ReproRehab

Week 4: MATLAB Tips to Improve Productivity

ReproRehab POD 1, 10/27/2023

Agenda

- MORE MATLAB
  - Tips and comments on Dr. Finley's code
  - learning more about the table data structure (useful functions + etc.)

- Activity
  - Change some parts, check results, and push your modified code to the shared repository.

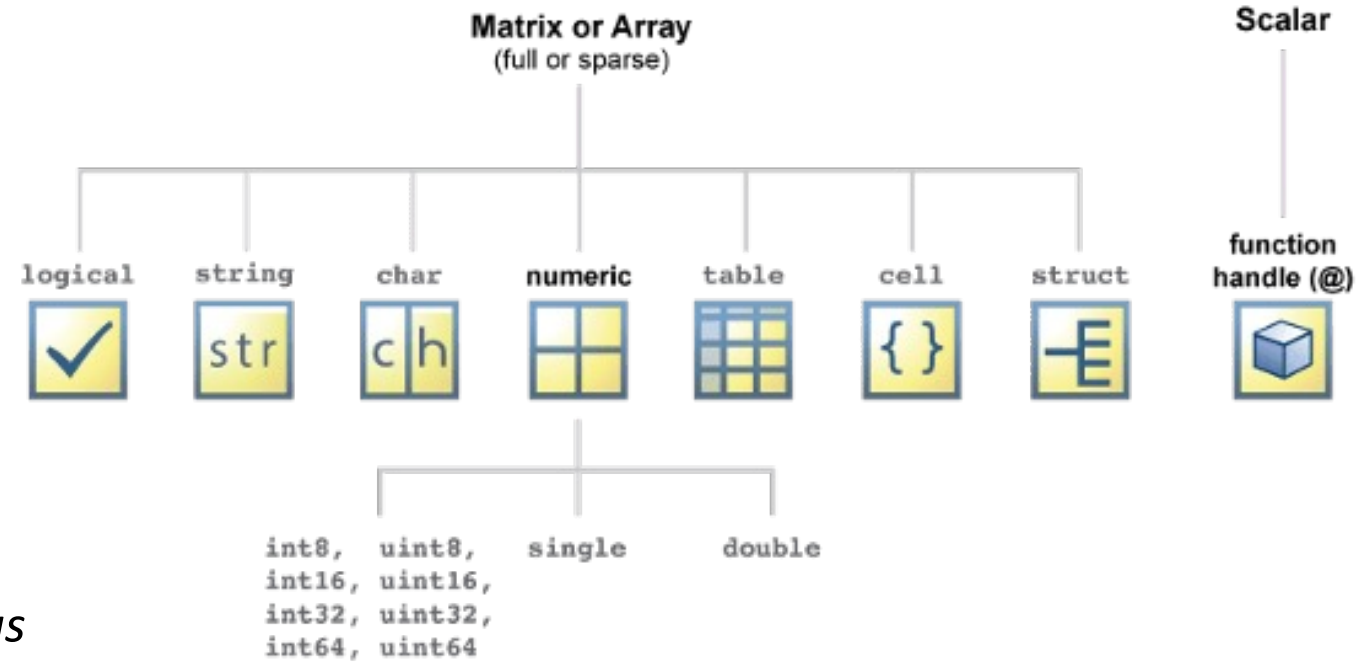
Quick check-in

- Depending on how far we go today…
- Week 5: Data visualization in MATLAB + interactive plots
- Week 6: Doing Statistics in MATLAB (we’re not saying bye to R!)
- Week 7: Your topic, please! (and we need to reschedule it)

MATLAB: Data types

- logical: **true** or **false**
- string: use string()
- char: ‘char’
- numeric: 1, 1.0, -1.0,…
- categorical

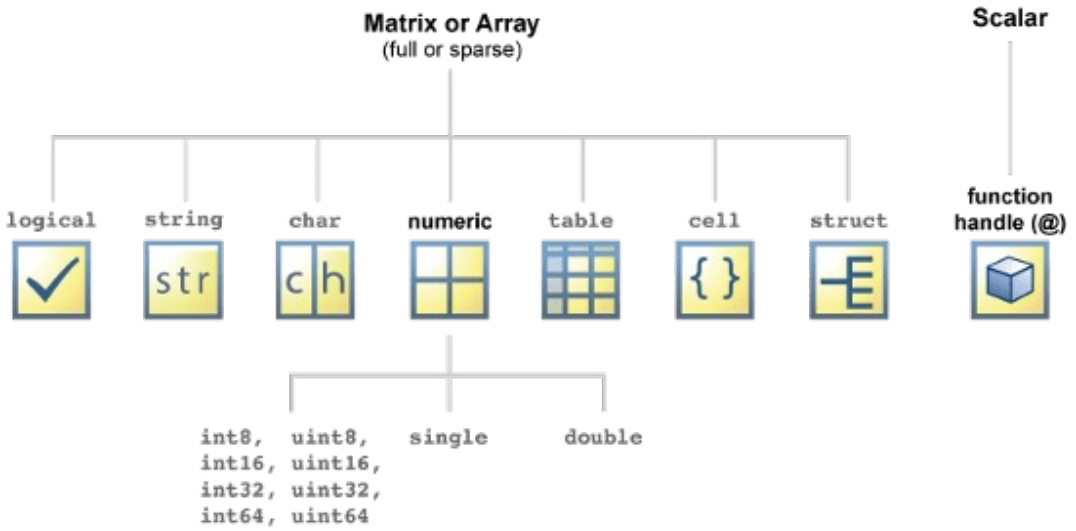
- These are also called *homogeneous*



MATLAB: Data types

- **Table**, cell, structure are *heterogeneous* data, meaning that each can contain data of different types.

- Ex) table with columns: id (char), knee joint angle (numeric), sex (char, numeric, or categorical)



MATLAB: Table

- You often read output files in .csv, .txt, or .tsv

- Read them as **tables** using *readtable* function.
  - *csvread – only reads csv files*
  - *importdata – if you have headers in your data file, it will prepare a structure.*

	4 lhipjoint_x	5 lhipjoint_y	6 lhipjoint_z	7 lfemur_x
1	9.2642	14.3610	34.5347	9.6028
2	9.2575	14.3631	34.5395	9.6002
3	9.2549	14.3663	34.5401	9.5993
4	9.2529	14.3658	34.5406	9.5986
5	9.2477	14.3648	34.5417	9.5959
6	9.2413	14.3647	34.5424	9.5925
7	9.2388	14.3624	34.5424	9.5895
8	9.2390	14.3608	34.5452	9.5865
9	9.2378	14.3616	34.5522	9.5842
10	9.2334	14.3613	34.5619	9.5832
11	9.2269	14.3602	34.5719	9.5800

MATLAB: Table

- It's *pivotal* that you know details of the files you're reading
- ex) reading a *messy* table

Example Vicon excel output

	A	B	C	D	E	F	G	H
1	Model Outputs							
2	240							
3			JO:LAbsAnkleAngle			JO:LAnkleAngles		
4	Frame	Sub Frame	X	Y	Z	X	Y	Z
5			deg	deg	deg	deg	deg	deg
6	1	0	7.06528	0	0	7.08129	0.327733	-3.84764
7	2	0	7.06705	0	0	7.08304	0.327048	-3.84257
8	3	0	7.06894	0	0	7.08495	0.326382	-3.83764
9	4	0	7.07103	0	0	7.08696	0.325735	-3.83286
10	5	0	7.07323	0	0	7.08909	0.325106	-3.8282
11	6	0	7.07547	0	0	7.09133	0.324502	-3.82372

MATLAB: Structure

- Is table ALWAYS the best choice?
- **Structure** can be an alternative (also a more *traditional* choice)

Original data file you read using *importdata*

	A	B	C	D	E	F
1	root_x	root_y	root_z	lhipjoint_x	lhipjoint_y	lhipjoint_z
2	10.6385	16.0605	34.8776	9.264214378	14.36099489	34.53467325
3	10.6351	16.0609	34.8775	9.257474558	14.36311626	34.53948244
4	10.6332	16.0639	34.8765	9.254888279	14.36634592	34.5401307
5	10.6315	16.0633	34.8762	9.252936335	14.36579646	34.54060904
6	10.6275	16.0616	34.8757	9.247732547	14.36476633	34.5416722

In MATLAB

1x1 struct with 3 fields

Field	Value
data	*531x93 double*
textdata	*1x93 cell*
colheaders	*1x93 cell*

Activity

- You will ‘clean up’ a messy xlsx output (It’s the recording from the Vicon motion capture system capturing me doing a vertical jump – I truncated it for a potential copyright issue)

- Instructions are included, but please ask TA’s for any help.

Example Vicon excel output

	A	B	C	D	E	F	G	H
1	Model Outputs							
2	240							
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