Computer Hardware and Software

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Introduction to Computing

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Computer Hardware

As per Frankenfeld (1993), Computer Hardware refers to all physical components of a computer system that is responsible for the core processes of a software, such as input and output devices, storage, and memory allocation devices. Some examples includes the central processing unit (CPU), which is responsible for arithmetic calculations, input devices such as the mouse and keyboard provides direct manipulation and alphabetic features, and output devices such as monitors for display visualization and speakers for audio. Consequently, the Computer Hardware comprises all electronic circuitry and input output devices, of which requires the software for proper functionality and utilization of the components. (Garrie et al., 2024).

Software

According to Ugah et al. (2018), software refers to a set of programs that processes as a whole, where it also relies on hardware for its core functions. It is also refered to as the "non-physical" component of a computer system, focusing on user interface, usability, and readability. Furthermore, software relies on input and output devices in order to interact with the user.

Types of Software

System Software

Attested by Awati and Lutkevich (2024), system software refers to the computer program that focuses on the incorporation of hardware and software, where the system software is the layer that hides unreadable lines of code, and provides a user interface for the interaction of both the human and the computer hardware. An example of system software would be Operating Systems such as: Windows, MacOS, and Android.

Utility Software

As stated by Ferguson and Hebels (2003), Utility Software refers to programs that are made for functional maintenance of the computer system. It is usually built-in with the operating system, where programs such as task managers, trash bins, fire walls, and virtual private networks (VPN) are not essential for the success for the operation of the computer system, but are necessary for maintenance. Examples of utility software would be: Task manager, trash bin, file management, and the fire wall.

Application Software

Application software or Apps for short, are programs made to run necessary tasks which could either be for work, entertainment, scholarly, or online communication, where some of these applications require a word processor, a web browser, or any graphics software in order to function properly. A few examples of application software includes: games, online streaming apps, social media, video or photo editing apps, programming tools, and banking apps (Applications Software - Software - KS3 Computer Science Revision - BBC Bitesize, 2023).

Implementation in the different institutions in the community

Education

For software, applications such as Zoom and Google Meet are necessary for online conferences in cases where physical meetings are limited, and Canvas or Google Classroom for efficient learning management systems. As for Hardware, low end to middle-end desktops (depending on the school's budget) are useful for online and computer related courses or subjects.(EdTech Books, n.d.).

Healthcare

As exemplified by Mehta et al. (1994), Computers have assisted in the advancement of medicine over the years, with new technology that could monitor heart rates, visualization of anatomies, computerized hospital information systems, and computerized support-related systems.

Business Operations

A study by Li (2024), emphasized that the rapid development of hardware and software has improved enterprise management, wherein the automation of stocks, transactions, and management have increased the ability of business operators to efficiently manage through the help of software and hardware. Basically allowing business owners to work efficiently with the assistance of computer systems.

Analysis

Within personal belief , Computer Hardware is essentially all electrical circuitry pieces and parts that can be physically touched, and is necessary for the implementation and incorporation of software. Computer hardware plays a vital role in providing input and output processes that allow for human-computer interaction. On the other half, Software is also essential in running and automating programs, tasks, processes, algorithms, and data structures that allows for the logical aspect of hardware to run. This means that software is responsible for the backend processes such as calculations, logical processes and holding necessary data. Subsequently, these two complement each other in a way such that hardware is that of a human body, capable of physical interactions and abilities, while the software is that of the human mind, with the ability of logical thinking, arithmetic reasoning, and pattern memorization. It is amazing that humanity has progressed to the point where computers are almost nearly accessible to all, wherein in this progressive technological world, comes digital literacy, which is important in this day and age, for the fact that computer systems could potentially be important assets for future purposes. Consequently, the computer system is made up of both the incorporation of hardware and software into one unit, assisting us humans in speeding up processes such as simulations, calculations, research, and communication. Modern software also provides us with the capability for entertainment via online games, online streaming, and communication applications, and with hardware advancing, simulations and calculations are boosted with efficiency, for example: NASA supercomputers and business organizations with their database servers. Consequently, it is important to know that there are dangers that come with modern technology, these dangers are electrical short circuits, which may cause electrical fires, cyber-attacks, cyber-bullying, and electrical-induced explosions from un-maintained hardware. Overall, hardware and software go hand in hand, both functioning their own roles.

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