

Computer Programming - Basics

(version 0.95)

I. Overview

In this course we will discuss the basic components of a computer, both hardware and software. We will also be giving a brief overview of programming languages and the program development life cycle. Different number systems and conversions from one type to another will be discussed. The course introduces the students to the bases of computer programming.

II. Requirements

Elementary computer skills: required

Computer English: initial level

III. Course Program

1. Mathematics Basics (lectures: 2, exercises: 2, homework: 2)

- Fundamental mathematical operations – Modulo, Factorial, etc.
- Numeric systems - Decimal, Binary, Octal, Hexadecimal
- Decimal to binary / Binary to Decimal
- Decimal to octal (or Hexadecimal)/Octal (or Hexadecimal) to decimal.
- Binary to octal / Octal to Binary
- Binary to hexadecimal / Hexadecimal to binary

2. Introduction to Algorithms (lectures: 1)

- What is algorithm?
- Why we need to learn algorithms
- Some basic algorithms
- How to solve problems

3. Basic Components of a Computer (lectures: 1)

- Hardware
- The central processing unit
- Memory
- Input and output devices
- Software

4. Introduction to Operating Systems (lectures: 1)

- What is an Operating System

- Process management
- Memory management
- Disk and file systems
- Networking
- Security

5. What is Programming (lectures: 1)

- Definition of program
- Two different types of software
- What do programs do

6. Overview of Computer Programming Languages (lectures: 2, exercises: 1)

- What is a programming language?
- Categories of programming languages
- The program development life cycle
- Problem definition
- Problem analysis
- Algorithm design and representation
- Flowcharting symbols and their meanings
- Coding and debugging

7. Compilers and Interpreters (lectures: 1)

- Introduction
- Compiling
- Interpreting
- JIT

8. What is a Variable (lectures: 1, exercises: 1)

- What exactly is a variable
- A real world example of variables
- Data in a PC
- Variables are temporary
- How big is a variable
- What is a variable type
- What types of data can a variable hold?

9. Integrated Development Environment (lectures: 1)

- What is IDE?
- What is the difference with a pure editor (Notepad)
- A simple HelloWorld sample with debugging

10. How to Learn in XXI Century (lectures: 1)

- Blogs
- Podcasts
- Screencasts
- Searching in Google and Wikipedia

IV. Training Duration

Lectures: 12 hours

Exercises: 4 hours

Homework: 2 hours

Allocation: ~2 weeks, 2 times * 4 hours at week