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DEPARTMENT: MECHATRONICS ENGINEERING

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ASSIGNMENT 2:

1. Discuss in details not more than one page the relationship between Software Engineering and Mechatronics Engineering?

Mechatronics Engineering being a multidisciplinary field of science integrates the principles of disciplines like Mechanical Engineering, Electronics, Computer Engineering, Telecommunication Engineering, systems engineering and control engineering into a unified discipline. It combines the fundamentals of these disciplines and focuses them on the design and production of automated equipment, smart machines and systems that are aware of their environment, and can processing information to make decisions. On the other hand, Software Engineering is a field of engineering, for designing and writing programs for computers or other electronic devices. It involves analyzing user requirements and then designing, building, and testing software application which will satisfy those requirements.

As technology advances over time, various subfields of engineering have succeeded in both adapting and multiplying. While mechatronics teaches how to integrate and control mechanical components using electronic sensors, electrical actuators and programmable devices such as microcontrollers and microprocessors all into one single project as video cameras, airplanes and automobiles, all of which use mechanical components that are controlled by electronics and computer programs or software. Software engineering techniques are been used in the development of software that are used to satisfy this very purpose. For instance, in designing an integrated system like cell phones with camera that have accelerometers, in other to have an effective system the Engineer will need to understand the physical dynamics, the sensor's electrical characteristics, and how to interface it with your software. Since software forms part of such a system, software engineering methods can be applied to the study and design of software for such systems.

1. Explain the following and how they relate a computer science, computer engineering and software engineering.
2. Computer Engineering is a branch of engineering that integrates several fields of computer science and electronic engineering required to develop computer hardware and software. As such, it concerns the electrical engineering considerations of how microprocessors function, are designed, and are optimized; how data is communicated among electronic components; how integrated systems of electronic components are designed and how they operate to process instructions expressed in software; and how software is written, compiled, and optimized for specific hardware platforms.

Computer Science is the study of how data and instructions are processed, stored, communicated by computing devices. Computer Science deals with algorithms for processing data, the symbolic representation of data and instructions, the design of instruction languages for processing data, techniques for writing software that process data on a variety of computing platforms, protocols for communicating data reliably and securely across networks, the organization of data in databases of various types and scales, the emulation of human intelligence and learning through computer algorithms, statistical modeling of data in large databases to support inference of trends, and techniques for protecting the content and authenticity of data.

Software Engineering is the systematic application of engineering approaches to the development of software. It is a field of engineering, for designing and writing programs for computers or other electronic devices. It involves analyzing user requirements and then designing, building, and testing software application which will satisfy those requirements.

1. Relation

Both Computer Engineers, software engineers and Computer Scientists advance computing technology and solve problems using computing technology which may involve developing program amongst others. Considering computing technology in terms of scale, Computer Engineers operate often at the microscopic and macroscopic ends of the spectrum, whereas Computer Scientists and software Engineers 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. The main focus of the software engineer is software development, building and maintaining software systems. It is more applied and provides a greater emphasis on the developmental process to ensure that programs work as they should and are safe. Software Engineering is a lot less focused on the hardware than Computer Engineering.

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