Lecture 08

Files, Plotting

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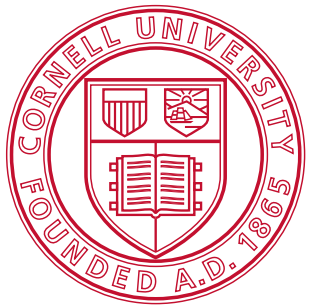

Cornell University

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Before we begin

HWe Due July 22

PP Proposals

PL Prelim tomorrow

Today

- Writing to files
- Reading from files
- Plot function

Opening a File - fopen

fopen

Opens a file

```
f = fopen('cs1109.txt','w');
```

Usage

```
fid = fopen(filename);
fid = fopen(filename, permission);

% returns id's of all open files
fids = fopen('all');
```

Opening a File - Permissions

Permissions

'r'	Opens file for reading.
'w'	Open or create new file for writing. Existing content is discarded.
'a'	Open or create new file for writing. Append data to the end of file.
'r+'	Open for reading and writing.
'w+'	Open or create new file for reading and writing. Existing content is discarded.
'a+'	Open or create new file for reading and writing. Append data to the end of the file.

Writing to a File

fprintf

Writes formatted data to the file

```
fprintf(f, '%d %10.5f', n, x);
```

Usage

```
count = fprintf(fid, format, A, ..);
```

Closing a File

fclose

Closes a file

```
fclose(f);
```

Usage

```
status = fclose(fid);

% closes all open files
status = fclose('all');
```

Writing to a File - Example

Sine Table

```
deg = 0:90;
rad = deg * pi/180;
s   = sin(rad);

% let's open a file
f = fopen('sintable.txt','w');

% write values to the file
for j = 1:length(deg)
   fprintf(f,'%2d %8.6f\n',deg(j),s(j));
end

% and close it!
fclose(f);
```

Appending to a File - Example

Sine Table

```
deg = 91:180;
rad = deg * pi/180;
s   = sin(rad);

% let's open a file
f = fopen('sintable.txt','w');

% write values to the file
for j = 1:length(deg)
   fprintf(f,'%2d %8.6f\n',deg(j),s(j));
end

% and close it!
fclose(f);
```

Writing to a File - Batch Version

fprintf is talented

```
deg = 0:90;
rad = deg * pi/180;
s   = sin(rad);

% let's open a file
f = fopen('sintable.txt','w');

% write values to the file
data = [deg; s];
fprintf(f,'%2d %8.6f\n',data);

% and close it!
fclose(f);
```

Reading from a File

fscanf

Reads formatted data from a file

```
[d, s] = fscanf(f, '%2d %8.6f\n');
```

Usage

```
A = fscanf(fid, format);
[A, count] = fscanf(fid, format, size);
```

Reading from a File - Example

Sine Table

```
% let's open a file for reading
f = fopen('sintable.txt','r');

% read values from the file
[data, count] = fscanf(f,'%d %f', [2 inf]);

% let's display the values
disp(data)

% and close it!
fclose(f);
```

Plotting - Ithaca Weather

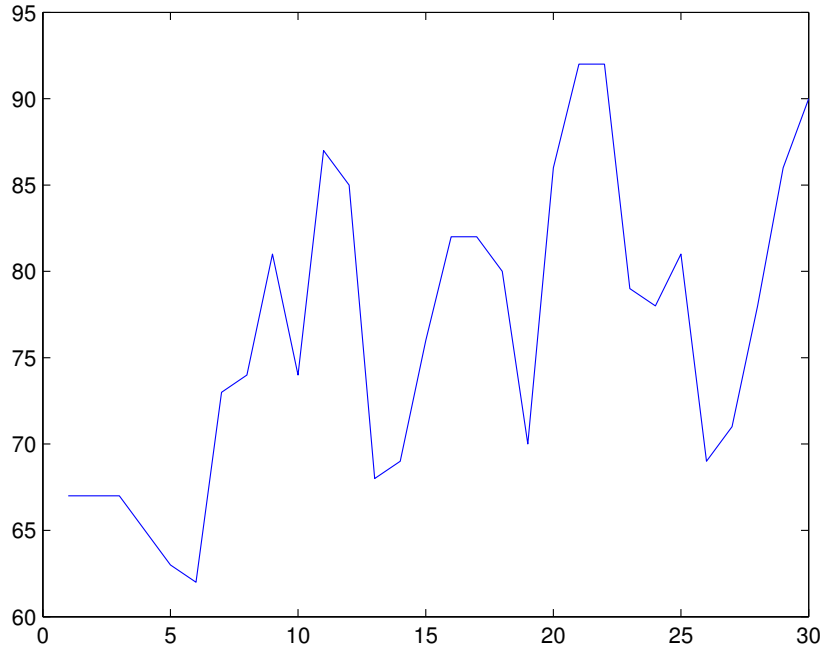
Read data from file

Ithaca Temperature June 2012

Day	Max	Min	Avg
1	67	43	55
2	67	52	60
3	67	51	59
...	...	...	...
30	90	61	76

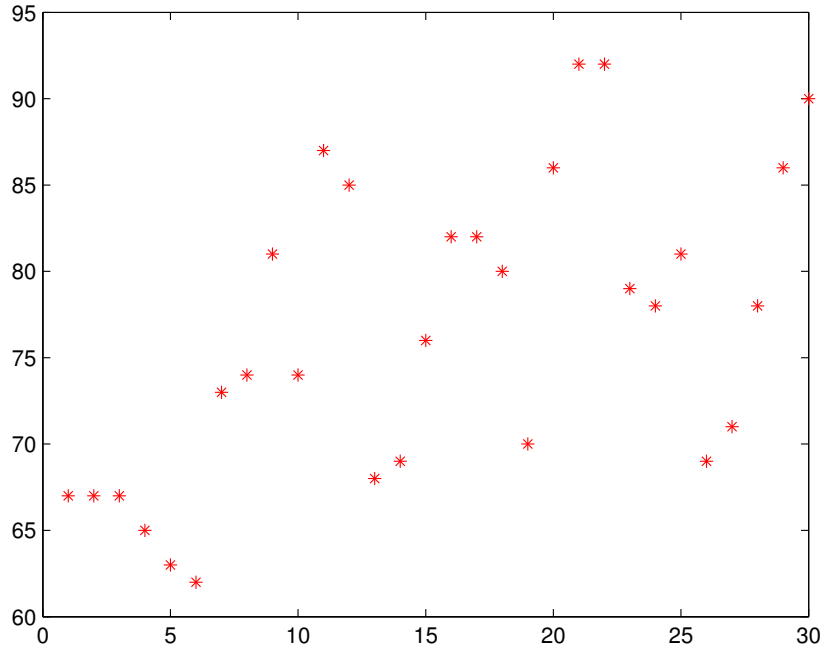
```
f = fopen('ithaca_june_2012.txt','r');
data = fscanf(f, '%d %d %d %d',[4 inf]);
fclose(f);
```

Plotting - Ithaca Weather



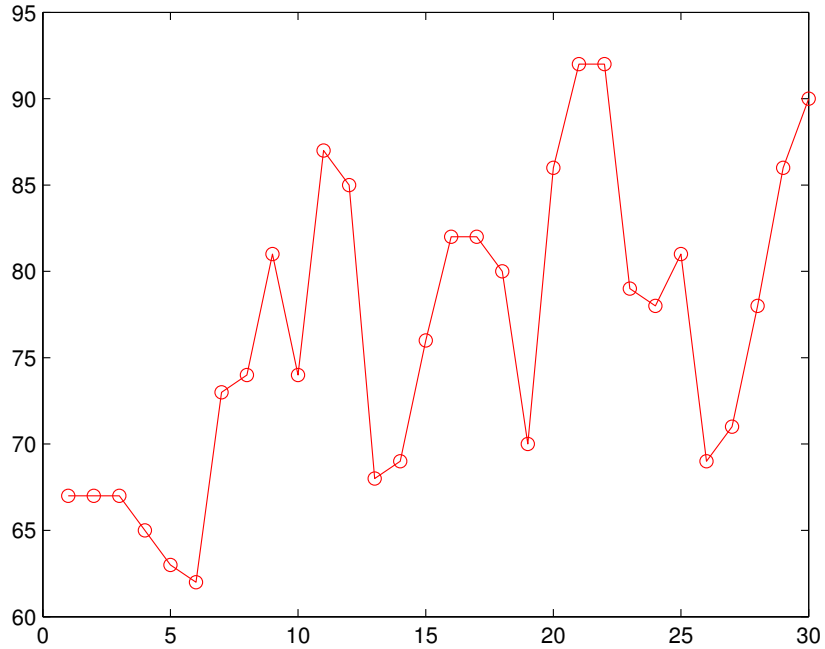

```
% plot daily maximum temperature
plot(data(1,:),data(2,:));
```

Plotting - Ithaca Weather




```
% plot with stars in red color
plot(data(1,:),data(2,:),'r*');
```

Plotting - Ithaca Weather




```
% connect data points, use circles
plot(data(1,:),data(2,:),'ro-');
```

Plotting - Figure

figure

Creates a new figure window

Usage

```
figure
figure(h)
h = figure(...)
```

Plotting - Figure - Example

Example

```
figure(1) % plot max temp
plot(data(1,:),data(2,:),'r')

figure(2) % plot min temp
plot(data(1,:),data(3,:),'b')

figure(3) % plot avg temp
plot(data(1,:),data(4,:),'g')
```

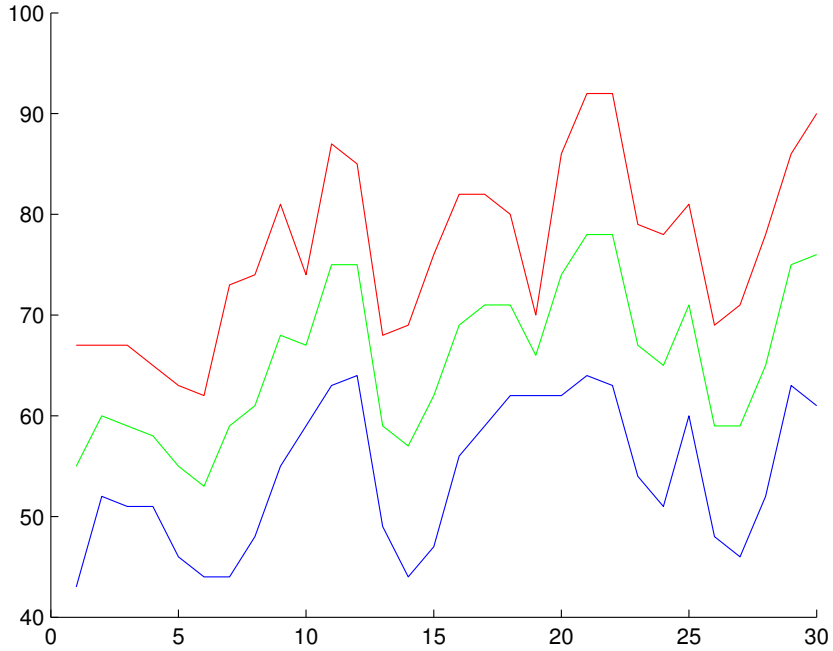
Plotting - hold on/off

hold on

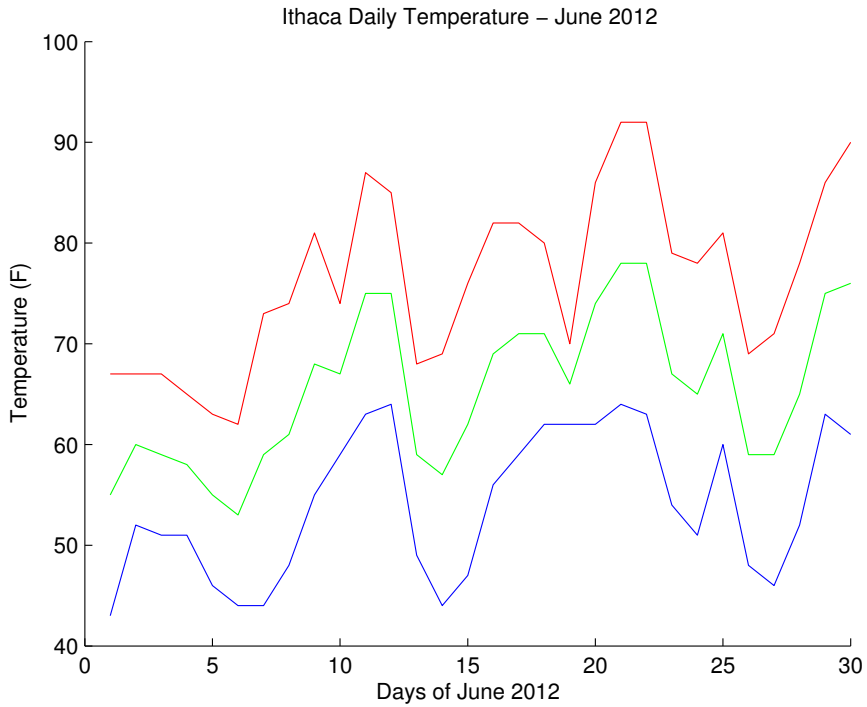
holds the current plot

```
figure
hold on
plot(data(1,:),data(2,:),'r')
plot(data(1,:),data(3,:),'b')
plot(data(1,:),data(4,:),'g')
hold off % back to normal state
```

Plotting - Hold

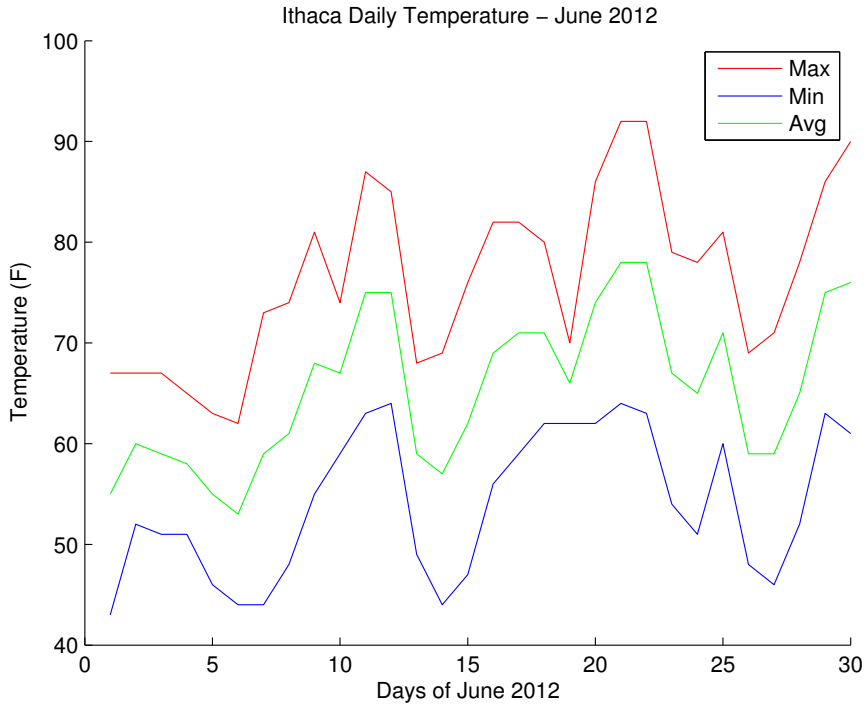


Plotting - Title/Label




```
title('Ithaca Daily Temperature – June 2012')
xlabel('Days of June 2012')
ylabel('Temperature (F)')
```

Plotting - Legend




```
legend('Max','Min','Avg')
```