

Tutorial 3 – Mastermind

What we learn in this tutorial:

- Arrays
- Random numbers
- Repetition statements (**for** and **while** loop)

Mastermind is a popular game first implemented in 1960's Titan computer in Cambridge.

In this game the computer draws a random sequence of four colours and asks the user to guess them. In our version, the colours are represented by numbers between 0 and 5.

At each round, the user attempts a new sequence and receives a hint from the machine. The hint consists in the number of colours correctly placed and the number of colours present but misplaced. For example, if the secret sequence is “2 0 1 5” and the user inputs “2 3 4 0”, one colour is correctly placed and one misplaced.

The goal is for the user to guess all the colours. The printout on the right shows a possible game.

```
Mastermind

round 1> 1 2 3 4
correct: 0 misplaced: 3
round 2> 1 1 1 1
correct: 1 misplaced: 3
round 3> 2 2 2 2
correct: 0 misplaced: 0
round 4> 0 1 3 4
correct: 0 misplaced: 4
round 5> 0 1 4 3
correct: 0 misplaced: 4
round 6> 3 4 0 1
correct: 2 misplaced: 2
round 7> 4 3 0 1
correct: 4 misplaced: 0
```

1) Write a program that:

1. Declares an array of four integers to hold the secret sequence and an array of four integers to hold the user input. Declare and initialise other necessary variables.
2. Initialise the secret array at random using a for loop. For this, *rand()* from *stdlib.h* can be used. The random seed should also be initialised to avoid always generating the same sequence. One way of doing this is to use the function call *srand(time(NULL))*, that uses the current time (with *time()* from *time.h*) as random seed.
3. The program loops until the user guesses all the numbers doing the following:
 - a. Input a sequence using a for-loop
 - b. Count and print the number of correctly placed and misplaced guesses

2) Modify the program to draw a secret sequence without duplicates.