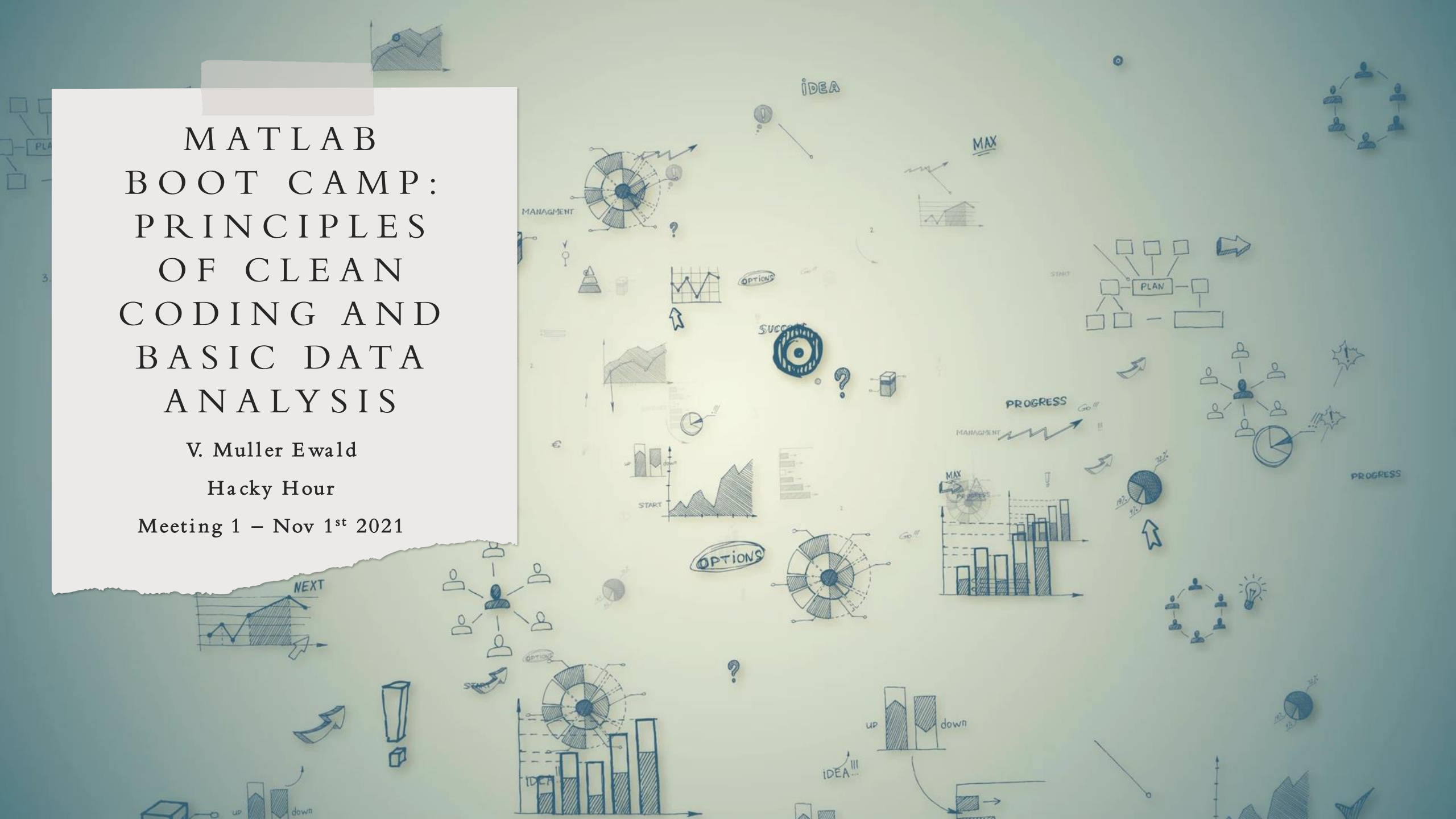


MATLAB BOOT CAMP: PRINCIPLES OF CLEAN CODING AND BASIC DATA ANALYSIS

V. Muller Ewald

Hacky Hour

Meeting 1 – Nov 1st 2021

WORKSHOP GOALS:

To introduce trainees to basic programming techniques in MatLab.
By the end of the program, participants will be able to:

- Import and export data
- Create figures and save in a variety of file formats
- Run t-tests and ANOVAs in MatLab
- Write data analysis scripts

WORKSHOP DATES:

November 1st - Principles of clean coding, introduction to MatLab
November 8th – Single-subject data analysis and visualization
November 15th – Automatic processing of multiple subjects
November 22nd – Data analysis in MatLab
November 29th - Best practices for working with "inherited" scripts

CERTIFICATE OF CLEAN CODING IN MATLAB:

Participates who attend 4/5 lectures and turn in 4/5 exercises will receive a certificate of participation in the Fall MatLab Boot Camp.
Participants will also be entered to win prizes!

Meeting time:
10 to 11am.
30 min class, immediately followed by 30 min working interval.

Meeting place:
Zoom Meeting: https://uiowa.zoom.us/j/99106981110
Meeting ID: 991 0698 1110
Passcode: 430289

Office hours:
Wednesdays from 3:30 to 4:30pm
https://uiowa.zoom.us/j/99474787236

Questions about how the bootcamp will work?

WHY AM I TEACHING THIS CLASS?

1. Because I need teaching experience
2. Because I had a very hard time learning how to code
3. Because it is my professional ambition to bring more women into coding

ACKNOWLEDGE YOUR MOTHER

WHAT IS PROGRAMMING?

‘Programming is a little bit of math and an “if” statement where a decision gets made’

– Bill Gates

WHY LEARN PROGRAMMING?

Because processors are ubiquitous

Because my PI is making me

Because it teaches you computational thinking skills

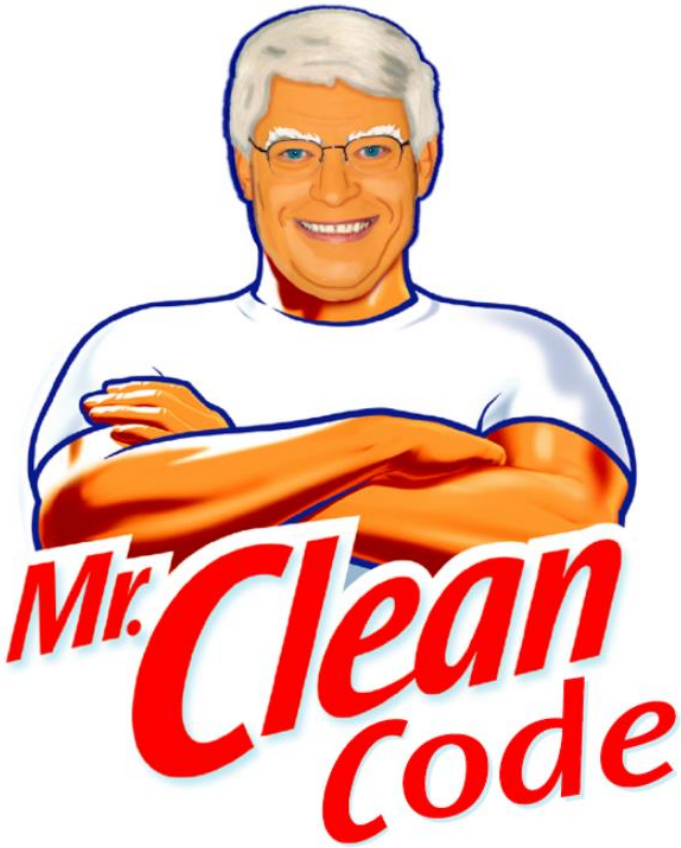
Because it is an easily transferrable skill

Because it is useful

Because (on occasion) it can be fun

WE WOULD LIKE TO THINK WE SPEND MOST OF OUR TIME POWER TYPING, BUT WE ACTUALLY SPEND MOST OF OUR TIME STARING INTO THE ABYSS.

- Crockford



PRINCIPLES OF CLEAN CODING

WHY CLEAN CODING?

Because convoluted code will SLOW YOU DOWN.

The fact that you got a script working is ½ of the job.

Once it's working, you have to clean it.

1. ONLY YOU ARE RESPONSIBLE FOR THE QUALITY OF YOUR CODE

- Does not matter if someone else wrote it initially

- Write as if you are going to pass it on to a junior lab member

2. NAME YOUR VARIABLES IN AN INTUITIVE WAY

BAD VARIABLE NAMES:

- tempVariable
- i
- table

BETTER NAMES:

- latencyAverage
- subjectLoop, trialRun
- leverPressTable

3. BE CAREFUL WITH ANNOTATIONS

Annotate the crap out of your code:

Will help you understand the purpose of a line of code.

Can help someone else understand why you organized your code in a specific way.

Can help you remember places to troubleshoot

Use annotations sparingly:

Code should speak for itself

Can lead to confusion if not regularly updated

Just one more thing that you have to remember to do

```
1   %% Lever press Averaging Scipt v3
2   % Written by V. Muller Ewald, LaLumiere Lab, Fall 2018
3   %% What this script does:
4   % 1. Imports lever press data from each rat
5   % 2. Calculates session average from each rat
6   % 3. Averages across rats
7   % 4. Makes graphs
8   % 5. Exports to excel
9
10  %% 1. Import lever press data from each rat
11  for ratLoop = 1:size(nRats,1)
```

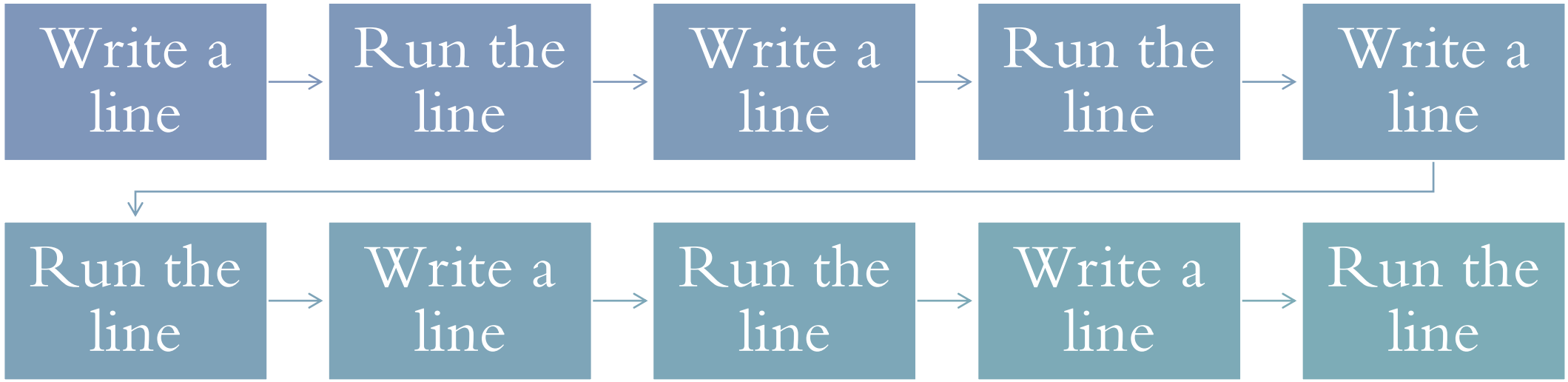
4. SCOUT RULE

Leave the code better than you found it.

- Improve a variable name?
- Break up a section that is too long?

Meeting 5: How to troubleshoot inherited scripts

5. TEST AS YOU WRITE



6. PRACTICE

YOU WILL BE BAD AT THE BEGINNING

START EARLY SO BY THE TIME YOU ARE RUNNING ANALYSES FOR YOUR DISSERTATION YOU ARE DECENT.

7. FIND A MENTOR

YOU HAVE TO DO THE WORK. YOU HAVE TO TRY HARD. YOU HAVE TO GET FRUSTRATED.

BUT YOU DON'T HAVE TO DO IT ALONE.

DIFFERENT WINDOWS IN MATLAB