General Computer Science for Engineers CISC 106 Lecture 07

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Lecture Overview

- More Emacs
 - Reading in and editing files
- Plotting
 - Simple Plots
- Matlab talks back to you
 - Using fprintf to display output.



Emacs

- Opening a new file
 - emacs newfile.cpp
 - Creates a blank file named newfile.cpp for editing
- If new file already exists
 - Emacs newfile.cpp opens file for editing
- Save edited file by using GUI or by command Ctrl x followed by Ctrl w.



Emacs

• Let's create a file with two arrays.



Plot

- Using the plot command
- plot(<array l>,<array 2>)

where array I is the x-axis and array2 is the y-axis

NOTE: array I and array2 must be equal in terms of size of dimensions!



Plot

- For example:
 - x=[1 2 3 4 5];
 - y=[10 20 30 40 50];

plot(x,y)



Plot

- Other useful command with plot
- xlabel('<string>') sets the label for the x-axis
- ylabel('<string>') sets the label for the y-axis
- grid on creates a grid
- title('<string>') sets title of the plot



- Use the fprintf command
 - print is intuitive, but fprintf?
 - fprintf <u>f</u>ormatted <u>print</u> to a <u>f</u>ile
- What do files have to do with output to the screen?



- Lets look at the syntax
 - count = fprintf(fid, format, A, ...)
 - count the number of bytes written
 - fid refers to opened file
 - format is a format string in between single quotes
- If fid is set to one or omitted the output goes to the screen.

- Example:
 - "There are 5 widgets in inventory"
 - fprintf('There are %d widgets in inventory', widgets);
- %d acts as a place holder for widget variable at end of command and is known as a conversion character.
- Conversion characters specify the notation of the output.
- Note the variable widgets as the second argument.



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- Example
 - "On average we sell 2.56 widgets every 2 weeks"
 - fprintf('On average we sell %f widgets every %d weeks', widgets_ave, num_weeks);

• The conversion characters matter

- %f for fixed point notation 5.6332
- %c for a single character
 's'
- %d/%i for signed integers -2354
- %s for a string of character "CISCI06"
- Even more conversion characters online in Matlab reference.



- Example
 - "Line one
 - Line two"

fprintf("Line one \nLine two");

Is the same as

```
fprintf("Line one");
```

```
fprintf("\nLine Two");
```

- Escape Characters
 - \n new line
 \t Horizontal tab
 - \b backspace \\ Backslash

- When MATLAB gives you ugly numbers.....
 - Take pi for example 3.14159265358979323846
- Print pi to 4 decimal places
 - fprintf('Pi to 4 decimal places %.4f', pi);
 - 3.1415
- Print pi to 7 significant digits
 - fprintf('Pi to AT LEAST 7 significant digits %7f', pi);
 - Significant digits digits before the decimal point