ARTSCI / ISCI 3IE1
Introduction to Scientific Computing

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Winter, 2019

Welcome!

Who am I?

Why am I here?

Who are you?

Why are you here?

Learning Objectives

- Navigate and operate the MATLAB computing environment;
- Use git and github for version control, code publishing, and sharing;
- Apply basic elements of commenting and markdown to create documentation;
- Describe the various variable types and control structures available in MATLAB (and any programming language), and discuss why, when, and how they might be used in a scientific computing approach;
- Apply principles of scientific computing to perform future data analyses and visualization

What’s the point?

Schedule and location

Date	Time	Location
Saturday, 2-Feb, 2019	0930 - 1600	BSB 241 (and/or Mills Wong Classroom)
Wednesday, 6-Feb, 2019	1900 - 2200	BSB 241 (and/or Mills Wong Classroom)

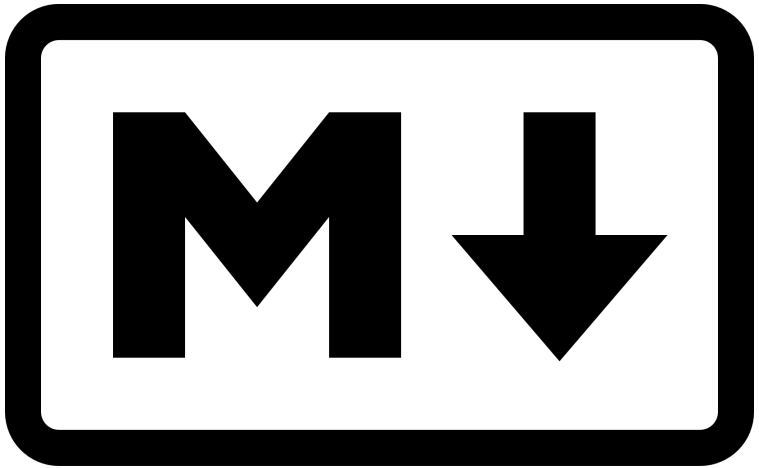
Deliverables

The class will be graded on a pass/fail basis.

- Under instructor guidance, students will **participate** in a hands-on introduction to scientific computing and the MATLAB environment.
- Students will **select a project** from a small selection of choices that will be provided by the instructor. Students will be assigned a number of requirements, and will work independently or in groups (with assistance from the instructor or peers, as necessary) to develop programmatic approaches to meet the requirements. All datasets and background information required to complete the tasks will be required.
- Students will be required to comment their code appropriately, use git to track versions, and will **archive their products (code and data) using Github** . As a final passing requirement, the contents of the Github repository must be understandable and executable by the instructor or another student.


Matlab


git




GitHub

Matlab

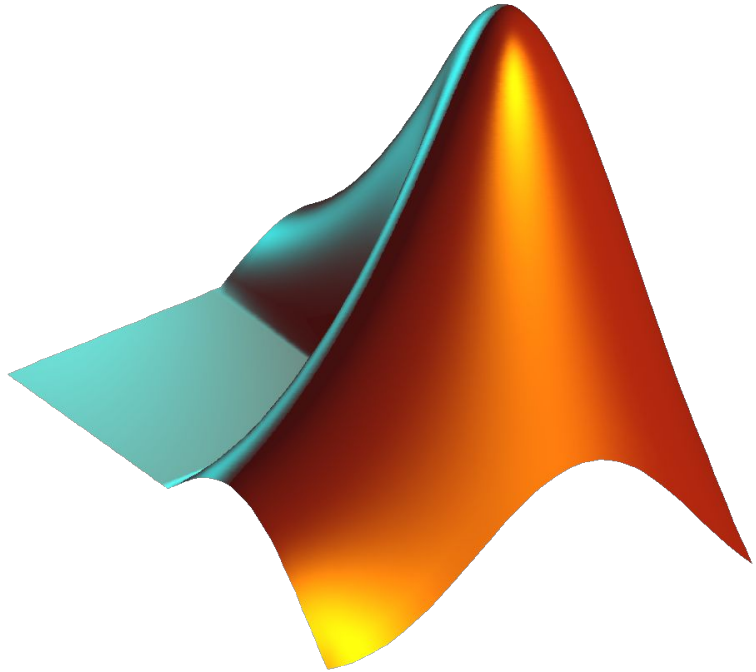
MATrix LABoratory

High-level programming language, originally based on the C language

More user-friendly than basic languages (e.g. Fortran, C)

Designed for numerical computing, data visualization, image processing

Widely used in academia (science, engineering and economics)



	Excel (spreadsheet)	MATLAB (scripted)
Amount of Data	Small to Medium	**Small to Large**
Nature of Operations	Few, Simple	**Many, Complex**
Range of Applications	Limited (more with macros)	**Wide**
Interaction Style	**Mostly Graphical (some scripted)**	Mostly Scripted (some graphical)
Learning Time	**Less**	More
Output Control	Limited	**High**
Finding, Fixing Errors	**Simpler for obvious errors**	Can be more difficult
Chance of Hidden Errors	Higher	**Much Lower**

git & Github

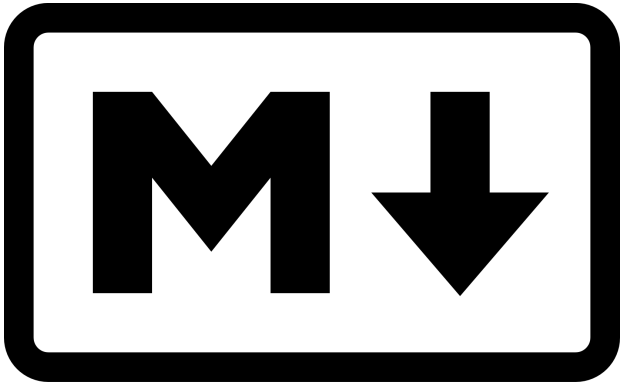
Git is a free and open source distributed version control system designed to handle everything from small to very large projects with speed and efficiency.

GitHub is a web-based hosting service for version control using Git. It is mostly used for computer code. It offers all of the distributed version control and source code management functionality of Git as well as adding its own features

Markdown

Markdown is a way to style text on the web. You control the display of the document; formatting words as bold or italic, adding images, and creating lists are just a few of the things we can do with Markdown. Mostly, Markdown is just regular text with a few non-alphabetic characters thrown in, like # or *.

https://guides.github.com/features/mastering-markdown/



Github uses Markdown to improve formatting of documentation, while leaving the plan document readable.

Getting started

Open Matlab

Go to https://github.com/3IE1/SciComp-2019 in a browser