

## Chapter 9 - Lecture 2

ENGR1120 - 800 - Honors Programming for Engineers

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**Data Input from .csv Files**

## Lecture 2 - Data Input from .csv Files

- Review Data Files and IO
- File Output to .csv
- Example in MATLAB

## What is a Data File?

### What is a Data File ?

- Standard way of organizing data for computer **storage**
- The data can represent many different things but it is all stored **digitally**
- Different **file types** are used for different purposes
  - 
  - 
  - list of all...

## Why use Data Files?

### Why use Data Files ?

- Organize large amounts of information
- Share large amounts of information
-

# What is File IO?

## What is File IO?



## File Output to a Program

### File Output to a Program

- put data into a file during **Program Execution**
- data comes from a variable(s) in your program

## Comma Separated Values

The individual values in a file are often separated or *delimited* by a comma. Other characters are also used such as the space or *newline*.

A .txt file with values delimited by commas is called a comma separated value file or **.csv** file.

Traditionally the *end of file* was marked by a special character as well but modern data files are organized by file size and do not require an end of file character.

## MATLAB functions for file IO

There are different ways to get data from a file. We are going to **scan** the data one character at a time using these functions.

```
fopen()
```

```
fprintf()
```

```
fclose()
```



## The fopen() Function

Open the file with the **fopen()** function

```
[FID]=fopen(FILENAME , PERMISSION)
```

- Input 1: FILENAME - the name of the file to open
- Input 2: PERMISSION - direction of access 'r' or 'w'
- Output 1: FID - the file identifier

## The File Identifier

The **file identifier** (FID) gives important info

- If the file opens properly the FID will have a positive value
- The FID will have a negative value if there was an **error**
  - File is not in the proper **directory**
  - The **current folder** has not been set properly
  - Please organize you file structure!
- FID can also give information about the **End Of File**

## The fprintf() Function

**fprintf()** can access the data only if the file is open

```
fprintf(FID,FORMAT,VAR);
```

- Input 1: FID - the **file identifier** fid
- Input 2: FORMAT - format specification of the scan
- Input 3: VAR - variable to be put into FORMAT

## The fclose() Function

Remember to close the file with **fclose()**

```
[ST]=fclose(FID)
```

- Input 1: FID - the **file identifier** fid
- Output 1: ST - status of close?
- Close the file after your program accesses the data
- THIS IS EASY TO FORGET BUT IMPORTANT!!!

## A Simple Example

```
FID = fopen('output_data.csv','w');  
  
x=999.9  
  
A = fprintf(FID,'%f',x)  
  
fclose(FID);
```

## A More Complex Example

```
clear variables;close all;clc

FID = fopen('output_data.csv','w');

t=0:0.1:2*pi % some data to test
y=5*sin(3*t)

figure(1);plot(t,y)
```

## A More Complex Example Continued

```
j=1  
while j<10  
    fprintf(FID,'%f',y(j));  
    j=j+1;  
end  
  
fclose(FID);
```

## References

- Your MATLAB textbook - Chapter 9 - Low Level File IO