MATLAB Programming

Basic File Input and Output

Scientists use (a lot of) data

- Images (matrix)
- Sound files (array or matrix)
- Video (3 dimension matrix)
- Instrument output (time series)
- Spreadsheets (set of matrices)
- é

MATLAB can read all of theseé and more.

Data import and output:

Input and convert to data structure

Print output to the screen

Write arrays in a suitable file format.

Two ways to import data:

Using the graphical interface

Two ways to import data:

Using the graphical interface

- Easiest to learn
- MATLAB figures out what kind of file you have

Two ways to import data:

Using the graphical interface

- Easiest to learn
- MATLAB figures out what kind of file you have

Using the command line

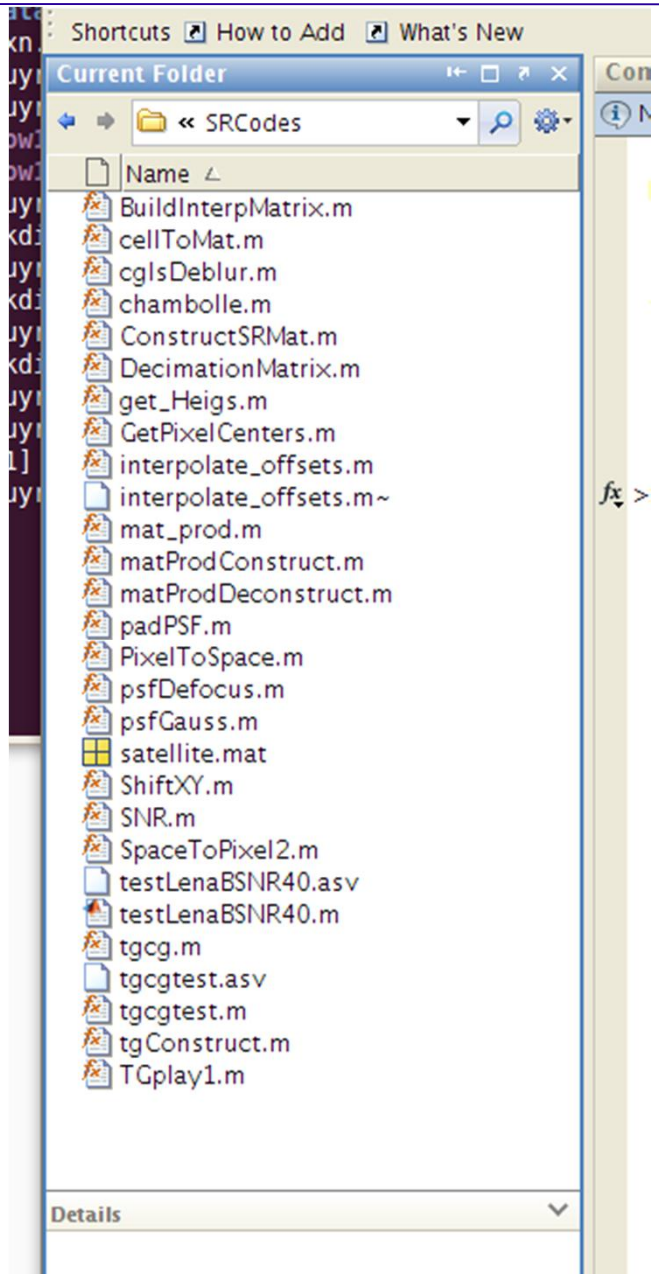
Two ways to import data:

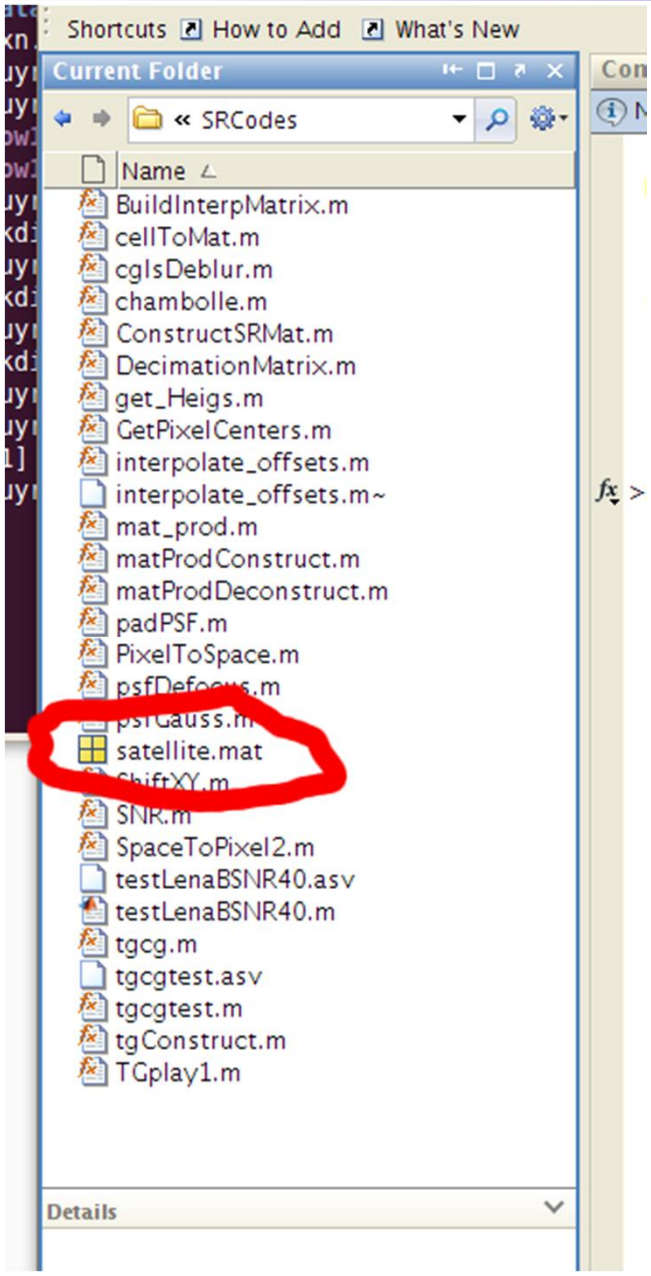
Using the graphical interface

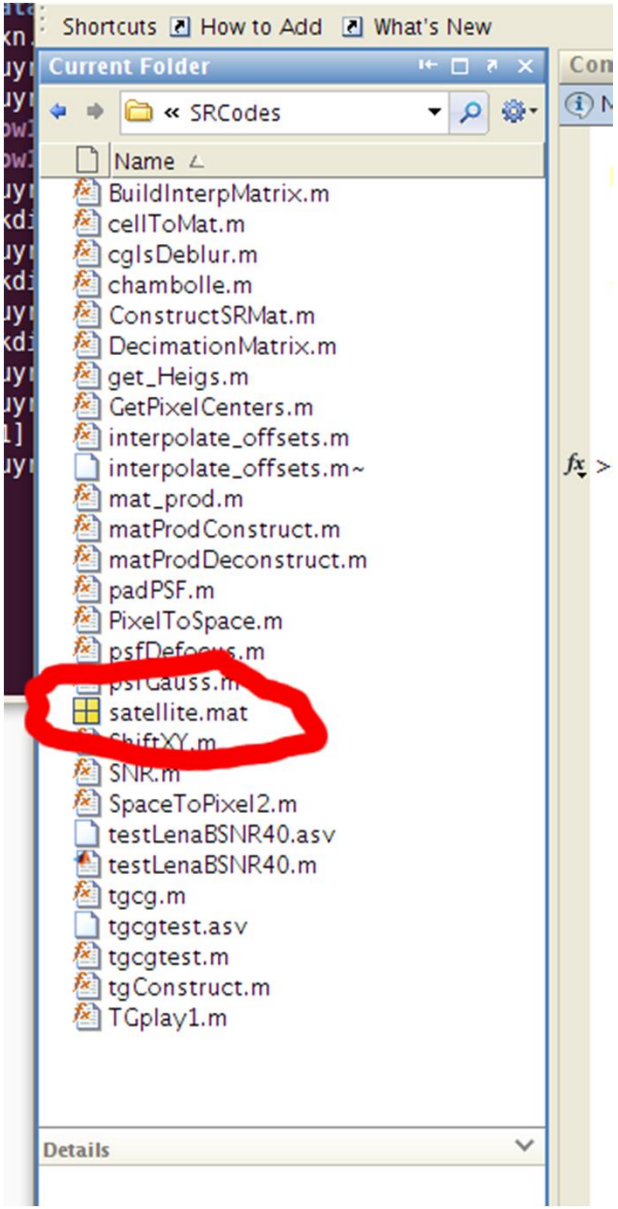
- Easiest to learn
- MATLAB figures out what kind of file you have

Using the command line

- Can be automated
- Supports many more formats


Shortcuts
How to Add
What's New
Current Folder
« SRCodes
Name
BuildInterpMatrix.m
cellToMat.m
cgIsDeblur.m
chambolle.m
ConstructSRMat.m
DecimationMatrix.m
get_Heigs.m
GetPixelCenters.m
interpolate_offsets.m
interpolate_offsets.m~
mat_prod.m
matProdConstruct.m
matProdDeconstruct.m
padPSF.m
PixelToSpace.m
psfDefocus.m
psfGauss.m
satellite.mat
ShiftXY.m
SNR.m
SpaceToPixel2.m
testLenaBSNR40.asv
testLenaBSNR40.m
tgcg.m
tgcgtest.asv
tgcgtest.m
tgConstruct.m
TGplay1.m
Details


Shortcuts
How to Add
What's New
Current Folder
« SRCodes
Name
BuildInterpMatrix.m
cellToMat.m
cgIsDeblur.m
chambolle.m
ConstructSRMat.m
DecimationMatrix.m
get_Heigs.m
GetPixelCenters.m
interpolate_offsets.m
interpolate_offsets.m~
mat_prod.m
matProdConstruct.m
matProdDeconstruct.m
padPSF.m
PixelToSpace.m
satellite.mat
SNR.m
SpaceToPixel2.m
testLenaBSNR40.asv
testLenaBSNR40.m
tgcg.m
tgcgtest.asv
tgcgtest.m
tgConstruct.m
TGplay1.m
Details

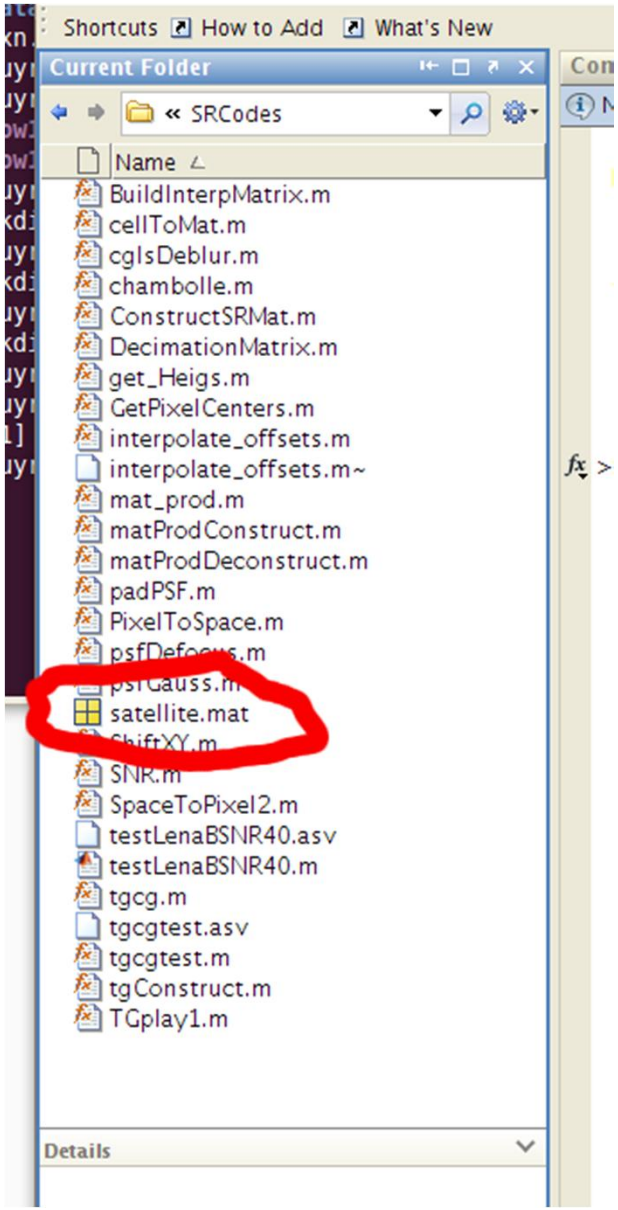


.mat file:

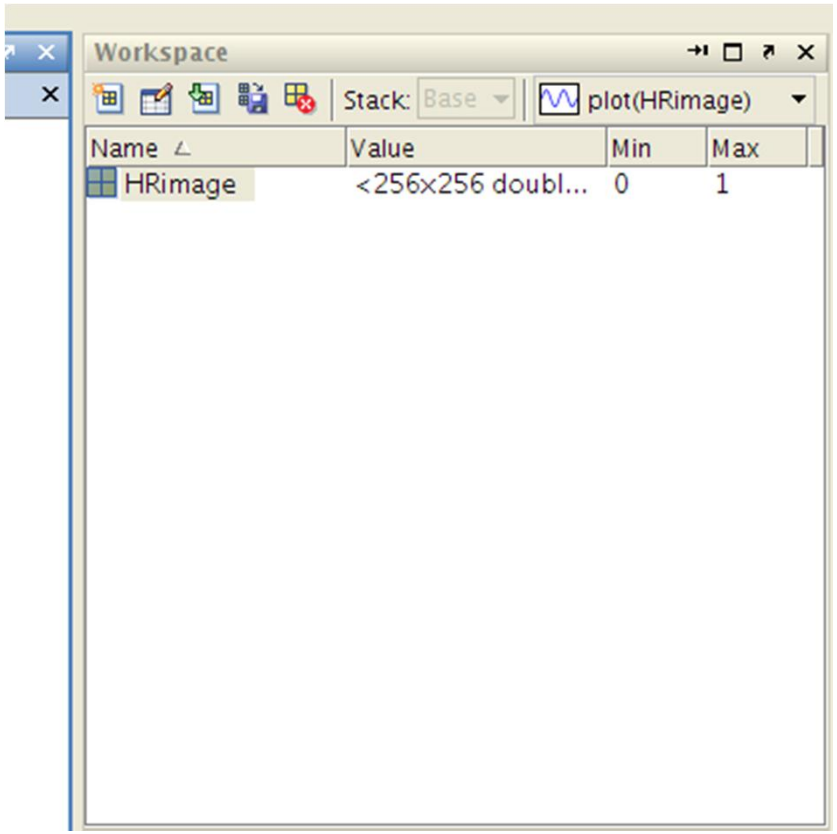
MATLABôs prefered format.

Binary, which saves space.

Designed to store multiple variables.



Double click



Text data: comma or space separated

My file: tweets.txt

```
Latitude longitude tweet_density
43.650332   -79.389013  0.000739
43.669778   -79.38267    0.00273
43.648943   -79.391319  0.003818
```

Load data into MATLAB:

```
>> data = importdata('tweets.txt');
```

Load data into MATLAB:

```
>> data = importdata('tweets.txt');
```

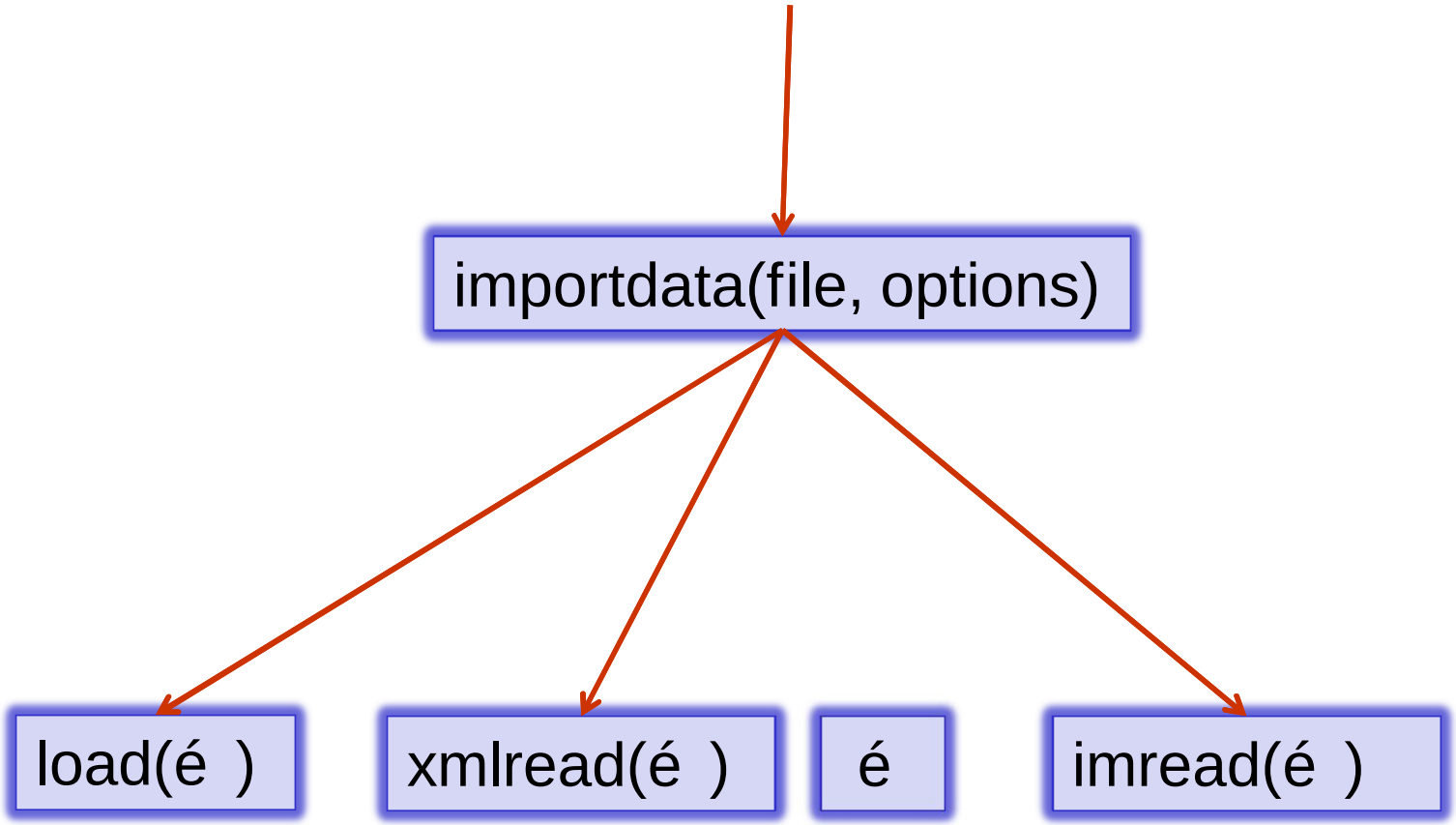
importdata is a ówrapper function.ô

Identifies the format of the file

- Is it text, image, MAT file format, spreadsheet, sound, XML, é ?

Find the correct function to load the file.

- Optional arguments can help figure this out.


importdata(file, options)
load(é)
xmlread(é)
é
imread(é)

```
>> in = importdata('tweets.txt');
>> in
in =
  data: [40000x3 double]
  textdata: {'Lat'  ' Lng'  ' Weight'}
  colheaders: {'Lat'  ' Lng'  ' Weight'}
```

```
>> in = importdata('tweets.txt');
>> in
in =
  data: [40000x3 double]
  textdata: {'Lat'  ' Lng'  ' Weight'}
  colheaders: {'Lat'  ' Lng'  ' Weight'}
```

```
>> in = importdata('tweets.txt');
>> in
in =
  data: [40000x3 double]
  textdata: {'Lat'  ' Lng'  ' Weight'}
  colheaders: {'Lat'  ' Lng'  ' Weight'}
```

```
>> in = importdata('tweets.txt');
>> in
in =
  data: [40000x3 double]
  textdata: {'Lat'  ' Lng'  ' Weight'}
  colheaders: {'Lat'  ' Lng'  ' Weight'}
```

MATLAB can also read things like spreadsheets:

```
>> in = importdata('mydata.xls');
>> in
  in =
     Sheet1 = [6 x 2 double]
     Sheet2 = [13 x 1 double]
```

MATLAB can also read things like spreadsheets:

```
>> in = importdata('mydata.xls');
>> in
  in =
    Sheet1 = [6 x 2 double]
    Sheet2 = [13 x 1 double]
```

Each sheet is a member of the structure

Exporting results:

Visualization

- Printing to screen
  - Exporting to a file

Exporting results:

Visualization

Special episode on graphing and images

Printing to screen

Exporting to a file

created by

Richard T. Guy

February 2011