

# Introduction to C Programming

## Programming Exercises

In the following tasks you will create 'User Functions', blocks of code that may be used within your program. There are a number of simple additional tasks to help you understand how function work. Don't forget to include a function prototype for each function you create.

### Task 1 - A simple that calls a function (callname.c)

Write a program that calls a function that will use a 'printf' statement to display your name on the monitor 10 times. Make sure you save the code before you compile it and again when you have it working correctly.

### Task 2 - Experimentation

- 2a. Delete the function prototype and see if the compiler will allow it.
- 2b. Now move the called function to above "main" function to see what happens when you compile it.

### Task 3 - Passing Parameters (name10.c)

Adapt the program above so that the function call carries the number of times your name should be printed on the screen. You can start by using the good working copy of task 1 and using 'save as' to save the new version.

### Task 4 - Passing and Returning Values (newf2c.c)

Rewrite 'fahtocel.c' (shown below), from an earlier example, and move the temperature calculation to a function. You should pass the fahrenheit value to the function and return the celsius value to 'main' for displaying on the screen.

```
void main(void)          /* start of main function */
{
    int fah, cel; /*declaration of two variables used in program */

    /*The prompt*/
    printf("\n\nEnter degrees Fahrenheit: ");

    /*Get the input*/
    scanf("%f",&fah);

    /*Calculate the result*/
    cel = (fah - 32.0) * 0.555;

    /*Display result*/
    printf("\nDegrees Celsius = %f",cel);

}                          /* end of the main function */
```

## Task 5 - Using a Menu (area.c) (Note: Demonstrate this program to your lecturer)

Write a menu driven program that calculates the area of a square, rectangle or triangle given the length of the side(s) or a circle given the diameter (distance from edge to edge across the centre). The structure of the program is given below.

**Main Function** to :

Call **Menu Function**

Decide which **Shape Function** to call

**Menu Function** to :

Display a menu

Ask operator for their selection

**Shape Functions** to :

Ask for length of side(s)

Calculate area

Output area

**NOTE:** 1. Area of triangle =  $\sqrt{s(s-a)(s-b)(s-c)}$

where  $s = (a + b + c) / 2$

a, b and c are side lengths

2. Square Root function *sqrt*( ) is in header file *<math.h>*

3. Area of a circle =  $d * B$

where  $B = 3.14159$  (there is no function in C for B)

d is the diameter of the circle

## Task 6 - Menu Exiting and Selection Validation (area2.c)

Modify previous program to include an exit facility on the menu and the program validates the operator input for menu selection i.e. it does not exit the **Menu Function** until the selection is valid. Output an error message if selection is invalid. Also modify the **Main Function** so that the operator can run the program again until exit selected.

**Main Function** to :

Continually-

Call **Menu Function**

Decide which **Shape Function** to call if not exit

Until exit selected

**Menu Function** to :

Continually

Display a menu

Ask operator for their selection

Validate selection

Until selection valid

### **Task 7 - Data Input Validation (area3.c)**

Modify previous program to include practical checks on length of the side(s) (i.e. sides cannot have a length of  $\leq 0$  ). The Shape Function is to check for practicality of the side length(s) and put area to a value of 0 if any side length is impractical.