# CSC9V4 Pract. 5:
# How functions function.

## Introduction

Focus on functions! Please go through the teaching material about functions (video and slides) in detail before attempting this practical – questions for checkpoints may regard that material, as wll as general concepts about the C language introducd in the module. Test the various examples, and "play" with them (change them, try to create error conditions, test unexpected inputs, ….  be curious).

## Min and Max

The following main function, a C program uses two functions, max() and min(), to compute the maximum and minimum of an array. The program contains **function calls**, but not **function definitions**.

1. Please, provide suitable function definitions after the main() function. You have to scan the array and keep the max/min value. Remember to **'declare'** the function with a function header before main()!

```
#include <stdio.h>

#define N 10


/* Declare functions here. */


int main(void)
{
  int b[N], I, big, small;

  printf("Enter %d numbers: ", N);
  for (I = 0; I < N; i++)
    scanf("%d", &b[i]);

  printf("Largest: %d\n", max(b, N) ); /* Function to implement. */
  printf("Smallest: %d\n",min(b, N));  /* Function to implement. */

  return 0;
}


---
```

2. Can you improve the min() and max() functions so that they can work with arrays of variable length?

## From Pen and Paper, to Coins and Notes, to C bytes

Consider the following block of very simple code, that takes some amount in Sterling and breaks it down into the minimum number of notes and coins that total the amount given.

```
#include <stdio.h>

int main(void)
{
  int amount, twenties, tens, fives, ones, reduced_amount;

  printf("Enter a pound amount: ");
  scanf("%d", &amount);

  twenties = amount / 20;
  reduced_amount = amount - (20 * twenties);

  tens = reduced_amount / 10;
  reduced_amount = reduced_amount - (10 * tens);

  fives = reduced_amount / 5;
  ones = reduced_amount - (5 * fives);

  printf("\n");   /* blank line */

  printf("£20 notes: %d\n", twenties);
  printf("£10 notes: %d\n", tens);
  printf(" £5 notes: %d\n", fives);
  printf(" £1 notes: %d\n", ones);

  return 0;
}
```

3. Re-write the program to solve the problem using functions, and with the following constraints:

   a. No calculation about the Sterling amounts within the body of `main()`.
   b. All output within the body of `main()`.
   c. You are **not allowed** to use **pointers**.

This is *hard*. Avoid underestimating the complexity of the task. Pen and paper is a great start!

4. Implement and test the program that you have designed on paper.

5. Can you think to a more compact code, without sacrificing clarity? (Hint: there seems to be a repeating pattern …)

**Check Point**