

ICT Essentials: INTRODUCTION TO COMPUTER SYSTEMS

Learning objectives:

By the end of this chapter, students will be able to;

- i. Define ICT and computer systems
- ii. Explain the fundamental components of a computer system

By now, the word ICT is not a new word to us given the fact that you took a foundation course named principles of ICT in your first semester. This course builds on principles of ICT course while taking an abstract approach in understanding the basic hardware and software architecture which will makes ‘technical hat’ one put on a when making recommendations for a choice of computer system and fine tuning it for best or balanced performance and efficiency.

ICT has been defined by different scholars in many ways. In this course, ICT will be looked at as all forms of technologies be computer hardware, software, telecommunications and other technologies that create value to an individual or a firm. Such technologies include IP telephony, ATMs, Radios, Televisions, Microwaves, Internet, Computers and all its peripherals, software, Routers, Switches, wireless and wired technologies and so forth.

A close analysis of our definition of ICT should ignite two facets that you are already aware of i.e. computer hardware and software. In fact, these two concepts can be seen as computer system. In this course a computer system is defined as a system made up of computer hardware, software, data and communication element. The hardware is that tangible part of the computer. The one we can physically touch and feel such as keyboard, mouse, RAM, CPU, Monitor, Hard disk drive etc. The software refers to the set of instructions that tell the hardware what to do. These applications or programs make the hardware usable. Data are raw facts about something or an object. Ideally, users feed data into the computer and manipulate it into information which we can base on to make informed decisions. Think about what happens when such data or information needs to be communicated online or retrieved from another location. More importantly, how does data get to move from hardware component to another or between software and hardware component? This is where the communication element comes into play. The communication element makes it possible for data to be transmitted between the hardware and software components.

Let’s try to explain the Computer system further. Recall that the goal of the course is to make us put ‘technical hat’ on a when making recommendations for a choice of computer system and fine tuning it for best or balanced performance and efficiency. Thus, the components of the computer systems are further explained below:

1. **Computer Hardware:** From previous page we saw hardware as tangible component of the computer system. We know that a computer can be seen as any electronic component capable of

accepting inputs, processing, outputting or storing data or information. This definition brings rise to the fundamental components of computer hardware i.e. input, process, output and storage.

The input component allows us to capture data or information into the computer. Such component includes keyboard, mouse, barcode readers etc.

The process component is the Central Processing Unit (CPU). Unlike the rest of components that have many or various examples, the processing component is carried out by only the CPU. The basic function of the CPU is to fetch and execute instructions i.e. the CPU fetches data or instructions from main memory or cache memory and executes it.

The third hardware component is memory or storage. Previously we mentioned the concept of main memory and cache memory. Main memory is Random Access Memory (RAM) which holds data and programs that the CPU fetches for execution. RAM is one of the components that have effect on the speed of your computer i.e. how fast or slow your programs load other factors remaining constant like malware, CPU and hard disk drive (HDD). Cache memory is basically the high-speed memory closer to the CPU. More about RAM and CPU will be covered in subsequent topic to come.

The fourth component is the Output used to display data or information e.g. displays screen/monitor.

2. **Computer software:** Imagine you are required to submit an assignment, you will definitely interact with a certain application that allows you to get the assignment done. This may be Microsoft office application, database application, web application etc. You will most likely interact with an operating system (OS) like Windows, Unix based (Ubuntu and Linux) or Mac OS. The core of the software is the operating system and this will be captured later in depth.

3. **Data:** When we interact with software, we make them do what we want for example in a supermarket setting, a customer picks a product from the shelf, brings it to the counter or till and the attendant extracts data or information from the product using the barcode reader and, in the end, the customer gets a printed form detailing the items bought and their respective prices. This shows that data can be represented in any form. It can be alphanumeric, images or photos or picture, audio, video, graphs and charts. We shall have detailed view of data in the subsequent topic.

4. **Communication element:** In the previous introduction, we took two approaches to this component. The first transmits data from one computer system to another using routers, switches, network interface cards (NICs), cables and the second within the same computer system for example the bus which transmits instructions and data from RAM to CPU and motherboard to the hard disk drive.

Assignment: identify the types of computer systems