# Computing

## Definition

**# Source**: [**Wiki source**](https://drive.google.com/drive/folders/1EjqQ_DdiBqc00sC5hPOIg79ubO2zj8qx?usp=drive_link): [Computing](https://drive.google.com/file/d/1cjZ5svnnesq4AoJS9wLsr4LIwZFfUGDH/view?usp=drive_link)-> at - (**Top**): [Computing is any goal-oriented activity…]

**# Source**: **Chatgpt (GPT-4-turbo) at [4/3/2025]**: [what is computing machinery…, Key Components of...]

\*Computing is any goal-oriented activity requiring, benefiting from, or creating [computing machinery](https://en.wikipedia.org/wiki/Computer).[[1]](https://en.wikipedia.org/wiki/Computing#cite_note-:0-1) It includes the study and experimentation of [algorithmic](https://en.wikipedia.org/wiki/Algorithm) processes, and the development of both [hardware](https://en.wikipedia.org/wiki/Computer_hardware) and software. Computing has scientific, engineering, mathematical, technological, and social aspects. Major computing disciplines include [computer engineering](https://en.wikipedia.org/wiki/Computer_engineering), [computer science](https://en.wikipedia.org/wiki/Computer_science), [cybersecurity](https://en.wikipedia.org/wiki/Cybersecurity), [data science](https://en.wikipedia.org/wiki/Data_science), [information systems](https://en.wikipedia.org/wiki/Information_systems), [information technology](https://en.wikipedia.org/wiki/Information_technology), and [software engineering](https://en.wikipedia.org/wiki/Software_engineering).[[2]](https://en.wikipedia.org/wiki/Computing#cite_note-2)

**\*what is computing machinery**

Computing machinery generally refers to the physical and **logical components** used to perform computations. It can include both **hardware** and **systems** involved in processing, storing, and transmitting data.

**\*Key Components of Computing Machinery:**

**1. Hardware Devices:**

- Central Processing Units (CPU) – the “brain” that performs

calculations.

- Memory (RAM, ROM) – for storing data temporarily or permanently.

- Storage Devices – like hard drives, SSDs.

- Input/Output Devices – keyboards, screens, printers, etc.

- Networking Equipment – routers, switches.

**2. Computing Systems:**

- Servers

- Supercomputers

- Embedded systems

- Personal computers

- Cloud computing infrastructure

**3. Logical Components:**

- Operating Systems

- Compilers

- Algorithms

- Software applications

## Branches of Computing

1. Computer engineering
2. Software engineering
3. Computer science
4. Cybersecurity
5. Data science
6. Information systems
7. Information technology

### **1-Computer engineering**

**# Source**: [**Wiki source**](https://drive.google.com/drive/folders/1EjqQ_DdiBqc00sC5hPOIg79ubO2zj8qx?usp=drive_link): [Computing](https://drive.google.com/file/d/1cjZ5svnnesq4AoJS9wLsr4LIwZFfUGDH/view?usp=drive_link)-> at - (**Sub-disciplines of computing - Computer engineering**)

Computer engineering is a [discipline](https://en.wikipedia.org/wiki/Academic_discipline) that integrates several fields of [electrical engineering](https://en.wikipedia.org/wiki/Electrical_engineering) and [computer science](https://en.wikipedia.org/wiki/Computer_science) required to develop computer hardware and software.[[36]](https://en.wikipedia.org/wiki/Computing#cite_note-36) Computer engineers usually have training in [electronic engineering](https://en.wikipedia.org/wiki/Electronic_engineering) (or [electrical engineering](https://en.wikipedia.org/wiki/Electrical_engineering)), [software design](https://en.wikipedia.org/wiki/Software_design), and hardware-software integration, rather than just software engineering or electronic engineering. Computer engineers are involved in many hardware and software aspects of computing, from the design of individual [microprocessors](https://en.wikipedia.org/wiki/Microprocessor), personal computers, and [supercomputers](https://en.wikipedia.org/wiki/Supercomputer), to [circuit design](https://en.wikipedia.org/wiki/Circuit_design). This field of engineering includes not only the design of hardware within its own domain, but also the interactions between hardware and the context in which it operates.[[37]](https://en.wikipedia.org/wiki/Computing#cite_note-37)

### **2-Software engineering**

**# Source**: [**Wiki source**](https://drive.google.com/drive/folders/1EjqQ_DdiBqc00sC5hPOIg79ubO2zj8qx?usp=drive_link): [Computing](https://drive.google.com/file/d/1cjZ5svnnesq4AoJS9wLsr4LIwZFfUGDH/view?usp=drive_link)-> at - (**Sub-disciplines of computing - Software engineering**)

Software engineering is the application of a systematic, disciplined, and quantifiable approach to the design, development, operation, and maintenance of software, and the study of these approaches. That is, the application of engineering to software.[[38]](https://en.wikipedia.org/wiki/Computing#cite_note-BoDu04-38)[[39]](https://en.wikipedia.org/wiki/Computing#cite_note-39)[[40]](https://en.wikipedia.org/wiki/Computing#cite_note-40) It is the act of using insights to conceive, model and scale a solution to a problem. The first reference to the term is the 1968 [NATO Software Engineering Conference](https://en.wikipedia.org/wiki/NATO_Software_Engineering_Conferences), and was intended to provoke thought regarding the perceived [*software crisis*](https://en.wikipedia.org/wiki/Software_crisis) at the time.[[41]](https://en.wikipedia.org/wiki/Computing#cite_note-41)[[42]](https://en.wikipedia.org/wiki/Computing#cite_note-42)[[43]](https://en.wikipedia.org/wiki/Computing#cite_note-43) [Software development](https://en.wikipedia.org/wiki/Software_development), a widely used and more generic term, does not necessarily subsume the engineering paradigm. The generally accepted concepts of Software Engineering as an engineering discipline have been specified in the Guide to the [Software Engineering Body of Knowledge](https://en.wikipedia.org/wiki/Software_Engineering_Body_of_Knowledge) (SWEBOK). The SWEBOK has become an internationally accepted standard in ISO/IEC TR 19759:2015.[[44]](https://en.wikipedia.org/wiki/Computing#cite_note-44)

### **3-Computer science**

**# Source**: [**Wiki source**](https://drive.google.com/drive/folders/1EjqQ_DdiBqc00sC5hPOIg79ubO2zj8qx?usp=drive_link): [Computing](https://drive.google.com/file/d/1cjZ5svnnesq4AoJS9wLsr4LIwZFfUGDH/view?usp=drive_link)-> at - (**Sub-disciplines of computing - Computer science**)

Computer science or computing science (abbreviated CS or Comp Sci) is the [scientific](https://en.wikipedia.org/wiki/Science) and practical approach to [computation](https://en.wikipedia.org/wiki/Computation) and its applications. A [computer scientist](https://en.wikipedia.org/wiki/Computer_scientist) specializes in the theory of computation and the design of computational systems.[[45]](https://en.wikipedia.org/wiki/Computing#cite_note-45)

Its subfields can be divided into practical techniques for its implementation and application in [computer systems](https://en.wikipedia.org/wiki/Computer_system), and purely theoretical areas. Some, such as [computational complexity theory](https://en.wikipedia.org/wiki/Computational_complexity_theory), which studies fundamental properties of [computational problems](https://en.wikipedia.org/wiki/Computational_problem), are highly abstract, while others, such as [computer graphics](https://en.wikipedia.org/wiki/Computer_graphics_(computer_science)), emphasize real-world applications. Others focus on the challenges in implementing computations. For example, [programming language theory](https://en.wikipedia.org/wiki/Programming_language_theory) studies approaches to the description of computations, while the study of [computer programming](https://en.wikipedia.org/wiki/Computer_programming) investigates the use of [programming languages](https://en.wikipedia.org/wiki/Programming_language) and [complex systems](https://en.wikipedia.org/wiki/Complex_systems). The field of [human–computer interaction](https://en.wikipedia.org/wiki/Human%E2%80%93computer_interaction) focuses on the challenges in making computers and computations useful, usable, and universally accessible to humans.[[46]](https://en.wikipedia.org/wiki/Computing#cite_note-46)

### **4-Cybersecurity**

**# Source**: [**Wiki source**](https://drive.google.com/drive/folders/1EjqQ_DdiBqc00sC5hPOIg79ubO2zj8qx?usp=drive_link): [Computing](https://drive.google.com/file/d/1cjZ5svnnesq4AoJS9wLsr4LIwZFfUGDH/view?usp=drive_link)-> at - (**Sub-disciplines of computing - Cybersecurity**)

The field of cybersecurity pertains to the protection of computer systems and networks. This includes [information and data privacy](https://en.wikipedia.org/wiki/Information_privacy), preventing [disruption](https://en.wikipedia.org/wiki/Denial-of-service_attack) of IT services and prevention of theft of and damage to hardware, software, and data.[[47]](https://en.wikipedia.org/wiki/Computing#cite_note-47)

### **5-Data science**

**# Source**: [**Wiki source**](https://drive.google.com/drive/folders/1EjqQ_DdiBqc00sC5hPOIg79ubO2zj8qx?usp=drive_link): [Computing](https://drive.google.com/file/d/1cjZ5svnnesq4AoJS9wLsr4LIwZFfUGDH/view?usp=drive_link)-> at - (**Sub-disciplines of computing - Data science**)

Data science is a field that uses scientific and computing tools to extract information and insights from data, driven by the increasing volume and availability of data.[[48]](https://en.wikipedia.org/wiki/Computing#cite_note-48) [Data mining](https://en.wikipedia.org/wiki/Data_mining), [big data](https://en.wikipedia.org/wiki/Big_data), statistics, [machine learning](https://en.wikipedia.org/wiki/Machine_learning) and [deep learning](https://en.wikipedia.org/wiki/Deep_learning) are all interwoven with data science.[[49]](https://en.wikipedia.org/wiki/Computing#cite_note-49)

### **6-Information systems**

**# Source**: [**Wiki source**](https://drive.google.com/drive/folders/1EjqQ_DdiBqc00sC5hPOIg79ubO2zj8qx?usp=drive_link): [Computing](https://drive.google.com/file/d/1cjZ5svnnesq4AoJS9wLsr4LIwZFfUGDH/view?usp=drive_link)-> at - (**Sub-disciplines of computing - Information systems**)

Information systems (IS) is the study of complementary networks of hardware and software (see information technology) that people and organizations use to collect, filter, process, create, and distribute [data](https://en.wikipedia.org/wiki/Data_(computing)).[[50]](https://en.wikipedia.org/wiki/Computing#cite_note-50)[[51]](https://en.wikipedia.org/wiki/Computing#cite_note-51)[[52]](https://en.wikipedia.org/wiki/Computing#cite_note-52) The [ACM](https://en.wikipedia.org/wiki/Association_for_Computing_Machinery)'s Computing Careers describes IS as:

"A majority of IS [degree] programs are located in business schools; however, they may have different names such as management information systems, computer information systems, or business information systems. All IS degrees combine business and computing topics, but the emphasis between technical and organizational issues varies among programs. For example, programs differ substantially in the amount of programming required."[[53]](https://en.wikipedia.org/wiki/Computing#cite_note-53)

The study of IS bridges business and [computer science](https://en.wikipedia.org/wiki/Computer_science), using the theoretical foundations of information and [computation](https://en.wikipedia.org/wiki/Computation) to study various business models and related [algorithmic](https://en.wikipedia.org/wiki/Algorithm) processes within a computer science discipline.[[54]](https://en.wikipedia.org/wiki/Computing#cite_note-54)[[55]](https://en.wikipedia.org/wiki/Computing#cite_note-55)[[56]](https://en.wikipedia.org/wiki/Computing#cite_note-56) The field of Computer Information Systems (CIS) studies computers and algorithmic processes, including their principles, their software and hardware designs, their applications, and their impact on society[[57]](https://en.wikipedia.org/wiki/Computing#cite_note-57)[[58]](https://en.wikipedia.org/wiki/Computing#cite_note-58) while IS emphasizes functionality over design.[[59]](https://en.wikipedia.org/wiki/Computing#cite_note-Freeman_Hart_2004-59)

### **7-Information technology**

**# Source**: [**Wiki source**](https://drive.google.com/drive/folders/1EjqQ_DdiBqc00sC5hPOIg79ubO2zj8qx?usp=drive_link): [Computing](https://drive.google.com/file/d/1cjZ5svnnesq4AoJS9wLsr4LIwZFfUGDH/view?usp=drive_link)-> at - (**Sub-disciplines of computing - Information technology**)

Information technology (IT) is the application of computers and [telecommunications equipment](https://en.wikipedia.org/wiki/Telecommunications_equipment) to store, retrieve, transmit, and manipulate data,[[60]](https://en.wikipedia.org/wiki/Computing#cite_note-DOP-60) often in the context of a business or other enterprise.[[61]](https://en.wikipedia.org/wiki/Computing#cite_note-61) The term is commonly used as a synonym for computers and computer networks, but also encompasses other information distribution technologies such as television and telephones. Several [industries](https://en.wikipedia.org/wiki/Computer_industry) are associated with information technology, including computer hardware, software, [electronics](https://en.wikipedia.org/wiki/Electronics), [semiconductors](https://en.wikipedia.org/wiki/Semiconductor), internet, [telecom equipment](https://en.wikipedia.org/wiki/Telecommunications_equipment), [e-commerce](https://en.wikipedia.org/wiki/E-commerce), and [computer services](https://en.wikipedia.org/wiki/Computer_services).[[62]](https://en.wikipedia.org/wiki/Computing#cite_note-DMC-62)[[63]](https://en.wikipedia.org/wiki/Computing#cite_note-Ralston2000-63)

## History of computing

**# Source**: [**Wiki source**](https://drive.google.com/drive/folders/1CwHRqpaM45ijqjJ3UcYLGAIt_BQQMh4d?usp=drive_link): [History of computing](https://drive.google.com/file/d/1Ph9MWMb5u_mnE7D-tthjs6xirH5zSGrh/view?usp=drive_link)-> at - (**Top**)

The **history of computing** is longer than the [history of computing hardware](https://en.wikipedia.org/wiki/History_of_computing_hardware) and [modern computing technology](https://en.wikipedia.org/wiki/Computer) and includes the history of methods intended for pen and paper or for chalk and slate, with or without the aid of tables.