

## Lectorial 2: A Simple Unit Conversion Program

In this lectorial we will be starting the unit conversion program project which is the major assessment task for the first half of this semester.

In this session begin by creating a **sequential script** that converts a temperature (a hardcoded numeric value) from Fahrenheit to Celsius.

Test that your program outputs the correct values by using the following **small set of test data** to compare with your results:

Sample test data				
$100^{\circ} F = 37.78^{\circ} C$	$0^{\circ} F = -17.78^{\circ} C$	$32^{\circ} F = 0^{\circ} C$	$-40^{\circ} F = -40^{\circ} C$	$55^{\circ} F = 12.78^{\circ} C$

Now write some more code that converts from Celsius to Fahrenheit. Repeat this for all the following unit-types:

Type	To imperial	To metric
<u>Temperature</u>		
$^{\circ} C \longleftrightarrow ^{\circ} F$	$T_{^{\circ}F} = \left( T_{^{\circ}C} \times \frac{9}{5} \right) + 32$	$T_{^{\circ}C} = (T_{^{\circ}F} - 32) \times \frac{5}{9}$
<u>Length &amp; Distance</u>		
$cm \longleftrightarrow inch$	$L_{inch} = \frac{L_{cm}}{2.54}$	$L_{cm} = L_{inch} \times 2.54$
$m \longleftrightarrow feet$	$L_{ft} = \frac{L_m}{0.3048}$	$L_m = L_{ft} \times 0.3048$
$km \longleftrightarrow miles$	$D_{mi} = \frac{D_{km}}{1.609344}$	$D_{km} = D_{mi} \times 1.609344$
<u>Mass</u>		
$grams \longleftrightarrow ounces$	$m_{oz} = \frac{m_{gr}}{28.3495}$	$m_{gr} = m_{oz} \times 28.3495$
$kg \longleftrightarrow pounds$	$m_{lb} = \frac{m_{kg}}{0.4536}$	$m_{kg} = m_{lb} \times 0.4536$
<u>Speed</u>		
$km/h \longleftrightarrow mph$	$v_{mph} = \frac{v_{km/h}}{1.609344}$	$v_{km/h} = v_{mph} \times 1.609344$
<u>Volume</u>		
$litre \longleftrightarrow gallon$	$V_{gal} = \frac{V_{lit}}{3.78544}$	$V_{lit} = V_{gal} \times 3.78544$
<u>Area</u>		
$hectare \longleftrightarrow acre$	$A_{ac} = A_h \times 2.4711$	$A_h = \frac{A_{ac}}{2.4711}$

### **Due date and further details on this task:**

The first milestone for this project is due at the **end of week 3 (Friday, before 11:59pm)**.

You are required to submit your MATLAB script file(s) and a report containing an abstract and evidence of testing. More details on this can be found on Canvas under **Modules -> Week 1 -> Assessment Task Instructions (IMPORTANT) -> Individual Lectorial Instructions**.

Milestone 1 should just consist of what we've done today. To fulfil the specifications, you need to do the following:

- Design and implement a basic unit converter that converts hardcoded numbers only (i.e. entered as variables in your script, not obtained through the user-input function).
- Your script should contain code that converts all the units given on the previous page (temperature, length, mass, speed, volume and area) to and from their imperial and metric types (i.e. both directions).
- There should be no conditional statements, loops or user-defined functions at this point; these will be included in future milestones.