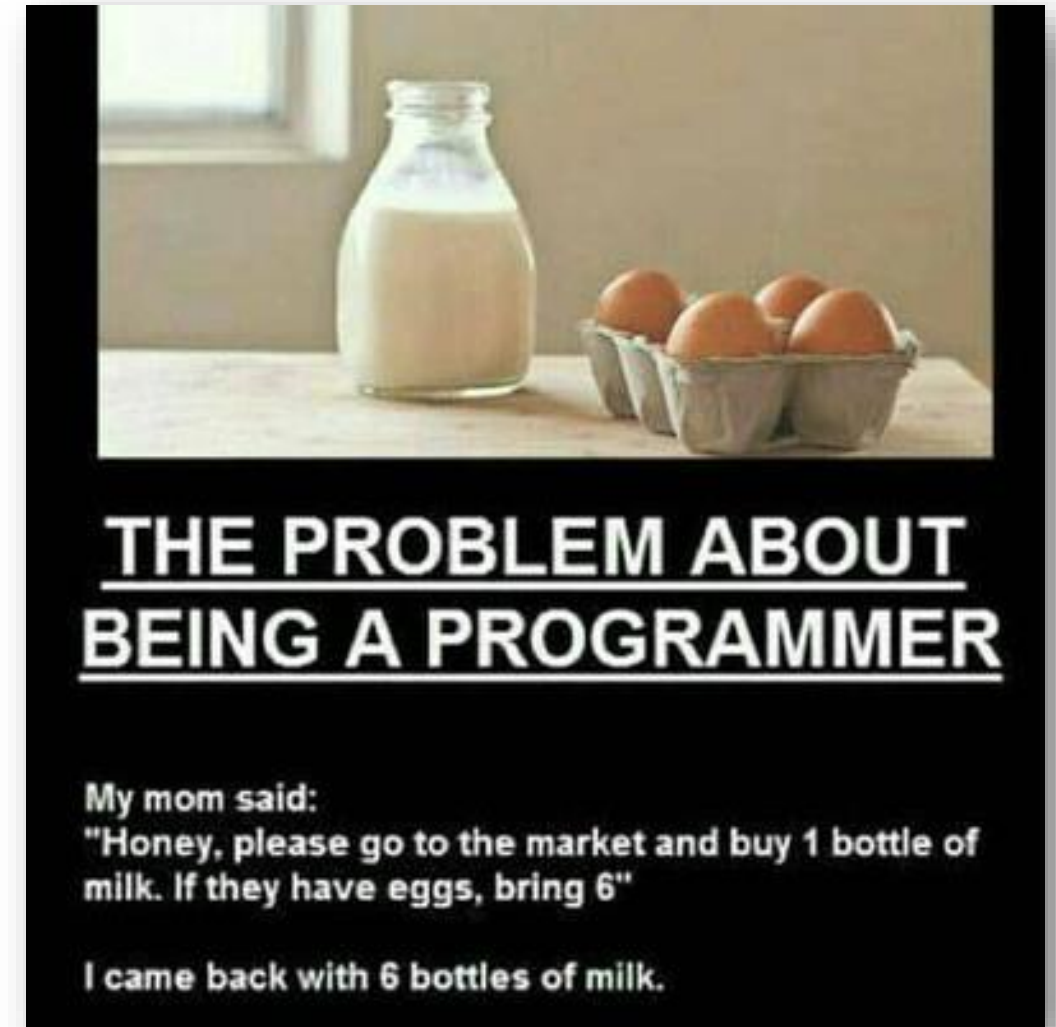


The good stuff. Now it starts to be code.

CONTROL STATEMENTS AND LOOPS

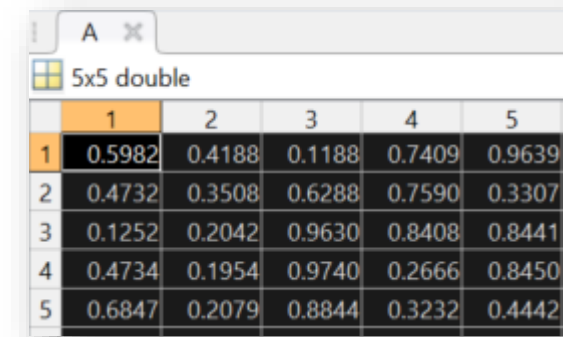


Topics

- Introduction: GUI and basic calculations
- Coding 1: Scripts, style, and variable classes
- Coding 2: **Control statements and loops**
- Visualization 1: Basics, subplots, get and set
- Coding 3: Functions
- Visualization 2: Descriptive plots
- Coding 4: Basic input and output
- Visualization 3: Distribution and 3D plots
- Coding 5: Input and output specials – last lecture before holidays
- Machine Learning 1: Introduction and dimension reduction
- Machine Learning 2: Clustering
- Machine Learning 3: Classification
- Coding 6: Efficiency and debugging basics
- Coding 7: Advanced functions and debugging

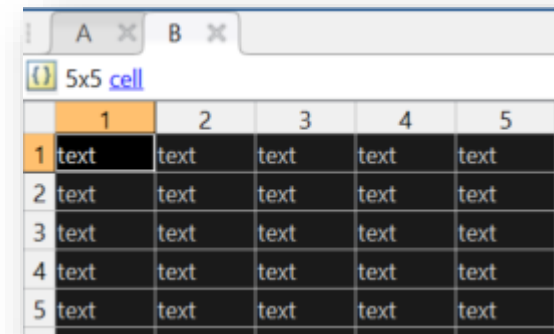
Variable Classes II

- Numerics
 - Scalars, Vectors, Matrices
 - Indexing with (i), deletion with = []
 - Integers, doubles, singles
- Character arrays
 - Strings also exist, but char is most frequent
- Logicals
 - True/false, using == ~= < > <= >= or other functions, combined with && and ||
- Structs
 - Flexible and complex, combination of fields and values, indexing by „.“
- Cells
 - Can hold different classes, indexing with {i}
- Test with „class()“, is*(), or isa(x,'<class>')



A screenshot of a MATLAB window titled 'A' showing a 5x5 double matrix. The matrix contains numerical values ranging from 0.0963 to 0.9740. The first row and first column are highlighted in orange.

	1	2	3	4	5
1	0.5982	0.4188	0.1188	0.7409	0.9639
2	0.4732	0.3508	0.6288	0.7590	0.3307
3	0.1252	0.2042	0.9630	0.8408	0.8441
4	0.4734	0.1954	0.9740	0.2666	0.8450
5	0.6847	0.2079	0.8844	0.3232	0.4442




A screenshot of a MATLAB window titled 'B' showing a 5x5 cell matrix. All cells contain the text 'text'. The first row and first column are highlighted in orange.

	1	2	3	4	5
1	text	text	text	text	text
2	text	text	text	text	text
3	text	text	text	text	text
4	text	text	text	text	text
5	text	text	text	text	text

Review: Common Error Messages

- Undefined function X for input argument Y
 - You tried to access something that doesn't exist, likely a typo in the code
- Index exceeds matrix dimensions.
 - You tried to access a matrix outside its size
- Subscripted assignment dimension mismatch.
 - You tried to stuff something into something else and the dimensions were not the same



```
Roses are Red,  
Violets are Blue  
  
Unexpected '{'  
on line 32.
```

Control Statements

- Conditional -> Content -> Alternative -> End
- If (logical), elseif, else, end
 - Combine logicals with &&, ||, ~
- Switch (variable), case, otherwise, end
- For i=x:y, content, end
 - Repeat code while counting an iterator
 - i_variable = 1:10, i_variable = [1 3 4 10]
- While (toggle_statement), content, end
 - Repeats code as long as toggle is true
 - Make sure your code ends!

Notes

- For loops for a defined number of iterations
- While loops if you don't know how often you need to run a code but know when you're done
- You can use nested control statements (statements inside statements)
 - Beware, it can get messy fast!
- It can help to comment at each end, what exactly ends.