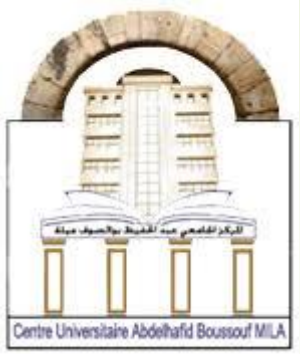
Abdelhafid Boussouf
University
Center of Mila



Structure of Computers and Applications

1st year ST – ENGINEERING

Part 1: Introduction to Computer Science

Course 01: Definition of Computer Science
Evolution of computing and computers

By

Dr. Farouk KECITA

Academic year : 2024/2025

1- Definition of Computer Science

What is Computer Science?

- Computer Science is the study of **computers** and **computational systems**.
- It encompasses the theory, development, and application of **software** and **hardware**, and involves algorithms, data structures, artificial intelligence, programming languages, and the design of computer systems and networks.
- Computer science focuses on the **automatic processing** of **information** by **computer**.
- With its interdisciplinary nature, computer science has driven innovation in healthcare, finance, transportation, and entertainment.

1- Definition of Computer Science

What are the main tasks of a computer?

The main tasks performed by a computer:

- **Data Processing**: Performing calculations and manipulating information.
- **Data Storage**: Storing data and programs for later use.
- **Data Retrieval**: Accessing and retrieving stored information.
- **Data Transmission**: Sending and receiving data over networks.
- **Control**: Managing and controlling external devices and systems.
- **User Interaction**: Providing interfaces for users to interact with the computer.
- **Automation**: Performing repetitive tasks automatically.
- **Analysis**: Analyzing data to extract insights and support decision-making.

These tasks enable computers to handle a wide range of functions across various fields.

2- Evolution of computing and computers

- The evolution of computing has happened over centuries thanks to numerous mathematician and physicist researchers. The evolution is marked by several key stages and breakthroughs:

Generation of Computers	Time Period	Evolved Hardware	Key Characteristics
First Generation	1940-1959	Vacuum tubes	Large size, high power consumption, limited memory
Second Generation	1950-1960	Transistors	Smaller size, increased reliability, reduced heat generation
Third Generation	1964-1971	Integrated circuits	Further size reduction, increased speed, improved efficiency
Fourth Generation	1972-present	Microprocessors	Personal computers, increased processing power, user-friendly interfaces
Fifth Generation	Present and beyond	AI hardware, neural networks	Machine learning capabilities, natural language processing
Sixth Generation	Emerging	Quantum processors, molecular computing	Massive parallel processing, potential for solving complex problems