

Lab Sheet: C# Fundamentals

This lab sheet covers the section on C# Fundamentals (Relevant Slides ) from the course on *Industrial Programming* (F21SC): <http://www.macs.hw.ac.uk/~hwloidl/Courses/F21SC#slides>. These tasks can be done in Visual Studio, either on the local machine, or via a remote desktop on one of the Windows lab machines (using the keyserver). See the Week0 Course Resources overview for details.

Most exercises are available from the `gitlab-student.macs.hw.ac.uk` server, and these are marked as . Use this HOWTO do exercises with the gitlab server for an introduction how to do these exercises and how to use the the continuous integration backend of gitlab to get immediate feedback on your solution. Try [this hello world exercise](#) , alongside watching the HOWTO, to try this yourself.

Only the bold-face exercises are mandatory. Others are recommended if you are fairly new to object-oriented programming or need to brush up on your background.

Getting Started

The technical HOWTOs section in the Canvas module and the matching section on the main course information page have several HOWTOs that should help in getting started with Visual Studio, accessing remote machines and using the `gitlab-student.macs.hw.ac.uk` server. In particular check out:

- Installing Visual Studio (from LinkedIn Learning) 
- HOWTO get started with VisualStudio (Hello world and command-line argument examples) 
- HOWTO run a console application taking command-line input 
- How to do exercises with the gitlab-student server 
- HOWTO use the keyserver to access Windows lab machines  (for remote access to lab machines)
- HOWTO install Mono on Ubuntu  (is you use a Linux machine)

C# Fundamentals (Week 1/2)

- Exercises on C# enumerations (**Gitlab** version of the lab exercise ):
 - Define `Weekdays` as an enumeration type and implement a `NextDay` method
 - Implement a `whatday` method returning either `WorkDay` or `WeekEnd` (use another enum)
- Simple loop exercises in C# (**Gitlab** sample source code ):
 - Write a method calculating the sum from 1 to n, for a fixed integer value n
 - Write a method calculating the sum over an array (one version with `foreach`, one version with explicit indexing)
- Use the `setstep` method (from the C# Fundamentals slides) to implement a method `set0`, which sets all array elements to the value 0.
- Define complex numbers using structs, and implement basic arithmetic on them. **Gitlab** 
- **Implement Euclid's greatest common divisor algorithm as a static method over two `int` parameters.** (**Gitlab** version of the lab exercise , **Gitlab** version for Visual Studio  )
- **Implement matrix multiplication as a static method taking two 2-dimensional arrays (of any size) as arguments.** (**Gitlab** version of the lab exercise , **Gitlab** version for Visual Studio  )

The bold-face exercises, **gcd**, **mat-mult**, **trees**, should be completed and pushed to gitlab by Week 3.