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**DISCUSS IN DETAILS NOT MORE THAN ONE PAGE THE RELATIONSHIP BETWEEN SOFTWARE ENGINEERING AND MECHATRONICS ENGINEERING**

Mechatronics engineering, is a [multidisciplinary](https://en.wikipedia.org/wiki/Multidisciplinary) branch of engineering that focuses on the engineering of both [electrical](https://en.wikipedia.org/wiki/Electronic_engineering) and [mechanical systems](https://en.wikipedia.org/wiki/Mechanical_engineering), and also includes a combination of [robotics](https://en.wikipedia.org/wiki/Robotics), [electronics](https://en.wikipedia.org/wiki/Electronics), [computer](https://en.wikipedia.org/wiki/Computer_engineering), [telecommunications](https://en.wikipedia.org/wiki/Telecommunications), [systems](https://en.wikipedia.org/wiki/Systems_engineering), [control](https://en.wikipedia.org/wiki/Control_engineering), and [product](https://en.wikipedia.org/wiki/Product_engineering) engineering. The intention of mechatronics is to produce a design solution that unifies each of these various subfields. An application of mechatronics is control system. Computer engineering is a subfield of mechatronics which is divided into hardware and software engineering.

Software engineering is an engineering branch associated with development of software product using well-defined scientific principles, methods and procedures.

Software has been an important component of control systems for many years. Control system software continues to grow in importance. For example, a faster processor in a control unit may allow a product to perform better and reduce costs by using simpler, lower cost mechanical parts, but only if the sensor and actuator control software are good enough. Software intensive, networked electronics are becoming increasingly central to the performance of products of all kinds, from industrial to consumer. More engineering teams are facing questions about the best way to handle software development as a key part of product development projects. [This includes mechatronics-based design, those integrating mechanical and electronics, including embedded software.]

Software development engineers, methods, and tools can be integrated into product development teams. Examples include industries and product types such as medical devices, radar subsystems, transportation equipment, production monitoring, aerospace, and communications. Approaches used by some of these companies can aid software development in new product introduction projects.

Without the knowledge of software engineering programming by a mechatronics engineer would not be possible therefore reducing their range of production. Software engineering is needed for control systems. Control systems are needed in equipments developed by a mechatronics engineer without this knowledge the equipment cannot be programmed to give instruction therefore making the equipment useless and unable to meet user requirement.

**EXPLAIN THE FOLLOWING AND HOW THEY RELATE COMPUTER SCIENCE, COMPUTER ENGINEERING AND SOFTWARE ENGINEERING.**

Computer science is Computer science is the study of [processes](https://en.wikipedia.org/wiki/Process_(engineering)) that interact with [data](https://en.wikipedia.org/wiki/Data) and that can be represented as data in the form of [programs](https://en.wikipedia.org/wiki/Computer_program). It enables the use of [algorithms](https://en.wikipedia.org/wiki/Algorithm) to [manipulate](https://en.wikipedia.org/wiki/Data_processing), [store](https://en.wikipedia.org/wiki/Data_storage), and [communicate](https://en.wikipedia.org/wiki/Communication) [digital information](https://en.wikipedia.org/wiki/Digital_data).

Computer engineering is a branch of [engineering](https://en.wikipedia.org/wiki/Engineering) that integrates several fields of [computer science](https://en.wikipedia.org/wiki/Computer_science) and [electronic engineering](https://en.wikipedia.org/wiki/Electronic_engineering) required to develop [computer hardware](https://en.wikipedia.org/wiki/Computer_hardware) and [software](https://en.wikipedia.org/wiki/Computer_software).

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**Relationship between Computer science and Computer engineering**

Both Computer Engineers and Computer Scientists advance computing technology and solve problems using computing technology. If we consider computing technology in terms of scale, Computer Engineers operate often at the microscopic and macroscopic ends of the spectrum, whereas Computer Scientists work in the middle parts of the spectrum. More specifically, Computer Engineers deal with the physics of semiconductor electronics so that they may design hardware from the integrated circuit level (small), as well as with the integration of hardware and software optimized to run on it to realize complete, special-purpose computing systems (large). Computer Scientists write the software, design the databases, devise the algorithms, format the communications, and secure the data that are processed by the hardware to make the integrated system function.

**Relationship between Computer engineering and software engineering**

The primary difference is that computer science was originally a sub-branch of mathematics. Computer science deals with the basic structure of a computer and is more theoretical. Hence, it is more malleable in terms of specialization, with the emphasis on math and science. Software engineering is a field concerned with the application of engineering processes to the creation, maintenance, and design of software for a variety of different purposes. A software engineer designs customized applications per the requirements of an organization.