UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Programming 1

2526-1-E3102Q104

Aims

By the end of the course the student will be able to:
(DdD 1) describe computer architecture, the compile–link–run cycle and the basic syntax and semantics of the C language;
(DdD 2) design and implement small/medium-sized imperative programs manipulating data in memory and on files;
(DdD 3) evaluate alternative solutions in terms of memory handling and input validation;
(DdD 4) document source code and clearly present design choices;
(DdD 5) autonomously consult technical documentation and transfer the acquired skills to new languages or tools.

Contents

Imperative programming with C: program structure, control flow, functions and recursion, arrays, strings, pointers, structures, formatted and file I/O.

Detailed program

Module | Main topics

- Foundations | Hardware & software, tool-chain gcc/clang, gdb
- First steps | main, #include, printf/scanf, operators
- Control flow | if, switch, while, for, do…while, logical operators
- Functions | Prototypes, scope, memory classes, recursion, math
- Arrays & strings | Sorting, search, string library
- Pointers | Arithmetic, array-pointer, const, function pointers, malloc/free

- Structures & enum | struct, union, typedef
- Advanced I/O & files | Streams, formatting, sequential and random-access files

The sequence may change slightly for teaching purposes.

Prerequisites

Elementary logic, basic arithmetic and basic computer skills.

Teaching form

The teaching consists of:
lectures, mainly in delivery mode;
exercises, in delivery and interactive mode;
assisted work sessions in the laboratory, mainly in interactive mode.
In addition, both the slides and exercises done in class and various types of targeted exercises (quizzes, practical questions) to be done individually by students will be made available online.

Language: Italian.

Textbook and teaching resource

P. Deitel, H. Deitel – Il linguaggio C. Fondamenti e tecniche di programmazione (9? ed., Pearson, 2023).
Slides, code examples and exercise sheets provided by the teacher.

Semester

First semester

Assessment method

The learning assessment includes a written test and an optional oral interview.
In the written test, the student is required to:
answer multiple choice and open questions, which aim to verify the student's preparation on the various parts of the program;
carry out some programming exercises in C language on the computer, with the aim of verifying whether the student is able to apply the programming techniques seen during the lessons and exercises, and to implement these techniques in the C programming language.
Each of the two parts will be evaluated in thirtieths and the grade of the written test will be the average of the grades of the two parts. Both tests must be passed with a grade ? 18/30.

The written test may be replaced by two partial tests administered in itinere, organized and evaluated in the same way as the written test but simpler and each concerning only one part of the program. Both tests must be passed with a grade ? 18/30.
During the oral exam, in addition to the discussion of the written exam, questions can be asked on all the topics of the course.

Office hours

By appointment arranged by e-mail.

Sustainable Development Goals

QUALITY EDUCATION