

## Re-examining functions within functions using previous HW problems:

**Example 1: Calculate a cannon ball's position from the cannon at time t.**

In main.m:

```
clear;clc;
angle = 45;
v0 = 100;
v0x = v0*cos(angle*pi/180);
v0y = v0*sin(angle*pi/180);
x0 = 0;
y0 = 0;
t = 5;
% distance from initial position
dist = calcdist(t,x0,y0,v0x,v0y)
```

In calcdist.m:

```
function [ value ] = calcdist (t,x0,y0,v0x,v0y)
value = sqrt( (x(t,x0,v0x)-x0)^2 + (y(t,y0,v0y)-y0)^2 );
endfunction
```

In x.m:

```
function [ value ] = x (t,x0,v0x)
value = x0 + v0x*t
endfunction
```

In y.m:

```
function [ value ] = y (t,y0,v0y)
value = y0 + v0y*t - 0.5*9.8*t^2;
endfunction
```

**Example 2: Calculate the standard deviation of an array of scores.**

In main.m:

```
score = [98, 96, 92];  
disp( standard(score) )
```

In standard.m:

```
function [result] = standard(score)  
meanx = avgscore(score);  
result = 0;  
for i=1:numel(score)  
    result = result + ( meanx - score(i) )^2;  
end  
result = sqrt( result/ (numel(score)-1) )  
endfunction
```

In avgscore.m:

```
function [result] = avgscore(score)  
result = 0;  
for i=1:numel(score)  
    result = result + score(i);  
end  
result = result/numel(score)  
endfunction
```

### Example 3:

In main.m:

```
clear;clc;
% g(x) = 2*x(t) + 1;
% where x(t) = t + t^2 for t>=5,
%           = t + 1 for t<5
for t=0:1:10
    disp( g(t) )
end
```

In g.m:

```
function [ value ] = g (t)
value = 2*x(t) + 1;
endfunction
```

In x.m:

```
function [ value ] = x (t)
if( t >= 5 )
    value = t + t^2;
else
    value = t + 1;
end
endfunction
```