



The Hebrew University of Jerusalem

Syllabus

Programming Workshop in C & C++ - 67315

Last update 01-03-2022

HU Credits: 4

Degree/Cycle: 1st degree (Bachelor)

Responsible Department: Computer Sciences

Academic year: 0

Semester: 2nd Semester

Teaching Languages: Hebrew

Campus: E. Safra

Course/Module Coordinator: Dr. Dina Schneidman

Coordinator Email: Dina.Schneidman@mail.huji.ac.il

Coordinator Office Hours:

Teaching Staff:

Dr. Dina Schneidman,
Dr. Barak Raveh

Course/Module description:

The course provides a thorough introduction to the C/C++ programming languages.

Course/Module aims:

Familiarity with the C programming language syntax, and better understanding of how programming language and hardware interact.
Understanding the basics of C++ classes and libraries, introduction to object oriented programming.

Learning outcomes - On successful completion of this module, students should be able to:

Read and write programs in C/C++ languages.
Understand memory management and pointers.
Apply generic programming in C.
Design readable, extendible and optimal programs.

Attendance requirements(%):

must attend TAs

Teaching arrangement and method of instruction: Frontal lectures, TAs, programming lab and programming assignments.

Course/Module Content:

Part 1 - C:

The structure of a C Program
Built in data types and enumerators
Variables types (local, static, global)
Logical and arithmetic expressions
Bitwise operations
C standard library
Standard and File IO
Control-flow statements
Functions
Pointers

Static and dynamic memory understanding and management

Arrays

Structs, unions and bitfields

Strings

Error handling

The C preprocessor (macros, directives)

Program organization

Multiple files compilation and linkage (static, extern)

Make utility and building a makefile

Command-line arguments

Generic programming in C

Function pointers

Code optimization

Variadic functions

Part 2 - C++:

Classes, fields and methods, members and static, constructors and destructors, const methods and objects

References

Functions and operators overloading

Static and dynamic memory understanding and management

Nested classes and Namespaces

Exceptions handling

Templates functions and classes

Principles of generic programming

Generic iterators

Templates specialization

Template meta-programming (TMP)

Standard template library (STL)

Inheritance

Virtual methods and polymorphism

Encapsulation, abstract classes and interfaces, multiple inheritance

Smart pointers

Required Reading:

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Additional Reading Material:

The C Programming Language

Book by Brian Kernighan and Dennis Ritchie

The C++ Programming Language

Book by Bjarne Stroustrup

Course/Module evaluation:

End of year written/oral examination 70 %

Presentation 0 %

Participation in Tutorials 6 %

Project work 0 %

Assignments 24 %

Reports 0 %

Research project 0 %

Quizzes 0 %

Other 0 %

Additional information:

Exams:

There will be a single exam in both C and C++. A mid-term C quiz will take place in the middle of the semester (Magen).

TAs:

This course has two hours of tirlgul in small groups. The first hour is frontal and the second hour is a programming lab. Students must attend the tirlgul group they are registered to.