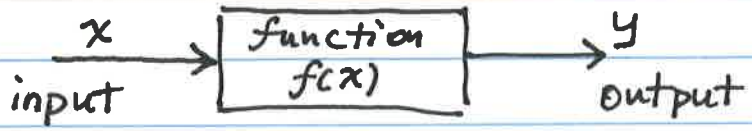
USER DEFINED FUNCTIONS

LECTURE DATE: 26 OCT 2016

Ask them what $f(x)$ is in mathematics?

→ associates a unique number to each value of x



We can also write functions for MATLAB
You have already used MATLAB functions, lets look at 2

x is a ratio

```
angle = sin(x)
```

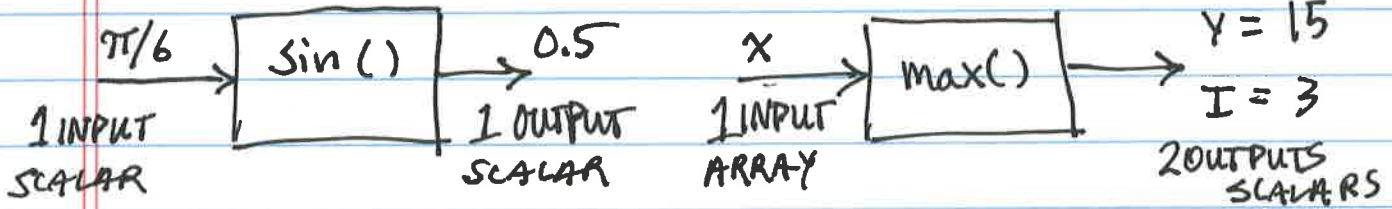
output ↑ ↖ input

let $x = \pi/6$

x is a vector

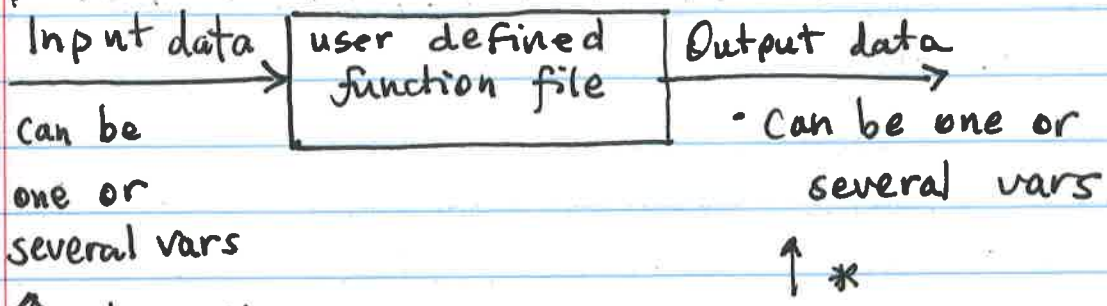
```
[Y, I] = max(x)
```

let $x = [7\ 12\ 15\ 8\ 9]$



When a function expression is simple and it only needs to be evaluated once, you can just type it up as part of the program

BUT if it needs to be evaluated many times with different values it can be valuable to write a function



lets make a function together

Calculate the maximum height that a ball reaches when thrown upward with a certain velocity

$$h_{max} = \frac{V_0^2}{2g}$$

optional, can still generate, write or plot or write data to a file

if multiple, seperate with ,

NEW

function

function definition line

function [output_args] = untitled (input)

MUST be the first word and lowercase

list of output args typed inside brackets

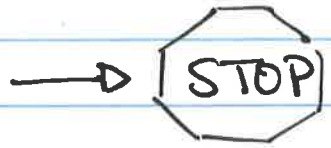
the name of the function

list of inputs

for function to work outputs MUST be assigned values inside function body

usually at least one, but can be zero

more on inputs, the math expressions inside a function must be written according to the dimensions of the inputs



ask them if they know what that means

⇒ if inputs are vectors or matrices, math must be elementwise or linear algebra

HELP TEXT LINES ARE VERY IMPORTANT:
When someone types in Help function, they are displayed

Local vs Global Variables:
All variables in a function file are local. That meant the variables are recognized and defined ONLY inside the function file

⟹ functions can use var names same as workspace without overwriting them!

When saving functions, you should use a name identical to the function name
→ this way when the function is called by using the function name.
If the file is a diff name, that must be used to call function

ex) hmax.m

You use the same way as a built in function