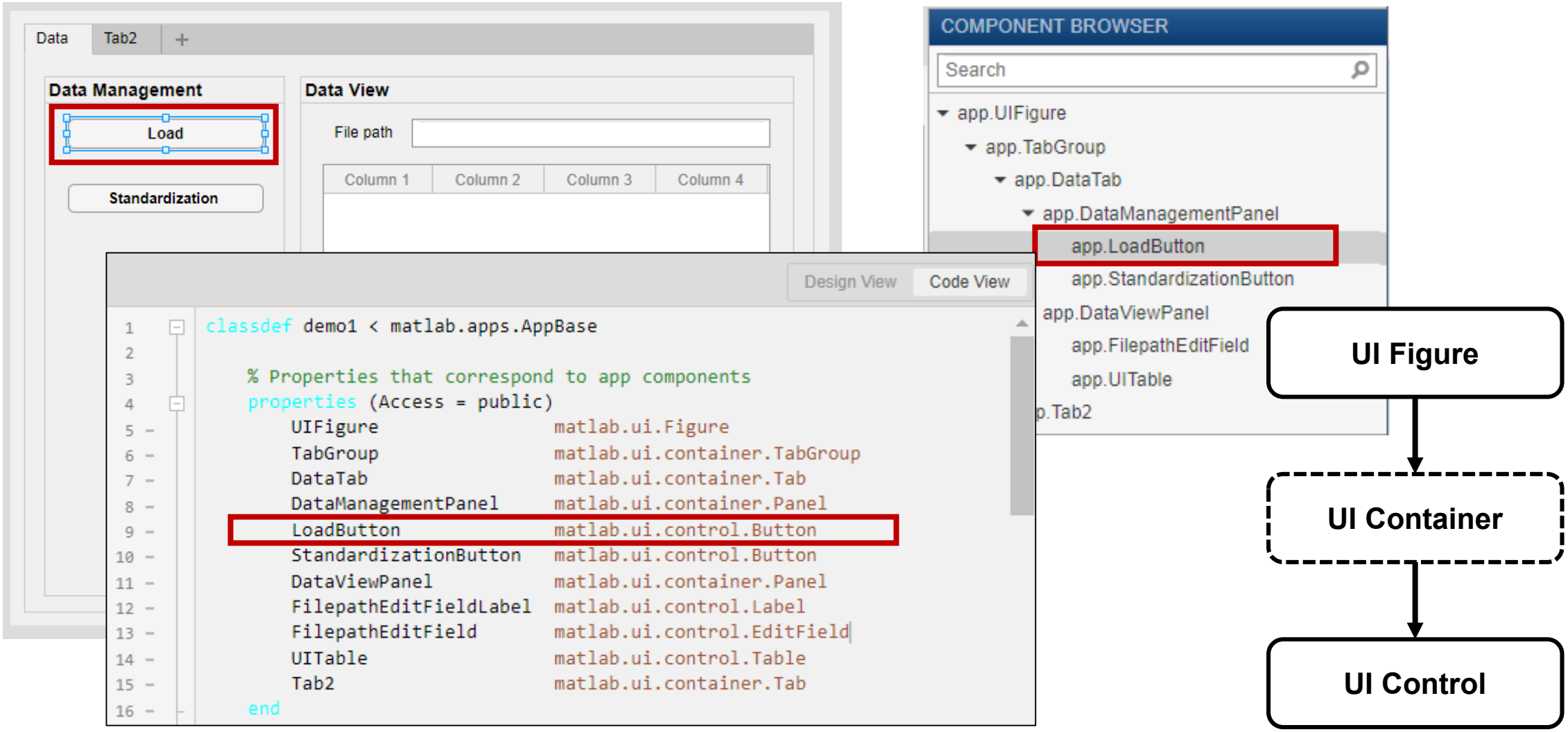
Create Your First App – UI Container



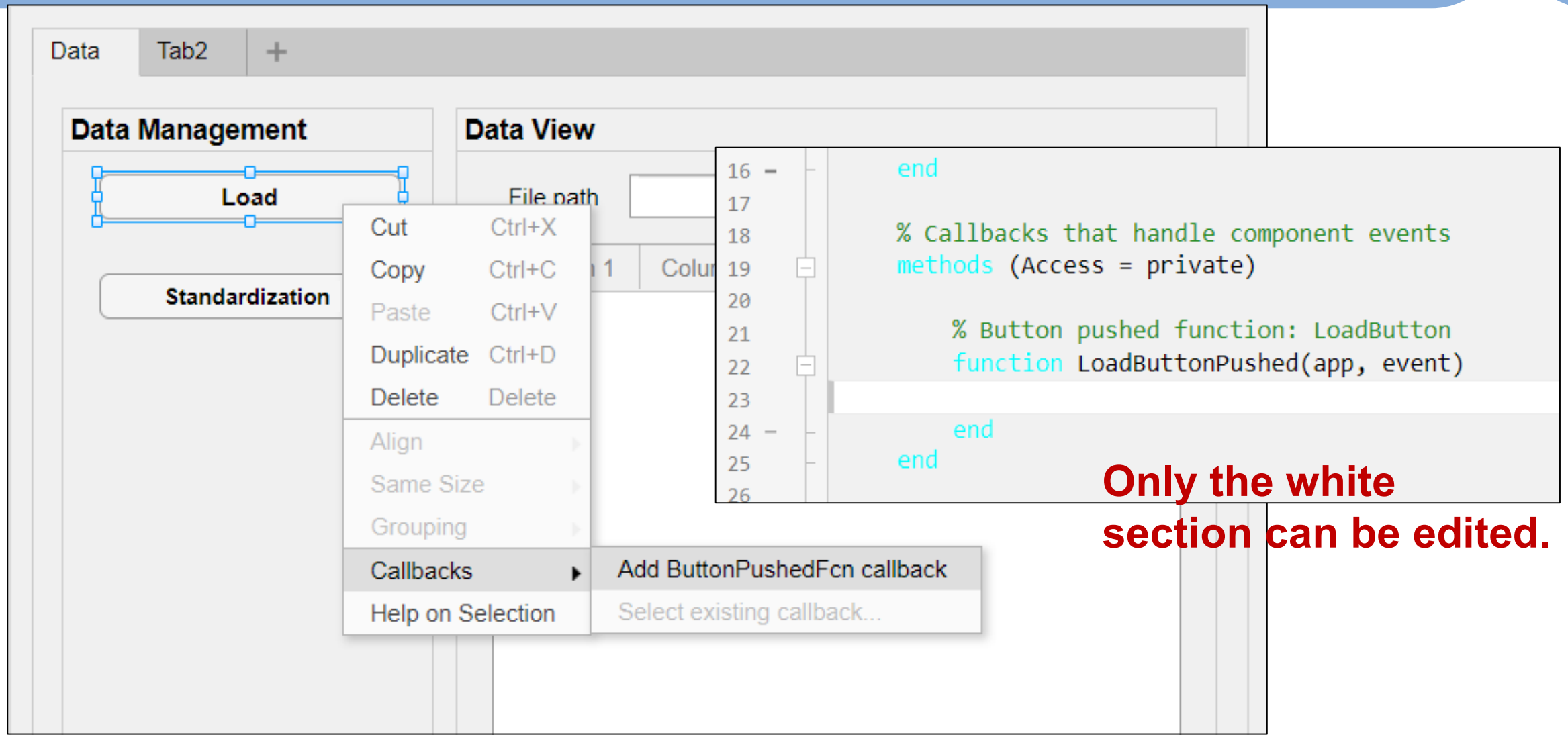
Create Your First App – UI Control



App Components



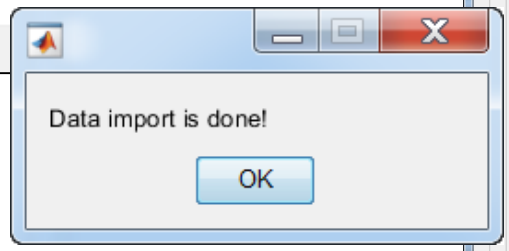
Callback of UI controls – Load

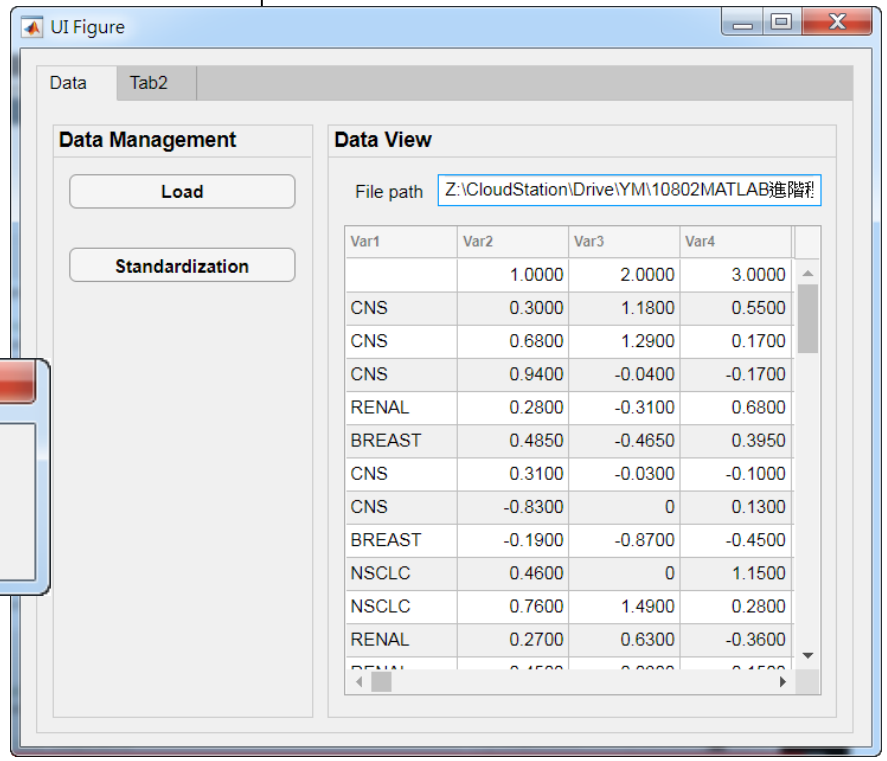


Only the white section can be edited.

Load data and display in UITable

```
18      % Callbacks that handle component events
19      methods (Access = private)
20
21          % Button pushed function: LoadButton
22          function LoadButtonPushed(app, event)
23              [filename,filepath] = uigetfile('*.*','Please select a file to import.');
24              if filename
25                  app.FilepathEditField.Value = [filepath, filename];
26                  data = readtable([filepath,filename]);
27                  app.UITable.Data = data;
28                  app.UITable.ColumnName = data.Properties.VariableNames;
29                  msgbox('Data import is done!')
30
31                  assignin('base','app',app) % assign 'app' to workspace
32              end
33          end
```





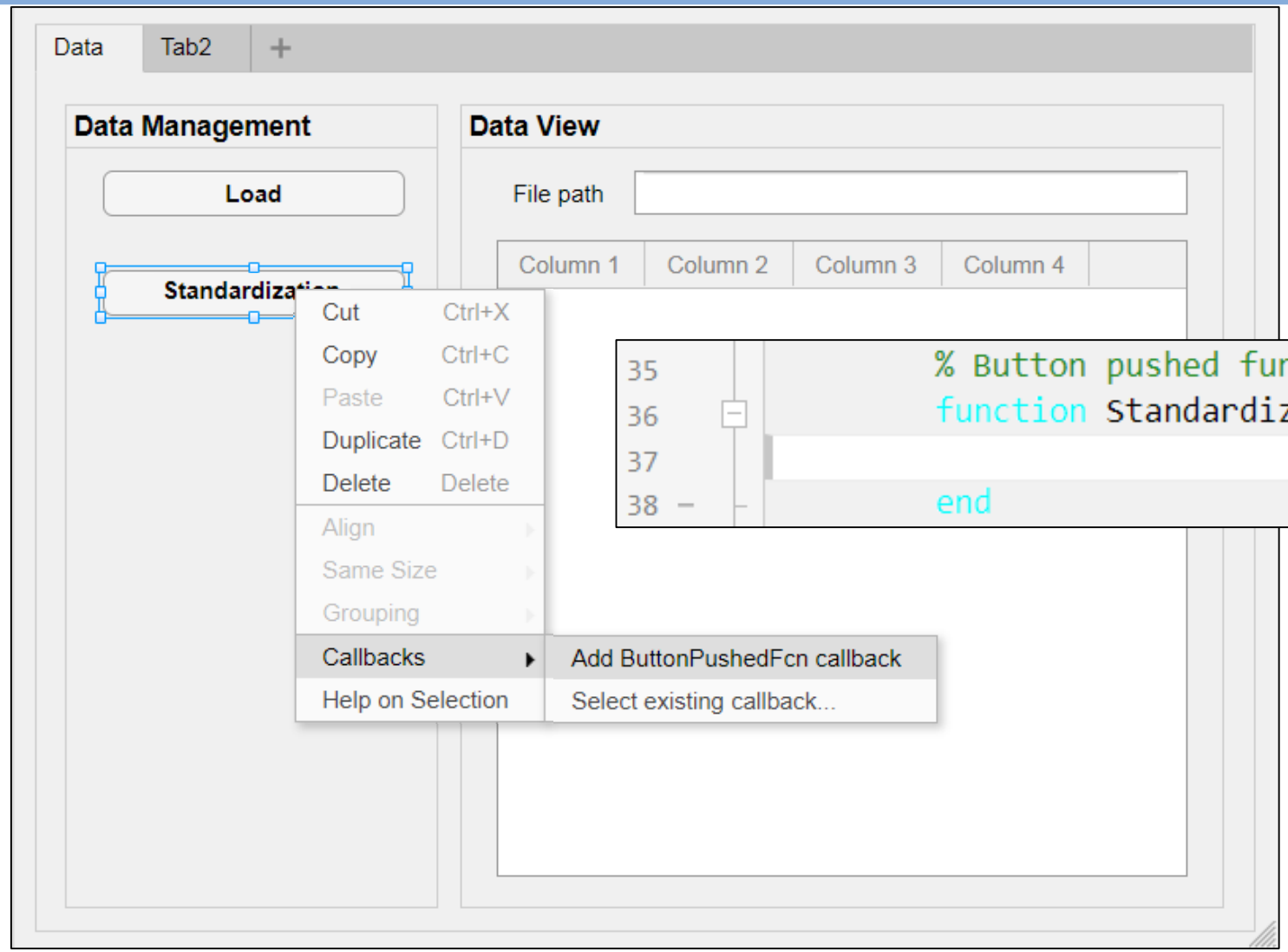
Load MLmaterials_L9\NCI60data.csv

Codes for Copy

```
[filename,filepath] = uigetfile('*.*','Please select a file to import.');
if filename
    app.FilepathEditField.Value = [filepath, filename];
    data = readtable([filepath,filename]);
    app.UITable.Data = data;
    app.UITable.ColumnName = data.Properties.VariableNames;
    msgbox('Data import is done!')

    assignin('base','app',app) % assign 'app' to workspace
end
```

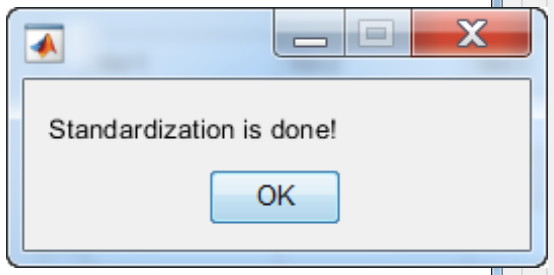
Callback of UI controls – Standardization

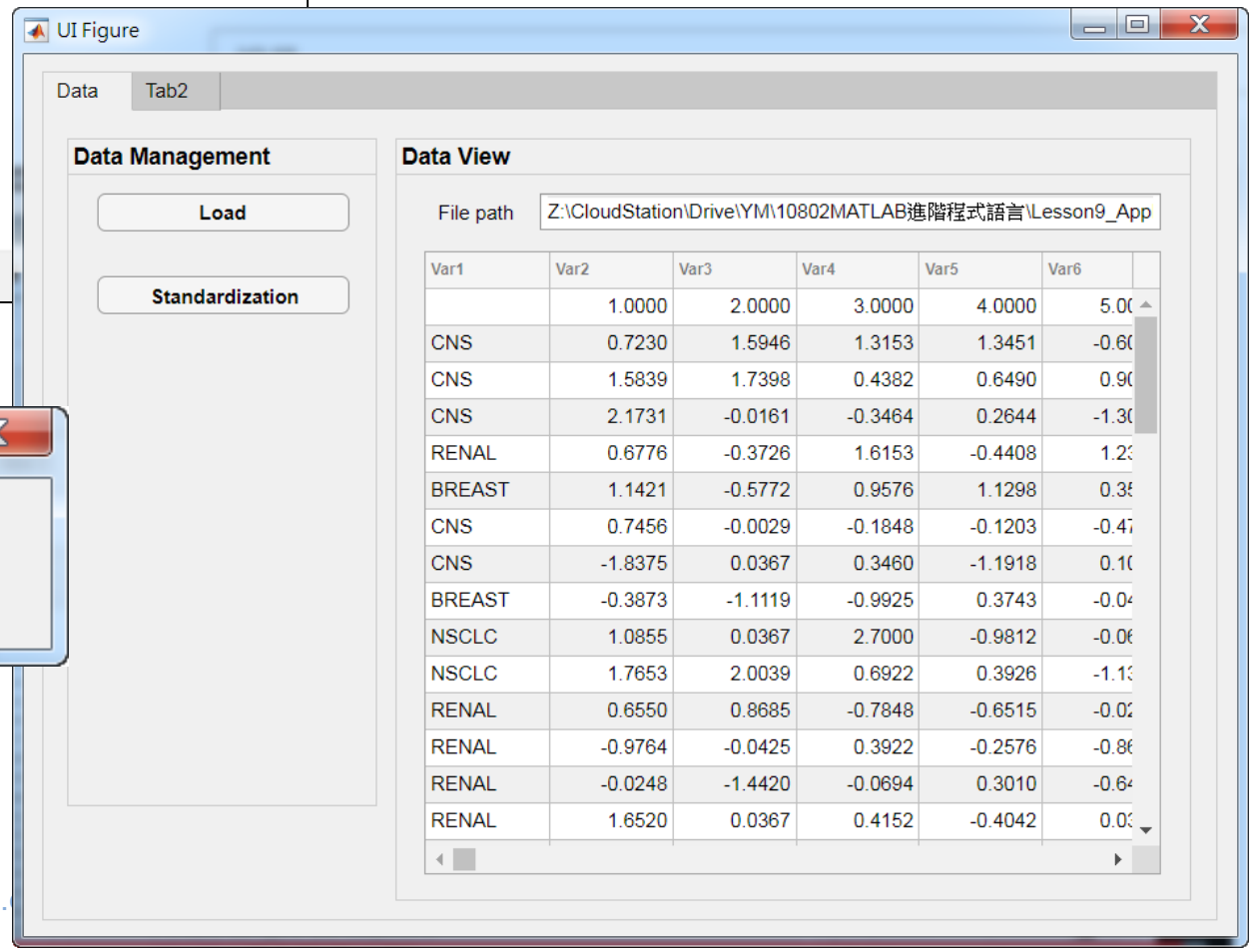



```
35          % Button pushed function: StandardizationButton
36          function StandardizationButtonPushed(app, event)
37
38          end
```

Standardize the data

```
35          % Button pushed function: StandardizationButton
36          function StandardizationButtonPushed(app, event)
37              data = app.UITable.Data;
38              numdata = table2array(data(2:end,2:end));
39              Z = zscore(numdata);
40              data(2:end,2:end) = array2table(Z);
41              app.UITable.Data = data;
42
43              msgbox('Standardization is done!')
44          end
```





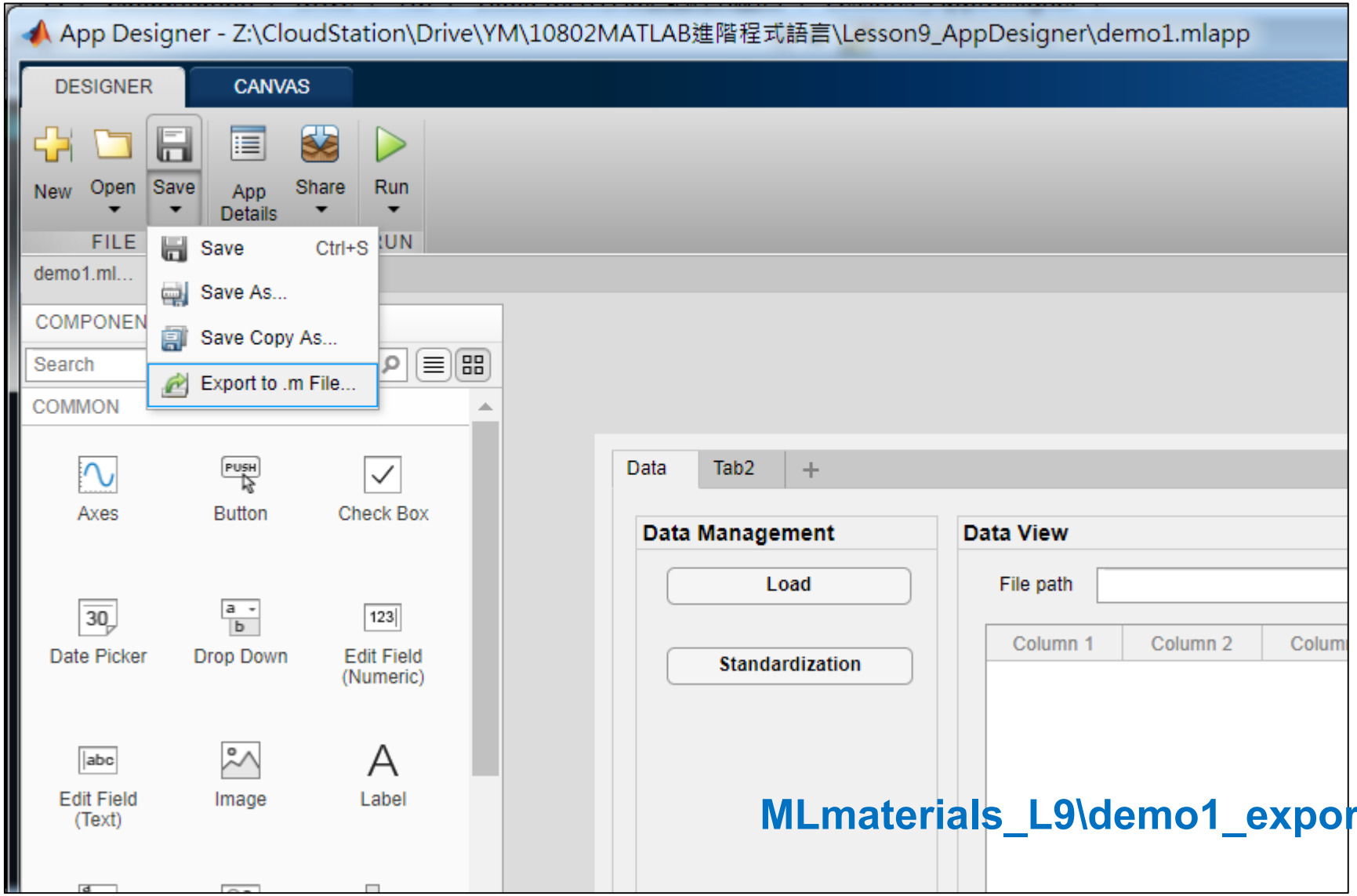
MLmaterials_L9\demo1.mlapp

Codes for Copy

```
data = app.UITable.Data;
numdata = table2array(data(2:end,2:end));
Z = zscore(numdata);
data(2:end,2:end) = array2table(Z);
app.UITable.Data = data;

msgbox('Standardization is done!')
```

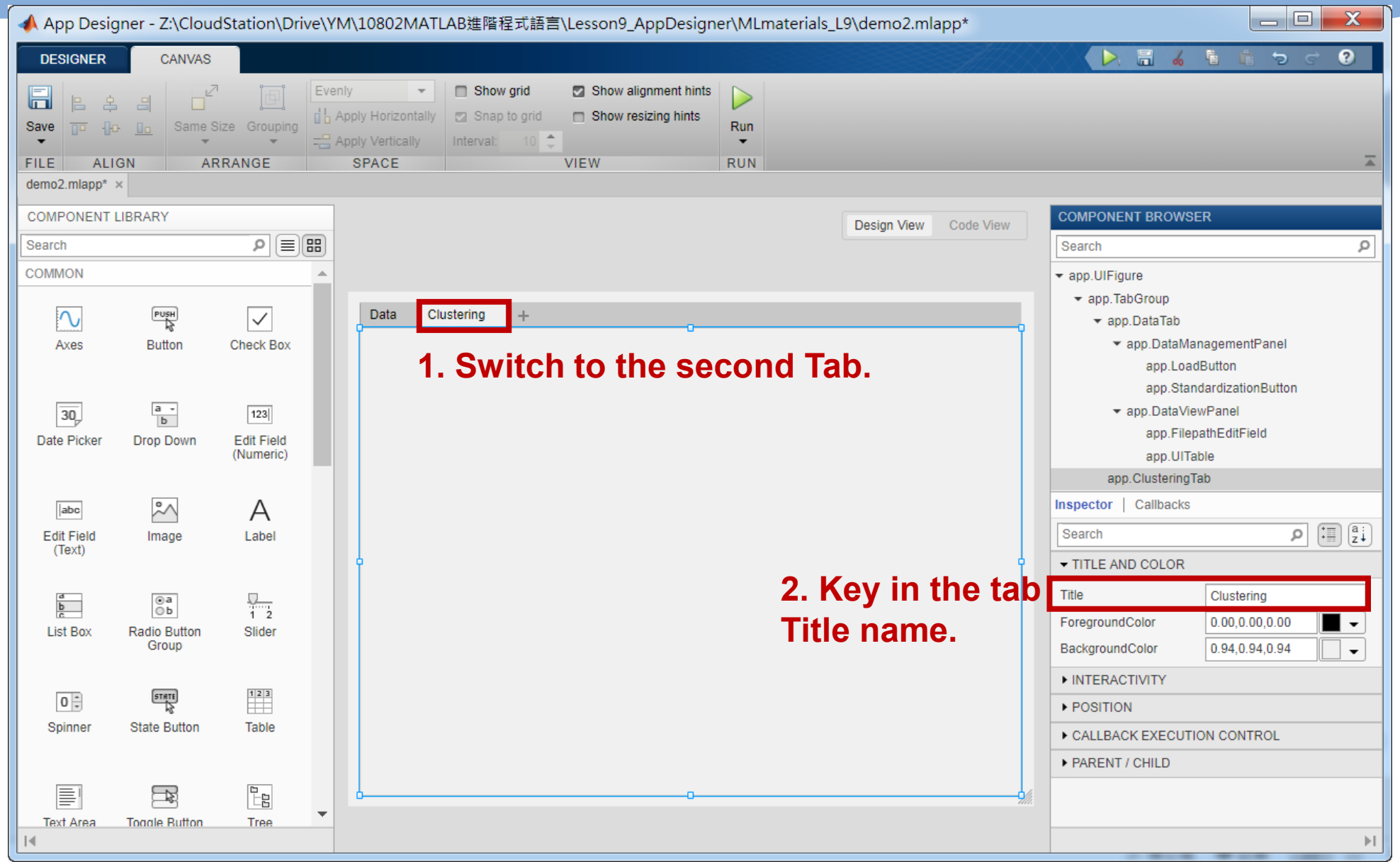
Generate M-code (*.m)



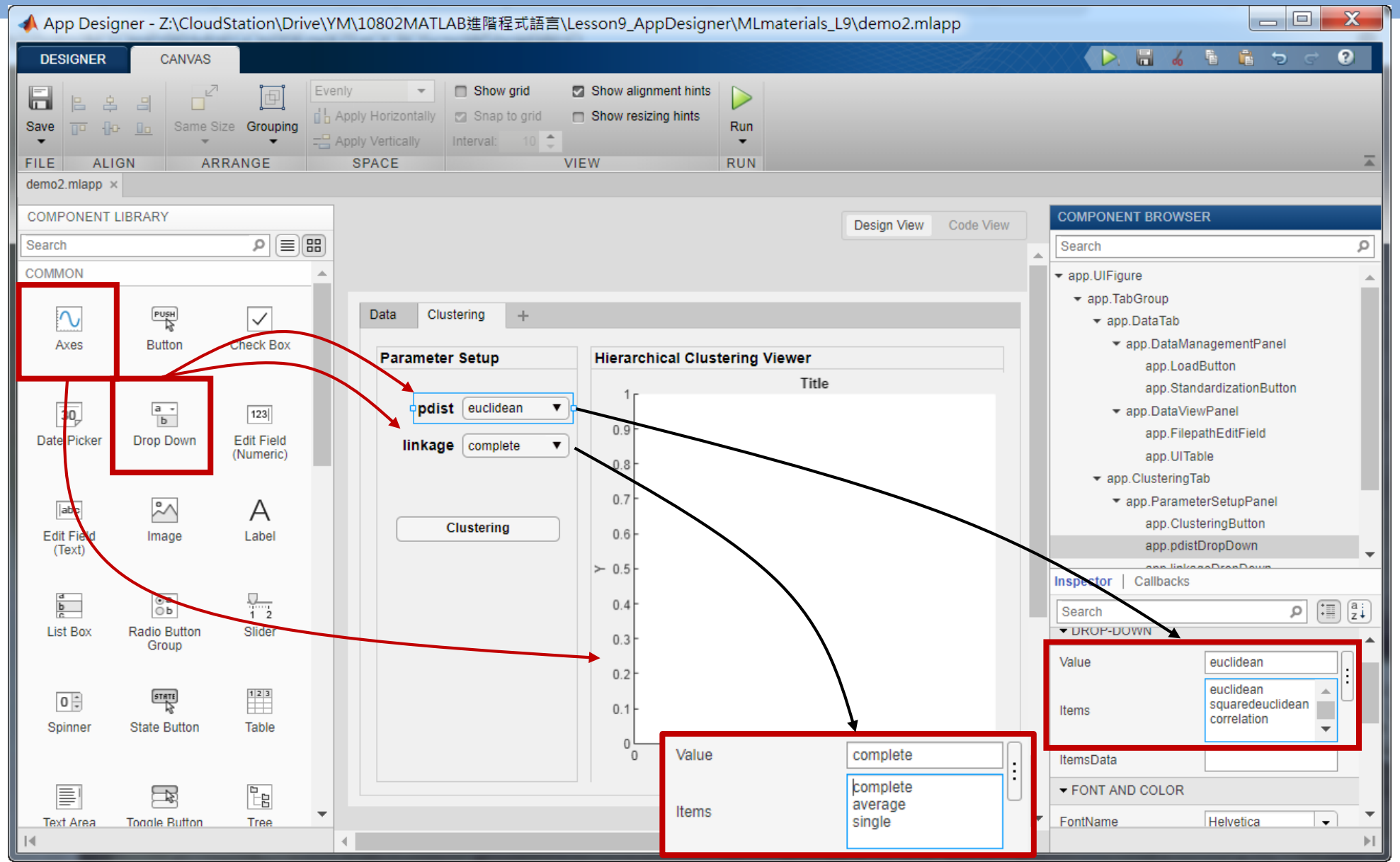
MLmaterials_L9\demo1_exported.m

Property and package of App

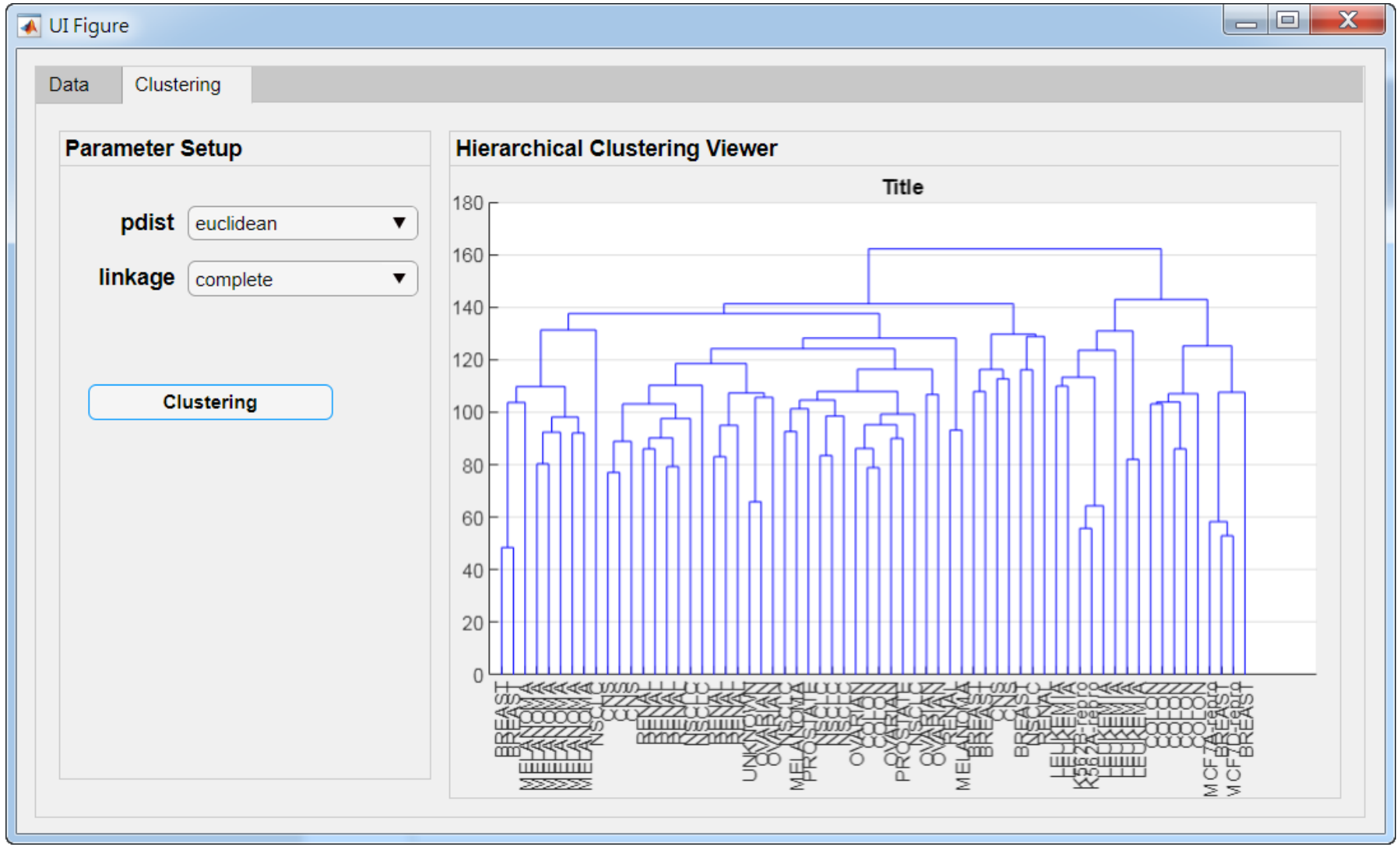
UI Tab Usage


App Designer - Z:\CloudStation\Drive\YM\10802MATLAB進階程式語言\Lesson9_AppDesigner\MLmaterials_L9\demo2.mlapp*
DESIGNER
CANVAS
Save
Same Size
Grouping
Evenly
Apply Horizontally
Apply Vertically
Show grid
Snap to grid
Interval:
Show alignment hints
Show resizing hints
Run
FILE
ALIGN
ARRANGE
SPACE
VIEW
RUN
demo2.mlapp*
COMPONENT LIBRARY
Search
COMMON
Axes
Button
Check Box
Date Picker
Drop Down
Edit Field (Numeric)
Edit Field (Text)
Image
Label
List Box
Radio Button Group
Slider
Spinner
State Button
Table
Text Area
Toggle Button
Tree
Design View
Code View
Data
Clustering
1. Switch to the second Tab.
2. Key in the tab Title name.
COMPONENT BROWSER
Search
app.UIFigure
app.TabGroup
app.DataTab
app.DataManagementPanel
app.LoadButton
app.StandardizationButton
app.DataViewPanel
app.FilepathEditField
app.UITable
app.ClusteringTab
Inspector
Callbacks
Search
TITLE AND COLOR
Title
Clustering
ForegroundColor
0.00,0.00,0.00
BackgroundColor
0.94,0.94,0.94
INTERACTIVITY
POSITION
CALLBACK EXECUTION CONTROL
PARENT / CHILD

Layout of the second Tab



Perform Hierarchical Clustering



Perform Hierarchical Clustering

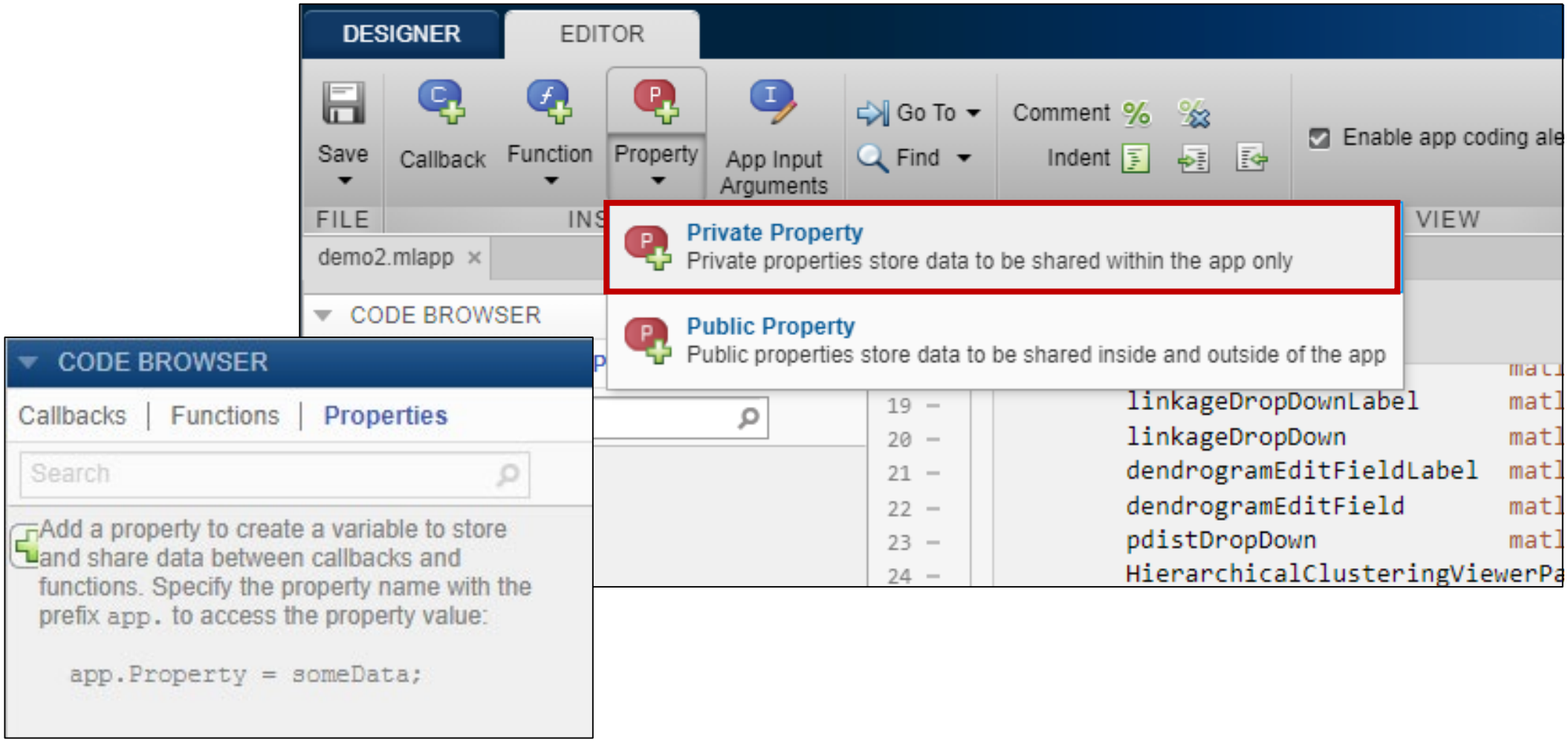
```
70        % perform hierarchical clustering
71 -      data = app.UITable.Data;
72 -      numdata = table2array(data(2:end,2:end));
73 -      datalabel = table2cell(data(2:end,1));
74
75 -      D=pdist(numdata,app.pdistDropDown.Value);
76 -      Ctree=linkage(D,app.linkageDropDown.Value);
77
78 -      [H,T,outperm]=dendrogram(Ctree,0,'Labels',datalabel,'Orientation','top');
79
80 -      plot(app.UIAxes,0)
81 -      hold(app.UIAxes) % hold axes
82 -      for i=1:length(H)
83 -         plot(app.UIAxes,H(i).XData,H(i).YData,'color','b')
84 -      end
85 -      hold(app.UIAxes)  % release axes
86 -      close(gcf) % close the figure generated by dendrogram
87
88 -      app.UIAxes.XTick = 1:length(datalabel);
89 -      app.UIAxes.XTickLabel = datalabel(outperm);
90 -      app.UIAxes.XTickLabelRotation = 90;
91 -      app.UIAxes.XLabel.String = '';
92 -      app.UIAxes.YLabel.String = '';
93 -      app.UIAxes.YGrid = 'on';
```

MLmaterials_L9\demo2.mlapp

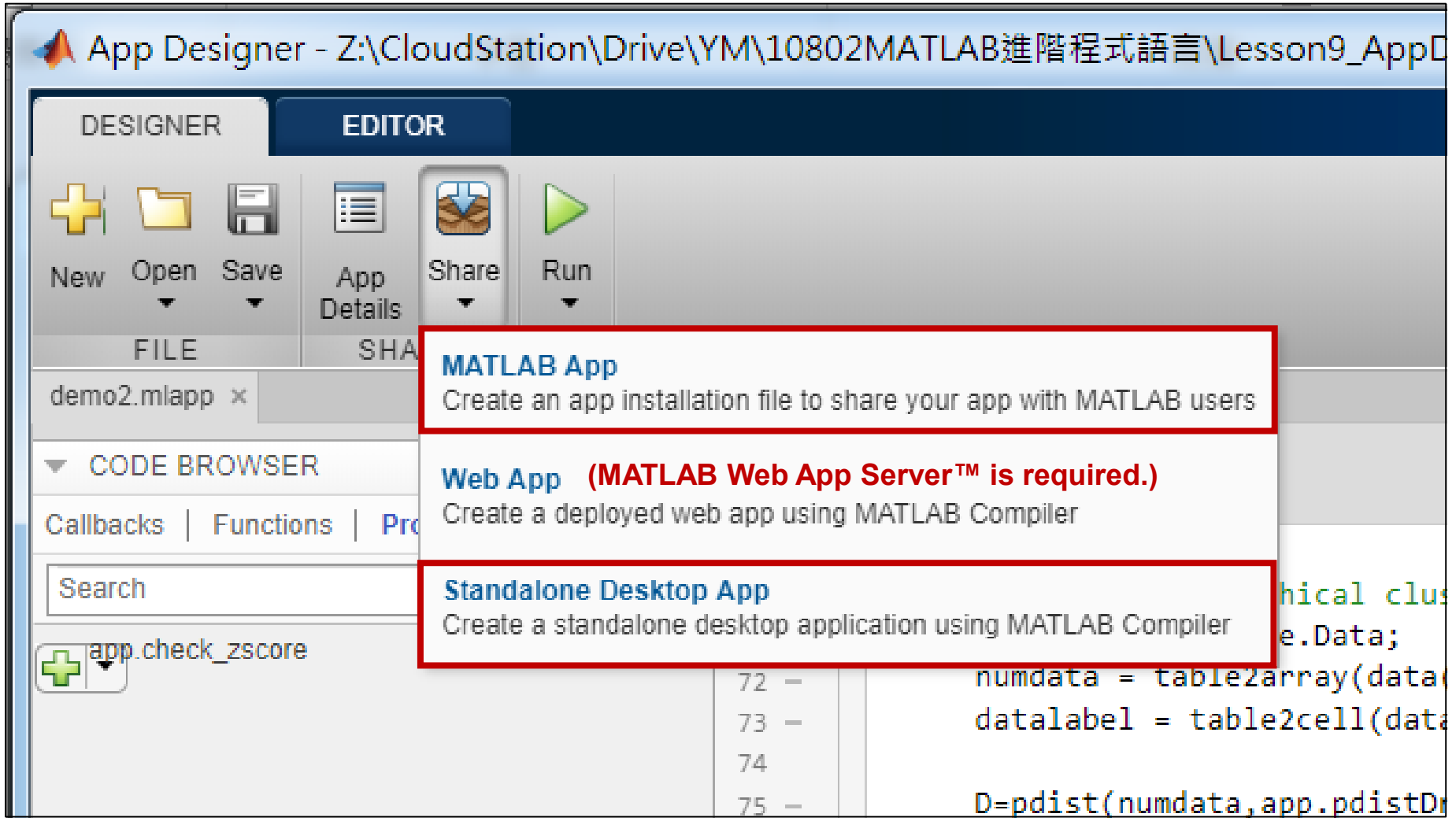
Codes for Copy

```
data = app.UITable.Data;
numdata = table2array(data(2:end,2:end));
datalabel = table2cell(data(2:end,1));
D=pdist(numdata,app.pdistDropDown.Value);
Ctree=linkage(D,app.linkageDropDown.Value);
[H,T,outperm]=dendrogram(Ctree,0,'Labels',datalabel,'Orientation','top');
plot(app.UIAxes,0)
hold(app.UIAxes) % hold axes
for i=1:length(H)
plot(app.UIAxes,H(i).XData,H(i).YData,'color','b')
end
hold(app.UIAxes) % release axes
close(gcf) % close the figure generated by dendrogram
app.UIAxes.XTick = 1:length(datalabel);
app.UIAxes.XTickLabel = datalabel(outperm);
app.UIAxes.XTickLabelRotation = 90;
app.UIAxes.XLabel.String = '';
app.UIAxes.YLabel.String = '';
app.UIAxes.YGrid = 'on';
```

Add in a Property under app



Standalone Desktop App



THE END

Contact:
盧家鋒 alvin4016@nycu.edu.tw