02393 Programming in C++

Module 0: Welcome!

Alceste Scalas
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Outline

Organisation

- **Teacher:** **Alceste Scalas** <alcsc@dtu.dk>
- **Teaching assistants:**
  - **Anton Rydahl** <s174515@student.dtu.dk>
  - **Francisco Jose Torres Mendez** <s175406@student.dtu.dk>
  - **Frederik Munk Svanholm Frost** <s184182@student.dtu.dk>
  - **Rasmus Ishøy Michelsen** <s164444@student.dtu.dk>
  - **Thyge Skødt Steffensen** <s175176@student.dtu.dk>
  - **Victor Brevig** <s184469@student.dtu.dk>
- **Lectures and labs:**
  - 4 hours of 50 minutes each with 10-minute breaks
    - usually a **lecture with live coding** followed by **lab time**
  - **Bring your laptop!**
  - Lectures are **streamed via MS Teams** and **recorded**
    - Instructions on the course homepage (on DTU Learn)
    - Priority is given to on-campus students

Course homepage and materials

https://learn.inside.dtu.dk/d2l/home/79659

- **Slides** and examples for the lectures
- **Assignments** and their **solutions**
- How to set up the **recommended editor and compiler**
- The **reference book** of the course:
  - Stanford Course Reader by S. Roberts, J. Zelenski: **Programming Abstractions in C++**
  - The book uses some ad-hoc libraries, e.g., for strings and vectors. We'll use standard libraries
- How to access MS Teams and the lecture recordings
- Other useful links

Live coding

https://www.nytimes.com/2019/10/04/style/live-code-music.html

During lectures, I will explain concepts mostly **by example**, via **live coding**

- The files will be on DTU Learn

Let's **be interactive**: try to follow along, ask questions!

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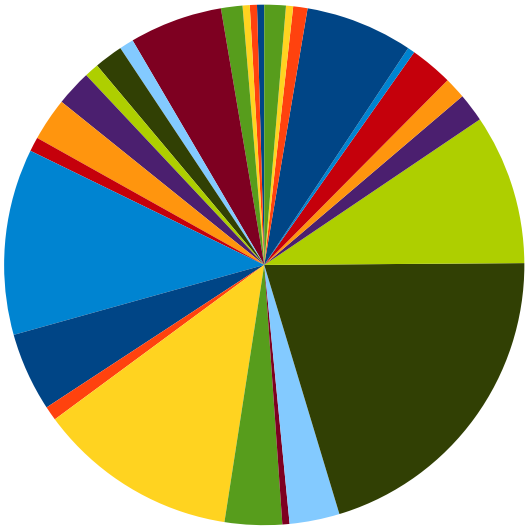
Let's **be interactive**: try to follow along, ask questions!

Consequently, **the lecture slides do not spell out everything in detail!**

- They summarise keywords & concepts

You should **refer to the book**, **complete the assignments** and **ask questions** when something is unclear

Who are you?


BSc Artificial Intelligence and Data
BSc Cyber Technology
BSc Design and Innovation
BSc Electrical Engineering
BSc General Engineering
BSc Geofysik
BSc Mathematics and Technology
BSc Mechanical Engineering
BSc Physics and Nanotechnology
BSc Software Technology
BSc Strategic Analysis and Systems Design
Diploma in Engineering
Electronics Engineering
Health Care Technology
MSc Autonomous Systems Engineering
MSc Bioinformatics and Systems Biology
MSc Business Analytics
MSc Communication Technologies and System Design
MSc Computer Science and Engineering
MSc Electrical Engineering
MSc Engineering Acoustics
MSc Engineering Mechanical Engineering
MSc Human-Centered Artificial Intelligence
MSc Materials and Manufacturing Engineering
MSc Mathematical Modelling and Computation
MSc Physics and Nanotechnology
MSc Quantitative Biology and Disease Modelling
PhD

Learning objectives

(From `http://kurser.dtu.dk/course/02393`)

A student who has met the objectives of the course will be able to:

- select and use **data types**
- define and construct **data structures and functions**
- use principles of **structured program design** and **methods**
- describe and use **containers and iterators**
- construct and demonstrate **generic functions and classes** (templates)
- use and define classes with **encapsulation** and **constructors**
- use **pointers** and **arrays** with **memory management**
- develop projects organized in **multiple header and source files**
- explain and apply the principles of **abstract data types**
- analyze and compare the **complexity** of different data structures and algorithms
- explain the **C++ runtime system**

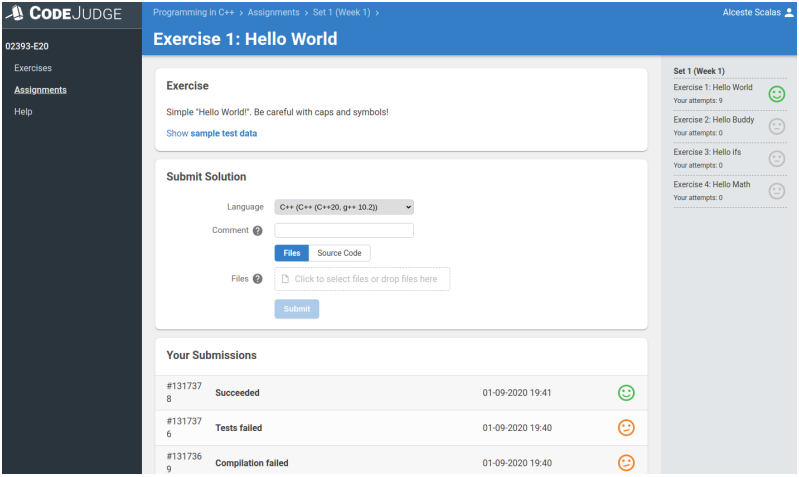
Assessment

- **Weekly assignments** with **immediate feedback**
  - To be handed in via **CodeJudge**: `https://dtu.codejudge.net/02393-e21/assignments`
  - Automatically tests your code, gives you a chance to fix bugs
  - See deadlines on CodeJudge
- **Exam**
  - Date: 05/12/2021
    - Time & location: TBD
    - In previous years it has been at 9 AM at the Ballerup campus
  - Duration: 4 hours, all aids allowed
  - Similar to the weekly assignments; past exams available on DTU Learn
- **Evaluation** (pass / fail)
  - Mainly based on the exam
  - Weekly assignments contribute to the final decision
    - Roughly: if your exam is borderline but you did most assignments well, you pass

What is CodeJudge?

An online system to **submit your solutions** to programming exercises and **get instant feedback**

You can **retry and resubmit until you pass all tests**



Support and feedback

During the labs, you can ask questions and get help from the TAs and me

- If you cannot attend in person, you can ask via MS Teams

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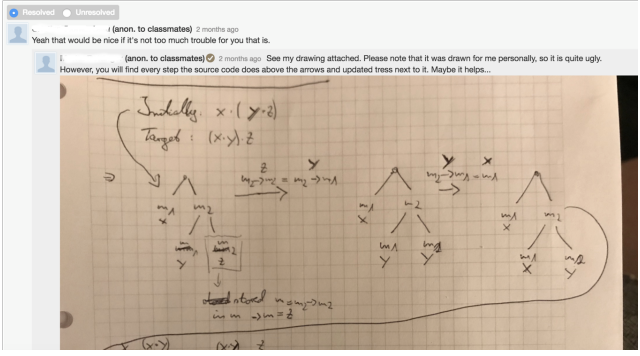
While you study, you can **ask & answer questions** on the **Q&A forum** on DTU Learn

`https://learn.inside.dtu.dk/d2l/le/79659/discussions/topics/9653/View`

You are **encouraged to answer your fellow students' questions**. You can **post anonymously** if you wish

In previous years we had very nice interactions!



Course plan

Module no.	Date	Topic	Book chapter*
0 and 1	31.08	Welcome & C++ Overview	1
2	07.09	Basic C++ and Data Types	1, 2.2 – 2.5
3	14.09	*LAB DAY*	*C++ Practice*
4	21.09	Data Types	2
5	28.09	Libraries and Interfaces	3
6	05.10	Classes and Objects	4.1, 4.2 and 9.1, 9.2
7	12.10	Templates	4.1, 11.1
		Autumn break	
8	26.10	Inheritance	14.3, 14.4, 14.5
9	02.11	**Guest lecture** & *LAB DAY*	*Previous exams*
10	09.11	Recursive Programming	5
11	16.11	Linked Lists	10.5
12	23.11	Trees	13
13	30.11	Conclusion & *LAB DAY*	*Exam preparation*
	05.12	**Exam**	

* Recall that the book uses some ad-hoc libraries (e.g., for strings and vectors). We will use standard libraries

Your feedback is important!

During the course I will ask you to fill some **brief anonymous feedback forms**

- Is the progression too slow / too fast?
- Is the content adequate / too much?
- ...

Also, feel free to report your feedback directly to me, e.g., by email or appointment