

Lab Sheet: C# Advanced Language Features

This lab sheet covers the sections on C# Objects, C# Advanced Language Features 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 Course Resources overview for details.

These exercises are *optional*, but aimed to deepen your understanding of the advanced language features that we covered in the course. Try at least one exercise from each section, to prepare you for the implementation of CW1.

C# Advanced Language Features (Week 4)

- Extend the `twice` example, and define a method that applies a function (input: integer; output: integer) n -times to an argument, using *delegates*. Use this method to print all powers of 2 from 0 to 10. (Gitlab repo 🐱)
- Perform the following extensions to the binary search tree (Gitlab repo 🐱):
 1. Modify the *binary search tree* example, using generics over the element type.
 2. For the binary search tree, implement an indexer, for direct access to the i -th element
 3. For the binary search tree, implement an enumerator, to enable foreach loops (*Beware: this exercise is more difficult than the rest*).
 4. Use *delegates* to define a method `mapTree` that applies a method to every element of a binary search tree.

C# GUIs (Week 5)

- Create a form with two text-areas as input fields, a text-area as output field, and a button to add these two values.
Hint: Check out [this HOWTO of creating a GUI in Visual Studio](#) 📄 and refer to these slides (espec. Slide 19) 📄 for basic information on how to build a GUI with Visual Studio.
- Extend the previous example to a simple calculator of basic arithmetic operations.

C# Systems Programming (Week 5)

- See the live coding screencast on list reversal 📺 and pick up the sample source code for `ListReversal1.cs` 🐱. Modify the code so that the list-reversal operation is done in-place (Gitlab repo 🐱).