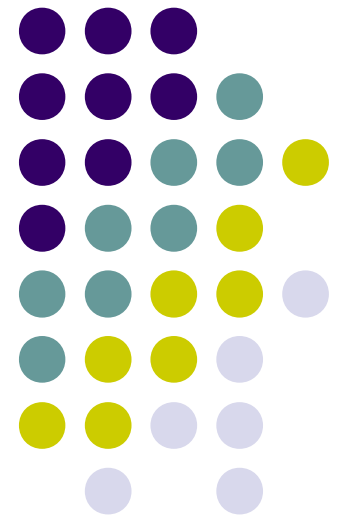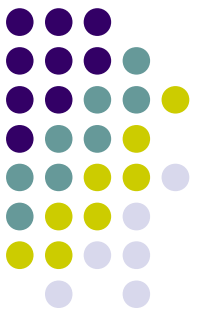# Using Matlab MEAM 248

Philip Dames
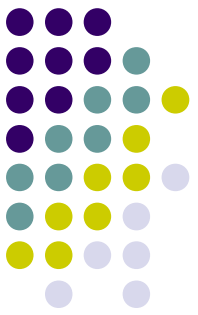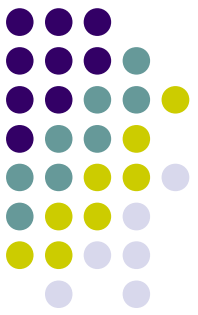
1/30/12

Getting Started

- Matlab comes with tutorials and demos to help you get started
  - Go to Help → Matlab → Examples (or Demos)

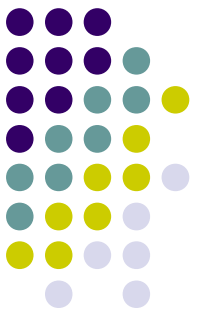- Many online guides
  - Ex. MEAM 211 homework 1

Using Built-in Functions

- What if **I** know the name of the Matlab function but don't know how to use it?
  - `doc FUNCTION_NAME`
  - `help FUNCTION_NAME`

- What if **I** think Matlab should be able to do something but **I** don't know the command?
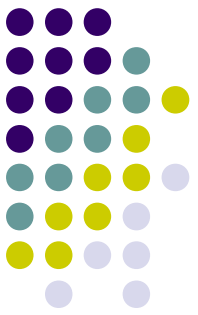 - `lookfor 'KEYWORD'`
  - Google

Programming Basics

- There is no "right way" to program
- Create a plan/write pseudo-code
- Test as you go
- Try simple cases first
- Use cells to evaluate small blocks of code
- Write lots of comments
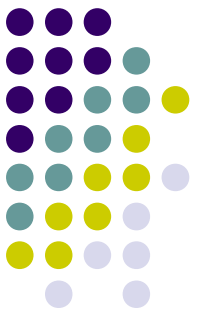- Give variables descriptive names

Useful Hotkeys

- `F5` – runs the file you are currently editing
- `Ctrl+Enter` – runs current cell

- `Ctrl+R` – comments highlighted lines
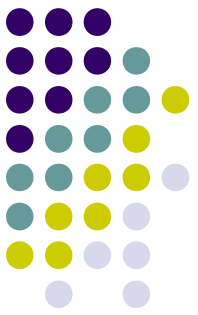- `Ctrl+T` – uncomments highlighted lines

Simulations

- Use your own integrator
  - Ex. Euler integration, MEAM 211 homework 3
- Use built-in integrators
  - `ode45`
  - `odeset` – sets ode solver options
- Make good plots
  - Conveys the results to others
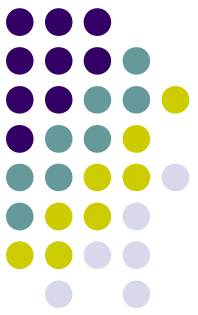 - Helps you spot errors

Debugging

- Read the error messages
  - They give hints about what is wrong
  - They tell you where the error happened (click the error message to go to that line in your code)

- Look at the data
  - `keyboard` (`return resumes code`)
  - `disp`
  - `pause` (With no input, pauses code until a key is pressed
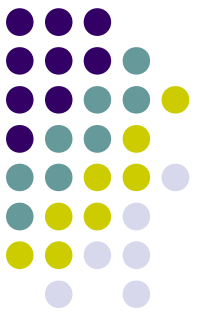   - Useful to step through loops

Debugging (cont'd)

- Write in sanity checks
  - `if`
  - `warning`
  - `error`
- Create breakpoints
  - Enters keyboard mode
- Look at the Editor warnings/errors
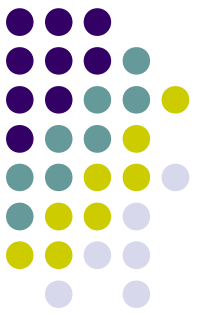 - Colored marks in the right bar in Editor window

Workspaces

- One of the boxes in the main Matlab window
  - A place where your variables exist
- Command line has a workspace
  - Scripts also access this workspace
- Functions have their own workspace
  - This means that (non-output) variables created in functions are not accessible outside the function
  - Keyboard enters the workspace it was called from → Lets you see variables in a function

How to Ask Me About Code

- Don't say:
  - My code doesn't work

- Do say:
  - I tried doing X and wanted to get Y but I got Z

- Email: pdames@seas.upenn.edu
- Office Hours: TBD

Final Remarks

- Practice makes perfect (or at least better)

- Matlab can do almost anything you want
  - Disclaimer: It's not always easy