Portfolio #4

Wayne Czar A. Ricaplaza

BSIT - 1

1) Computer Hardware

Definition and Components: Computer hardware consists of the physical components of a computer system. These include:

Central Processing Unit (CPU): The brain of the computer, responsible for executing instructions.

Memory (RAM): Short-term memory that stores data temporarily while a computer is running.

Storage (Hard Drives, SSDs): Long-term storage where data and files are kept permanently.

Motherboard: The main circuit board that connects all components.

Input Devices (Keyboard, Mouse): Devices that allow users to input data.

Output Devices (Monitor, Printer): Devices that display or print information.

Graphics Processing Unit (GPU): Handles rendering of images and videos.

Networking Components (Wi-Fi adapters, Ethernet): Connects computers to networks.

Types of Computer Hardware:

Personal Computers (Desktops, Laptops): Used by individuals for various applications.

Servers: Central computers in networks that manage resources and services.

Embedded Systems: Specialized computers within other devices, like appliances or vehicles.

Mobile Devices: Smartphones, tablets, and other portable devices.

Role of Hardware in Computing: Computer hardware is fundamental to any computing process, as it directly affects performance, storage capacity, and functionality.

2) Software

Definition and Categories: Software refers to the programs and applications that instruct hardware on what tasks to perform. It's categorized into:

System Software: Manages the hardware and serves as a platform for running applications.

Operating Systems (OS): The main software that manages hardware resources (e.g., Windows, macOS, Linux).

Utility Software: Tools that help maintain and optimize the computer, like antivirus software and file management tools.

Application Software: Programs designed for end-users to accomplish specific tasks.

Productivity Software: Includes word processors, spreadsheets, and presentation tools.

Database Management Systems (DBMS): Manages large data sets and supports complex queries.

Enterprise Resource Planning (ERP): Integrates various functions of an organization.

Programming Software: Tools used by developers to create software, such as compilers, debuggers, and IDEs (Integrated Development Environments).

Software Development: Software development includes phases like planning, coding, testing, deployment, and maintenance. Common methodologies include Agile, Waterfall, and DevOps, which guide the workflow to ensure quality and timely delivery.

3) Implementation of Computer Hardware and Software in Community Institutions

1. Education (Schools and Universities):

Hardware: Schools and universities implement hardware like desktop computers, laptops, interactive whiteboards, and networking equipment to facilitate digital learning and research.

Software: Learning Management Systems (LMS) such as Blackboard, Moodle, and Google Classroom are widely used. Educational software, such as Microsoft Office Suite, SPSS for statistical analysis, and Adobe Creative Cloud for design courses, are also common.

Outcomes: Improves the quality of education, enables remote learning, and facilitates data management for students, teachers, and administrators.

2. Healthcare (Hospitals and Clinics):

Hardware: Hospitals rely on specialized medical devices (MRI machines, X-ray systems) integrated with computers. They also use servers, networking hardware, and patient monitoring systems.

Software: Electronic Health Record (EHR) systems like Epic and Cerner help manage patient information. Diagnostic software, imaging applications, and telemedicine platforms enable remote consultations.

Outcomes: Enhances patient care, supports telemedicine, and improves record-keeping and accessibility of patient data.

3. Government and Public Administration:

Hardware: Government institutions often implement robust servers, workstations, and data centers to manage large volumes of public data.

Software: They utilize data management software, Geographic Information Systems (GIS) for mapping, and administrative software for managing public records and processing applications.

Outcomes: Facilitates efficient public service delivery, transparency, and better communication between government and citizens.

4. Businesses and Corporations:

Hardware: Offices are equipped with desktops, servers, and storage devices. Point-of-sale (POS) systems are common in retail.

Software: ERP software like SAP, CRM systems like Salesforce, and productivity suites like Microsoft 365 enhance collaboration, customer management, and operational efficiency.

Outcomes: Streamlines operations, enhances customer relationship management, and allows for data-driven decision-making.

5. Financial Institutions (Banks and Insurance):

Hardware: Banks implement ATMs, high-performance servers, and secure data centers.

Software: Banking software manages transactions and accounts, while cybersecurity software helps protect data. Financial institutions also use risk assessment and customer relationship software.

Outcomes: Increases security of financial transactions, enhances customer service, and streamlines operations.

6. Non-Profit and Community Organizations:

Hardware: Typically, these institutions use cost-effective desktops and laptops, with cloud-based storage solutions to save on expenses.

Software: Donor management software, grant tracking, and event planning applications help manage resources and operations.

Outcomes: Improves fundraising efforts, enables efficient management of resources, and enhances outreach and community engagement.

Analysis/Reaction

The materials provided give a broad overview of computer hardware, software, and how these are used in institutions within the community. As a BSIT student, I find this information critical because understanding hardware, software, and their applications in real-world environments is foundational to IT studies.

The information on computer hardware is essential because hardware is the physical foundation of all computing activities. Without the hardware, no software can run, making it the core of computing. The readings on hardware, such as those discussing graphics and processors, helped clarify how different parts work together to process information. For instance, learning about CPUs and GPUs shows the importance of having both strong processing and graphic components to handle complex tasks, especially as we move into fields like AI or data science. Hardware is crucial because it directly affects a system's speed, storage, and performance.

System software, like operating systems, manages the hardware and ensures it can support other applications. Application software, on the other hand, is what we interact with daily, whether for writing documents, analyzing data, or creating presentations. What I found interesting here is how different types of software, like database management and productivity tools, address unique user needs and help make businesses or organizations more efficient. Knowing how software works with hardware expands my view on how IT can solve real-world problems.

Lastly, the analysis of implementation in institutions shows the practical impact of IT on different sectors of society. For instance, in education, hardware and software are combined to create a digital learning environment, making education more accessible through platforms like Google Classroom.

Notes (Things to keep in mind)

Definition and Key Components: Computer hardware includes the physical parts of a computer system, such as:

CPU (Central Processing Unit): The main processor that runs tasks.

Memory (RAM): Short-term storage that holds data while a computer is in use.

Storage (Hard Drives, SSDs): Where data is kept long-term.

Motherboard: The main board that connects all components.

Input Devices: Tools like keyboards and mice to enter data.

Output Devices: Tools like monitors and printers to display information.

GPU (Graphics Processing Unit): Renders images and videos.

References:

1. Computer Hardware

Cage, G. W. (1986). Computer hardware. Dermatologic Clinics, 4(4), 533–543.

De Vos, A. (2010). Reversible computer hardware. Electronic Notes in Theoretical Computer Science, 253(6), 17–22.

Staudhammer, J. (1991). Computer graphics hardware. IEEE Computer Graphics and Applications, 11(1), 42–44.

Kroon, J. R., & Strayer, R. F. (1986). A computer hardware primer. Journal - American Water Works Association, 78(8), 30–35.

Tsuchiya, M. (1987). Computer hardware/software architecture. Microprocessors and Microsystems, 11(4), 236.

2. Software

BC Open Textbooks. (n.d.). Computer hardware and software. Retrieved from BC Open Textbooks website: https://opentextbc.ca/computerstudies/chapter/computer-hardware-and-software/

Hwang, K., & Briggs, F. A. (2010). Computer architecture and parallel processing. McGraw-Hill.

Tanenbaum, A. S., & Austin, T. (2012). Structured computer organization (6th ed.). Prentice Hall.

Stallings, W. (2015). Operating systems: internals and design principles (9th ed.). Pearson.

Galvin, P. B., & Gagne, G. (2018). Operating system concepts (10th ed.). Wiley.

3. Implementation in Institutions

Anderson, R., & Moore, T. (2006). Information security economics—and beyond. Workshop on the Economics of Information Security (pp. 1–20).

Dufour, M., & Bouchard, M.-P. (2018). The role of information technology in the development of organizations: A case study of a community health center in Quebec. International Journal of Health Services, 48(2), 276–295.

Kauffman, R., & Walden, E. A. (2001). Information technology and organizational performance: An integrative model of IT business value. Journal of Management Information Systems, 16(2), 67–100.

McKinsey & Company. (2020). How technology is reshaping healthcare in the COVID-19 era: A McKinsey report on the impact of technology on healthcare institutions during the pandemic.

Westerman, G., Bonnet, D., & McAfee, A. (2014). Leading digital: Turning technology into business transformation. Harvard Business Review Press.

Other Citations:

https://opentextbc.ca/computerstudies/chapter/computer-hardware-and-software/

https://www.grafiati.com/en/literature-selections/computer-hardware/

https://web.mit.edu/saltzer/www/publications/protection/References.html

https://introcompsys.github.io/resources/references.html

https://www.amazon.com/PC-Hardware-Reference-Craig-Zacker/dp/0072125160

https://taylorandfrancis.com/knowledge/Engineering_and_technology/Electrical_&_electronic_engineering/Computer_hardware/