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Relationship between software engineering and mechatronics engineering

1. **Development of software**

Software engineering treats the approach to developing software as a formal process which these softwares are then used by mechatronics engineers for automation and simulation purposes.

1. **Embedded systems**

Software engineering provides knowledge about microprocessors with integrated memory and peripheral interfaces and the design of the applications involved in using the microprocessors. Software engineering provides knowledge on optimization of the microprocessor softwares to reduce the size and increase the reliability and performance of the softwares when working with the microprocessors. Mechatronics engineering use these microprocessors in the construction of their embedded systems for digital and analog control of mechatronics machines and systems.

1. **Robotics**

Software engineering in robotics makes it possible to build and evolve new softwares, to reduce their development cost, and to enhance their quality. The process of bringing intelligence to a robot requires strongly coupled capabilities of sensing, processing, and acting. Software plays a key role as it is the medium to embody intelligence in the machine which is then implemented in mechatronics engineering to improve the robot’s artificial intelligence and machine learning based of the softwares and intelligence produced by software engineering.

1. **Real-time systems and control**

Software engineering is employed to develop softwares and applications for a controller or automation devices. Special skills and a good understanding of the automation and control problem are required. Web servers, information systems, business process management systems, and many other important and valuable infrastructures based on computing. Many concepts involving signal acquisition, transducers, control setpoints, and others are related to process-state variables, measurements and control. They are closely connected with real time processing. The concept of real-time processing must be considered when a mechatronics engineer develops and deploys a new automation and control systems. Software engineering provides database structures for the real time processing and webserver application and sofwares.

Computer science, computer engineering and software engineering

**Computer science**

Computer science focuses on understanding, designing, and developing programs and computers. Computer Science is the study of computers and computational systems. Unlike electrical and computer engineers, computer scientists deal mostly with software and software systems; this includes their theory, design, development, and application.

Principal areas of study within Computer Science include artificial intelligence, computer systems and networks, security, database systems, human computer interaction, vision and graphics, numerical analysis, programming languages, software engineering, bioinformatics and theory of computing.

**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). A [computer scientist](https://en.wikipedia.org/wiki/Computer_scientist) studies the [theory of computation](https://en.wikipedia.org/wiki/Theory_of_computation) and the [design](https://en.wikipedia.org/wiki/Software_design) of [software systems](https://en.wikipedia.org/wiki/Software_system)

**Software engineering**

This deals with building, maintain and implementing software system. Software engineering treats the approach to developing software as a formal process much like that found in traditional engineering. Software engineers begin by analyzing user needs. They design software, deploy, test it for quality and maintain it. They instruct computer programmers how to write the code they need. Software engineers may or may not [write any of the code](https://www.thoughtco.com/source-code-definition-958200) themselves, but they need strong programming skills to communicate with the programmers and are frequently fluent in several programming languages.

Software engineers [design and develop computer games](https://www.thoughtco.com/getting-a-gaming-industry-job-1393865), business applications, network control systems, and software operating systems. They are experts in the theory of computing software and the limitations of the hardware they design

**Computer engineering**

This emphasizes solving problems in digital hardware and at hardware-software interface. Computer engineering is the branch of engineering that integrates electronic engineering with computer sciences. Computer engineers design and develop computer systems and other technological devices. Computer engineers usually have training in 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 instead of only [software engineering](https://en.wikipedia.org/wiki/Software_engineering) or electronic engineering. Computer engineers are involved in many hardware and software aspects of computing, from the design of individual [microcontrollers](https://en.wikipedia.org/wiki/Microcontroller), [microprocessors](https://en.wikipedia.org/wiki/Microprocessor), [personal computers](https://en.wikipedia.org/wiki/Personal_computers), and [supercomputers](https://en.wikipedia.org/wiki/Supercomputer), to [circuit design](https://en.wikipedia.org/wiki/Circuit_design).

**How they relate**

Computer science takes broad approach to the study of priciples and use of computers that covers both theory and application. Software engineering is a field largely concerned with the application of engineering processes to the creation, maintenance and design of software for a variety of different purposes.

Computer engineering focuses on solving problems and designing hardware and software interfaces.

**Computer science, computer engineering and software engineering all have relationship with basic data structures, algorithms and understanding computer languages, programming and structure of a computer and its interfacing and communication**.