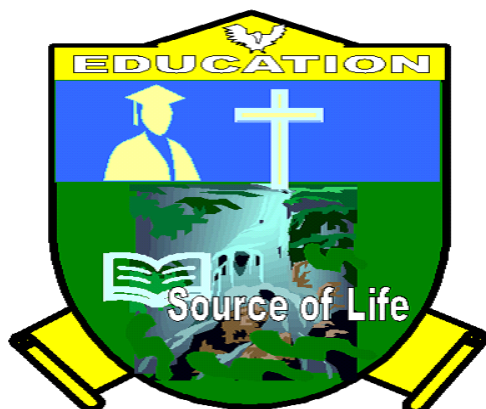


**RUAHA CATHOLIC UNIVERSITY**

**(RUCU)**



**FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT)**

**DEPARTMENT OF COMPUTER SCIENCE**

**COURSE NAME : INTRODUCTION TO INFORMATICS**

**COURSE CODE : RCS 113**

**COURSE INSTRUCTOR : MADAM JANE GILITU.**

**NATURE OF WORK : GROUP ASSIGNMENT**

**GROUP NUMBER : 01. BCS**

**SUBMISSION DATE : 22<sup>TH</sup>/NOVEMBER/2022**

**GROUP MEMBERS:**

NO.	NAME	REGISTRATION NO.	SIGNATURE
1.	BONPHACE KONDRAD BONIPHACE	RU/BCS/2022/001	
2.	GLORY M. ANTHONY	RU/BCS/2022/011	
3.	GEORGE CORNELIUS	RU/BCS/2022/100	
4.	SHERA PETER ULANGA	RU/BCS/2022/0	
5.	ROBERT EDWARD SENGO	RU/BCS/2022/007	
6.	HAWA ABDALLAH MWANDAMI	RU/BCS/2022/054	
7.	VALENTINE RWECHUNGURA	RU/BCS/2022/005	
8.	PETER LAMECK KINYUNYU	RU/BCS/2022/040	

## **GROUP ASSIGNMENT.**

### **QUESTION.**

Give detailed information on the following;

- ❖ Computer
- ❖ Operating systems
- ❖ Processor

Discuss them in detail looking on the;

- Definition
- Characteristics/features
- Factors to consider when doing classification
- Types
- Functions
- Advantages
- Disadvantages and
- Factors affecting it performance
- Common services offered

## **1. COMPUTER**

**Computer-** is the electronic device which receives, data, process, store and produce output according to the instruction given by a user. Normally computer performs four main operations which are input, processing, store data, and output.

### **CHARACTERISTICS /FEATURES OF COMPUTER**

#### **1 Has high speed**

- i. Computer is a very fast device
- ii. It is capable of performing addition of very big data
- iii. The computer can perform millions of calculations in a few seconds as compared to man

#### **2 Accuracy**

- i. The computer can perform calculations 100% error-free
- ii. Computer can have performed calculations and other jobs with 100% accuracy

#### **3 High storage capability**

- i. Memory is a very important characteristics of computer
- ii. The computer has much more storage capacity than human beings

#### **4 Diligence**

- i. Unlike human being
- ii. a computer is free from tiredness and lack of concentration
- iii. It can work continuously without creating any error and boredom

#### **5 Versatility**

- i. A computer is a very versatile machine
- ii. A computers very flexible in performing the jobs to be done
- iii. This machine can be used to solve the problems relating to various different fields.

#### **6 No IQ**

- i. Not a thinking machine
- ii. Follow human instructions
- iii. Not intelligent

## **FACTORS TO CONSIDER WHEN DOING CLASSIFICATION OF COMPUTERS**

### **i. Type of processor (central processing unit-CPU)**

Micro-computer use microprocessors, which are manufactured on a single chip as their CPU. In larger computers such as supercomputers and mainframe processing is carried out by a number of separate, high-speed component instead of a single processor

### **ii. Amount of main memory (RAM)**

All computer has some amount of RAM (Random access memory), which is used to hold the instructions required to perform a tasks.

### **iii. Storage capacity of the hard disk**

The storage capacity is the amount of space that is available for storing the instruction required to manipulate data.

### **iv. Cost of the computer**

The cost of computer is directly related to size. micro-computers are less cost compared to minicomputers, mainframe or supercomputers.

## **Types of computer**

### **Type based on size**

#### **i. Personal computer**

It is a single user computer system having moderately powerful microprocessor.

#### **ii. Workstation**

It is also a single user computer system similar to personal computer however has a more powerful microprocessor.

#### **iii. Minicomputer**

It is multiuser computer system capable of supporting hundreds of users simultaneously.

#### **iv. Main frame**

It is multiuser computer system capable of supporting hundreds of users simultaneously.

#### **v. Super computer**

A computer that was the fastest in the world at the time it will constructed.

The three types of computers along with their functions are given below:

- i. **Analog Computer** – An analog computer one that uses the continuously changeable aspects of physical phenomena to model the problem being solved. These phenomena may be such as electrical, mechanical, or hydraulic quantities and they are extremely complex to be used. Such computers are mostly used for scientific and industrial applications. Examples of Analog computers include Thermometer, Operational Amplifiers, Electric Integrators,
- ii. **Digital Computer** – Such computers are capable of solving problems in discrete format. It only operates on data entered in binary language and can perform the dynamic function of managing large amounts of data and regulating the operations of the machine, Examples of Digital computers are Desktop, Laptop, Mobile Phones,
- iii. **Hybrid Computer** – Computers that exhibit features of both Analog and Digital computers are called Hybrid Computers. The logical operations are solved by the digital aspects and the differential equations are solved using the analog features. Few important examples of Hybrid Computers include Space Flights, Food processing Plants,

## FUNCTION OF COMPUTER

- i. Input Function
- ii. Processing Function
- iii. Output Function
- iv. Storage Function

### Input function

As we know that computer is a data processing machine that doesn't work until a set of information is given to the computer system via input devices. Any device that can be used by a user to instruct the computer is known as the input device. examples, Keyboard, Mouse, Joystick, etc.

The input devices are responsible for getting data from the outside world and are in charge of processing this data for further execution. Data can be entered manually, automatically, or both. In the case of manual data, it is generally fed through the mouse, keyboard, joystick, . In addition to this, the automated data is fed via a script, with the help of robots, . and it can even be predefined to execute at the boot-up, or according to the user-based activity.

Along with the primary input devices, other devices extract the data in various forms such as text audio-video, and images. For example, Webcams can be used to feed data in video or image form, microphones can be used to send data in the form of audio, etc.

For example- **Keyboard** – A keyboard is a device consisting of several keys that are used to input text-type data in a computer via the keyboard.

**Mouse** – Mouse is a point and click device and is used more often than the keyboard. The mouse can click, drag, and select folders in the GUI( Graphical User Interface).

## Processing function

This is the main function of a computer system. The raw data that is fed into the computer system via input devices is processed here into meaningful data that is readable and understandable by the computer system.

Data processing is the core function of a computer system. To process this raw data the computer uses its CPU (Central Processing Unit) which is also known as the brain of the computer as it controls all the functions. i.e. run scripts, control user commands, and many more. With the advancement of technology, modern-day computer systems use the CPU in conjunction with the GPU (Graphical Processing Unit) making it known as APU (Accelerated Processing Unit).

The Central Processing Unit consists of three main components that are:-

- i. **Control Unit** – The control units monitor all the operations and activities of the computer. It also monitors the data fed via input devices from the user.
- ii. **Arithmetical Logical Unit** – The ALU is responsible for performing the arithmetic and logical data operations. The arithmetic data includes addition, subtraction, multiplication, and division whereas the logical data includes logical and decision-making processes such as AND, OR, greater than, etc.
- iii. **Memory Unit** – Memory units act as a temporary storage area in the CPU for storing the data received via input devices from the users. All the data temporarily stored is then moved to the ALU unit.

## Output function

When the raw data supplied by the users is processed in the computer processor then it's sent to the output devices by the CPU. The primary output device of a computer system that is set by default is Monitor.

Various output devices are used to access different types of output data forms. i.e. Headphones and Speakers are used to retrieve the sound output. The output received from the computer system can be stored in the form of soft copy and hard copy. Soft copy refers to the storing of processed data in the computer storage or other peripherals such as pen drives, hard disks which can be accessed later on the go.

Whereas hard copy refers to the output taken on cloth or paper with the help of the printing devices i.e. printer. Various other output devices are-

- i. **Monitor** – It is one of the main parts of a computer system that is used to access output whether it's hard to copy or soft copy. It is also known as the Visual Display Unit.
- ii. **Plotter** – This is also similar to the printer which is used to print vector graphics.

## Storage function

Storing data and information is the major function of a computer. A computer stores data in the temporary memory which is known as RAM (Random Access Memory) whereas the information can be stored permanently both internally as well as externally. The data stored in a temporary memory can be erased during a sudden shutdown. As the data fed via the user is stored in temporary memory it is stored there until the processing of data is completed, as it is converted

to meaningful information then it is transferred to permanent storage from the temporary memory. Various storage devices are used on a computer. Although, RAM, ROM, SSD/HDD plays a major role in the functioning of a computer system.

- i. **RAM** – RAM stands for Random Access Memory and the data stored here is temporary. It has a fast read and write speed. It's a volatile memory and the data stored can be erased in case of shutdown or power failures.
- ii. **ROM** – ROM stands for Read-Only Memory. It's a non-volatile memory and the data stored in ROM is in read-only format and can't be modified.
- iii. **SSD/HDD** – SSD stands for Solid State Drive and HDD stands for Hard Disk Drive. Both can be connected internally as well externally. SSDs are faster in comparison to HDDs.
- iv. Cloud Storage can also be used for storing data and information there are various examples. i.e Google Drive, MEGA, etc.

## ADVANTAGES OF COMPUTER

- i. **Multitasking** – Multitasking is one among the main advantage of computer. Person can do multiple task, multiple operation at a same time, calculate numerical problems within few seconds. Computer can perform millions or trillions of work in one second.
- ii. **Speed** – Now computer isn't just a calculating device. Now a day's computer has vital role in human life. One of the most advantages of computer is its incredible speed, which helps human to finish their task in few seconds.
- iii. **Cost/ Stores huge** – Amount of knowledge it's a coffee cost solution. Person can save huge data within a coffee budget. Centralized database of storing information is that the major advantage which will reduce cost.
- iv. **Accuracy** – One among the basis advantage of computer is which will perform not only calculations but also with accuracy.
- v. **Data Security** – Protecting digital data is understood as data security.
- vi. **Communication** – Computer helps the user in better understanding and communication with the other devices.
- vii. **Productivity** – The level of productivity gets automatically doubled as the computer can done the work at very fast.
- viii. **Reduces work load** – Information are often accessed by more than one person with the necessity for work to be duplicated.
- ix. **Reliability** – Computers can perform same sort of work repeatedly without throwing up errors thanks to tiredness or boredom, which are quite common among humans.

- x. **Storage** – The personal computer has an in-built memory where it can store an outsized amount of knowledge. You can also store data in auxiliary storage devices.

## **DISADVANTAGES OF USING A COMPUTER.**

Although there are many advantages to using a computer, there are also dangers and disadvantages (like most things in life). Computers pose several potential health concerns if not used properly. Below is a list of many of the negative impacts of using digital technology and computers and what type of problems you may personally experience.

### **I      limit learning and create a dependency**

If you use a computer that has an Internet connection, it can be a perfect place to get information about any topic. Getting knowledge about anything makes you dependent on the computer and other electronic devices. For example, to find spelling errors, an auto-correct or spell checker is a perfect tool that offers the benefit of finding mistakes and makes the correct spelling of a word. However, if you always depend on the spell checker or auto-correct tools and never learn the proper spelling of a word, you are more likely to make spelling errors. Also, there are many other helpful tools available, such as GPS, grammar checkers, and calculators. However, you may be helpless when they are not working if you are overly dependent on these tools.

### **ii      Time sink and lots of distractions**

Although a computer can be a great creation to increase your productivity, it can also be harmful in terms of wasting too much time. For example, you are learning about any particular topic and see any other interesting link, such as playing games. Then, you click on the link and spend more time playing games. After two hours, you realize you have wasted your time and not achieved your original goal. Furthermore, you can get distracted while trying to work with the popularity of social networks and notifications

### **iii      Unemployment**

Computers can also become the reason to replace the need for many jobs as they are more capable and smarter. For example, if a human can do any work within one hour, the computer can do that work in very few times. Thus, computers are reducing the requirement for many jobs that are also becoming inappropriate for the future. Increases waste and impacts the environment. Computers and other electronics are increasing rapidly and replacing old devices. People get thrown all the old devices that have a substantial impact on the environment.

### **iv      Time Consuming**

Much time will be wasted in front of the computer if a person starts watching videos and playing games without stopping. One should know the harmful effects of spending too much time on the computer. Sitting in front of a computer for too long can forget their essential works and responsibility towards others. It also affects our social skills like communication.



## **v      Health risk**

People continue to use computers throughout the day, especially those who have a dependent job on the computer and the Internet. Such continuity can lead to health problems such as poor eyesight, low energy, obesity in the body, and other diseases. Viewing the monitor screen of a computer all day weakens the eyes' vision and hurts the backbone. So if you are working in a job that depends on a computer, you should have to take remedial measures to take care of your eyes. **For example**, whenever you use the computer, make sure that you take a break of 10 to 15 minutes at an interval of an hour and stay away from the computer for some time. Such a rest will help protect your vision. E.g. eyes and backbone for sitting a long time to the computer.

## **FACTORS THAT AFFECT COMPUTER PERFORMANCE**

### **i.      Type of graphic card**

When it comes to visuals, the user interface, picture, videos, and more a powerfully graphics card is imperative to good performance. If you are using your PC to process a lot of graphics, you may want to know how to speed up computer performance by optimizing your graphics card.

### **ii.     Speed of Hard Disk space**

Any kind of computer speed test will indicate a decrease in performance with an increase in the number of tasks running. Multitasking slows down your pc because applications have less memory to themselves.

### **iii.    Speed of CPU**

The speed of the CPU is also known as the clock speed of the CPU. The clock speed of the CPU is the frequency of which the processor executes instructions or the frequency by which data is processed by the CPU. It is measured in millions of cycles per second or megahertz (MHz). If the Clock speed of the CPU is fast then definitely the performance of the computer will be affected positively, in other words the computer will carry out processing functions at a faster pace.

### **iv.     Size of RAM**

The RAM is referred to as the active part of the computer. This is because the RAM has the capability of storing data that the computer is currently using, because of the fact that it is fast to retrieve data stored in the RAM. With the definition above, a large RAM size will mean a faster computer performance and a smaller RAM size will result to slower computer performance.

### **v.      Memory cache**

Computer often reuse actions, so in light of this, the cache is type of memory that hold temporary instructions so that they needn't be computed unnecessary. The CPU automatically makes checks in the cache for any instructions before requesting data from the RAM.

## **COMMON SERVICE OFFERED BY A COMPUTER**

### **Hardware**

- i. IT Support firms are experts in selecting and installing computer hardware. If your business is due a device refresh, IT technicians know what systems are both of great value and future proof.
- ii. When it comes to installing these systems, IT Support firms can set these computers up and install all the necessary drivers and software required for your business.
- iii. In the event there are any hardware failures, IT Support services can handle the repair process. First, they identify the fault using their specialist diagnostics tools, order new parts if needed and install them. It's the best way to get your system back up and running.

### **Networking**

- i. Setting up a secure network is difficult and time-consuming. IT Support services can select the right network components, install the cabling and infrastructure needed and get you online in no time.
- ii. IT Support can maintain your network, periodically scanning for faults and network interference to increase network speeds.
- iii. IT technicians also can correctly configure network access permissions to improve network security.

### **Cloud Solutions**

As more businesses turn towards home working and online collaboration, IT Support services have stepped up their provision of cloud services.

- i. Technicians can configure remote access for your employees to access their files from home.
- ii. IT Support can introduce and set-up remote collaboration tools like Microsoft SharePoint to allow your employees to work collaboratively from separate locations.
- iii. Cloud storage not only provides geographical redundancy for your data in the event of a disaster, but it also allows your employees to access their work files from anywhere in the world.
- iv. Cloud computing can allow employees to harness the power of systems in the office or at third-party data centres to carry out work tasks from the comfort of their own home.

## **Data Security**

- i. To avoid costly data loss, IT Support services can set up regular backup routines to keep your company's data and customer information safe. Adding in cloud storage can also make sure the data is safe even if there is, for example, a fire at your office.
- ii. To keep your data safe from cyber-attacks, IT Support services can conduct thorough risk assessments to assess the possible threats to your business. Technicians can, in response, set up advanced firewalls, block suspicious IP addresses and install robust anti-malware software.
- iii. Finally, your employees have a role to play in keeping your business safe. Technicians can provide cybersecurity awareness training to businesses, helping employees spot fake sites, security risks, phishing emails and more.

## **2. OPERATING SYSTEM**

**Operating system-** is the type of software which is designed to control all actions taking place in computer operating system control and instruct the hardware of computer to perform various tasks.  
**Or**

Is the set of programs containing instructions that work together to coordinate all the activities among the computer hardware.

## **FEATURES/CHARACTERISTICS OF OPERATING SYSTEM**

### **i. Coordination between other software and user**

Operating systems also organize and allocate interpreters, compilers, assemblers and other software to computer users.

### **ii. Error detection**

The operating system continually monitors the system in order to discover faults and prevent a computer system from failing.

### **iii. Device management**

An operating system (OS) controls device connection through drivers. this programmer keeps track of all the device that are linked to the system. The input/output controller is a software that is responsible for all device. Determine which processes are allocated access to a device and for how long

#### **iv. Booting**

Booting is a process that begins when a computer system turns a limited set of instructions stored in the ROM to configure system hardware, test it, and load the operating system so that the computer system may do additional tasks.

#### **v. File management**

One of the most basic and crucial components of every operating system is file management. Operating system is used to manage its files. The operating system is in charge of all the files with various extension.

### **FACTORS TO CONSIDER WHEN DOING CLASSIFICATION OF OPERATING SYSTEM**

#### **i. Memory management**

You want an OS with good memory management, some OS are known as memory hogs. The same code can use twice as much memory on one OS compared to another

#### **ii. Sharing memory**

Went an OS with good memory sharing capability. AS we have, if we preload the modules and scripts at server startup, they are shared between the spawned children.

#### **iii. Cost and support**

Also remember that the less money you spend on OS and software, the more you will be able to spend on faster and stronger hardware,

#### **iv. OS releases**

Actively developed OS generally try to keep pace with technology development, and continually optimize the kernel and other parts of the OS to become better and other parts of the OS to become better and faster.

### **TYPES OF OPERATING SYSTEMS**

Operating systems usually come pre-loaded on any computer you buy. Most people use the operating system that comes with their computer, but it's possible to upgrade or even change operating systems. The three most common operating systems for personal computers are Microsoft Windows, macOS, and Linux.

Modern operating systems use a graphical user interface, or GUI. A GUI lets you use your mouse to click icons, buttons, and menus, and everything is clearly displayed on the screen using a combination of graphics and text. Each operating system's GUI has a different look and feel, so if you switch to a different operating system it may seem unfamiliar at first.

However, modern operating systems are designed to be easy to use, and most of the basic principles are the same.

**i. Microsoft Windows**

Microsoft created the Windows operating system in the mid-1980s. There have been many different versions of Windows, but the most recent ones are Windows 10 (released in 2015), Windows 8 (2012), Windows 7 (2009), and Windows Vista (2007). Windows comes pre-loaded on most new PCs, which helps to make it the most popular operating system in the world.

**ii. MacOS**

MacOS (previously called OS X) is a line of operating systems created by Apple. It comes preloaded on all Macintosh computers, or Macs. Some of the specific versions include Mojave (released in 2018), High Sierra (2017), and Sierra (2016). computers tend to be more expensive. However, many people do prefer the look and feel of MacOS over Windows.

**iii. Linux**

Linux is a family of open-source operating systems, which means they can be modified and distributed by anyone around the world. This is different from proprietary software like Windows, which can only be modified by the company that owns it. The advantages of Linux are that it is free, and there are many different distributions—or versions—you can choose from.

## **FUNCTIONS OF OPERATING SYSTEM**

- i. **Processor Management:** An operating system manages the processor's work by allocating various jobs to it and ensuring that each process receives enough time from the processor to function properly.
- ii. **Memory Management:** An operating system manages the allocation and deallocation of the memory to various processes and ensures that the other process does not consume the memory allocated to one process.
- iii. **Device Management:** There are various input and output devices. An OS controls the working of these input-output devices. It receives the requests from these devices, performs a specific task, and communicates back to the requesting process.

- iv. **File Management:** An operating system keeps track of information regarding the creation, deletion, transfer, copy, and storage of files in an organized way. It also maintains the integrity of the data stored in these files, including the file directory structure, by protecting against unauthorized access.
- v. **Security:** The operating system provides various techniques which assure the integrity and confidentiality of user data. Following security measures are used to protect user data:
  - a. Protection against unauthorized access through login.
  - b. Protection against intrusion by keeping Fireball active.
  - c. Protecting the system memory against malicious access.
  - d. Displaying messages related to system vulnerabilities.
- vi. **Error Detection:** From time to time, the operating system checks the system for any external threat or malicious software activity. It also checks the hardware for any type of damage. This process displays several alerts to the user so that the appropriate action can be taken against any damage caused to the system.
- vii. **Job Scheduling:** In a multitasking OS where multiple programs run simultaneously, the operating system determines which applications should run in which order and how time should be allocated to each application.

## ADVANTAGES OF OPERATING SYSTEM

### i. Computing Source

An operating system acts as an interface between the user and the hardware. It allows users to input data, process it, and access the output. Besides, through the operating system, users can communicate with computers to perform various functions such as arithmetic calculations and other significant tasks.

### ii User-Friendly Interface

Windows operating system, when it came into existence, also introduces Graphical User Interface (GUI), which made using computers much more natural than earlier Command Line Interface. Moreover, users can quickly understand, interact, and communicate with computer machines.

### iii Resource Sharing

Operating systems allow the sharing of data and useful information with other users via Printers, Modems, Players, and Fax Machines. Besides, a single user can share the same data with multiple

users at the corresponding time via mails. Also, various apps, images, and media files can be transferred from PC to other devices with the help of an operating system.

#### **iv No Coding Lines**

With the invention of GUI, operating systems allow accessing hardware without writing programs. Unlike, earlier users don't have to write code of lines to access the hardware functionality of a computer system.

#### **v Safeguard of Data**

There's a lot of user data stored on the computer, and that can only be accessed with the help of an OS. Besides, storing and accessing the data, another important task of an OS is to safely and securely manage the data. For example, Windows Defender in Microsoft Windows detects malicious and harmful files and removes them. Also, it secures your data by storing them with a bit to bit encryption.

#### **vi Software Update**

An operating system is a software which needs to update regularly to control high fleeting features that are continually increasing. With other apps and software hitting updates to improve their functionality, OS must improve their benchmarks and handle all the working of a computer. An OS can easily be updated without any complexity.

#### **vii Multitasking**

An operating system can handle several tasks simultaneously. It allows users to carry out different tasks at the same point in time.

### **DISADVANTAGES OF OPERATING SYSTEM**

#### **i System Error**

If the central operating system fails, the entire system will fail, and the machine will stop working. Furthermore, a computer system cannot work without an operating system. If the central system fails, all communication will be disrupted, and no further data processing will be possible.

## **ii      Expensive**

Some of the operating systems are more expensive than open-source platforms like Linux. While free operating systems are available, they are often more difficult to operate than others. Furthermore, operating systems with GUI functionality and other built-in features, such as Microsoft Windows, are expensive.

## **iii      Complex Structure**

Operating systems are extremely complicated, and the language used to create them is not well defined. Furthermore, if there is an issue with the OS that users do not understand, it cannot be fixed quickly.

## **iv      Threats from Viruses**

Operating system threats are worse since they are more vulnerable to viral attacks. Many users install malicious software packages on their computers, which cause the operating system to stop working and slow down.

## **v      Fragmentation**

When stored memory in a computer splits, it is known as fragmentation. When the technique of processing is larger than the memory size, internal fragmentation develops. When a method or process is eliminated, external fragmentation happens.

## **FACTORS THAT AFFECT PERFORMANCE IN AN OPERATING SYSTEM**

- i.      Number of cores or processors: If the number of CPU cores is more, then speed of operating system also increase accordingly.
- ii.     Multiple applications: If you are running more than one software together at a time, then the speed of an operating system can decrease accordingly.
- iii.    Graphics card type.
- iv.     Data bus width: If data bus width is more than the speed of operating system will increase accordingly.
- v.      Memory cache: More cache means operating system will work in speedier way.
- vi.     Clock speed
- vii.    Malware
  - a.    Viruses
- viii.   Defragmentation: If more space wasted due to memory fragmentation, then it can decrease operating system speed.
- ix.     RAM: If RAM will increase then it effects much on operating system speed.



## **COMMON SERVICE OFFERED BY OPERATING SYSTEM**

### **i Communication.**

The OS is in charge of coordinating the transfer of data and programs macros computer connected by network.

### **ii Security and protection.**

The OS secure a person statistics and package from unauthorized users and prevent them from being tampered

### **iii Program creation.**

The OS provides structure and tools like editors and debagger to aid program in the creation and modification

### **iv Error detection and response.**

The os monitor the system for problem and takes appropriate action with minimal impacts on running the program to avoid error.

## **3 PROCESSOR**

**Processor**-is the logical circuitry that respond to and processes the basic instructions that drive a computer. the CPU is seen as the main and most crucial integrated circuitry (IC) chip in a computer, as it is responsible for interpreting most of computer commands

## **CHARACTERISTICS/FEATURES OF PROCESSOR**

### **i Speed and feeds**

processor performance is usually a number in either MHZ (megahertz) or GHZ(gigahertz) that number represents how many times the internal clock inside the CPU ticks in cycles per second.

### **ii Cache size**

processor use two types of cache memory to improve performance by buffering transfer between the processor and relatively slow main slow main memory.

### **iii. Process size**

Process size, also called fab(reaction)size, is specified in nanometers (nm), and defines the size of the smallest individual elements on a processor die.so the performance of computer is actually depending on the process size

## **FACTOR TO CONSIDER WHEN DOING CLASSIFICATION OF PROCESSOR**

### **i. Cores**

The number of core are required to be considered when choosing a processor for processing data so multiple core are more important

### **ii. Cache**

A processors cache is similar to the memory of computer. A processors cache is a small amount of very fast memory that is used for temporary storage. this allows a computer to retrieve the files that are in processors cache very quickly. The large a processor cache, the more files it will be able to store for quick retrieval

### **iii. Socket compatibility**

Is primary concern when it comes to buying a processor. the socket compatibility enables the interface between a motherboard and its CPU. if a motherboard has already been acquired, make sure that the processor installed is compatible with the motherboards socket.

### **iv. Integrated graphics processing units(GPUs)**

many of today's processors have integrated graphics processing units, which are designed to perform the calculations related to graphics.

### **v. Frequency**

The frequency of a CPU, measured in hertz (HZ), is the speed at which it operates.in the past, a CPU running at a lower frequency may actually perform better than a processor running at a lower frequency may actually perform better than a processor running at a higher frequency due to the infrasture of the CPU.

## **TYPES OF PROCESSORS**

There are different types of Computer processors, which are used in computers. Below shown each one in detail:

### **i. Single Core Processor**

Single Core CPUs were used in the traditional type of computers. Those CPUs were able to perform one operation at once, so they were not comfortable to multi-tasking system. These CPUs got degrade the entire performance of computer system while running multiple programs at same time duration.

In Single Core CPU, FIFO (First Come First Serve) model is used, it means that couple of operations goes to CPU for processing according to priority base, and left operations get wait until first operation completed.

ii. **Dual Core Processor**

Dual Core processor contains two processors, and they are linked with each other like as single IC (Integrated circuit). Every processor consists its own local cache and controller, so they are able to perform different difficult operations in quickly than single core CPU. There are some examples which are used as dual core processors such as Intel Core Duo, the AMD X2, and the dual-core PowerPC G5.

iii. **Multi Core Processor**

Multi core processor is designed with using of various processing units means “Cores” on one chip, and every core of processor is able to perform their all tasks. For example, if you are doing multiple activities at a same time like as using WhatsApp and playing games then one core handles WhatsApp activities and other core manage to another works such as game.

iv. **Quad Core Processor**

Quad core processor is high power CPU, in which four different processors cores are combined into one processor. Every processor is capable to execute and process all instructions own level without taking support to other left processor cores. Quad core processors are able to execute massive instructions at a time without getting waiting pools. Quad core CPU help to enhance the processing power of computer system, but its performance depend on their using computing components.

v. **Octa Core Processor**

Octa core processor is designed with using of multiprocessor architecture, and its design produces the higher processing speed. Octa core processor has best ability to perform multi-tasking and to boost up efficiency of your CPU. These types of processors are mostly used in your smart phones.

## FUNCTION OF PROCESSOR

The processor also known as CPU is a piece of hardware. It is often referred to as the “Brain of a PC” because all the computations and processing are carried out directly or indirectly by the processor containing millions of transistors. It is a single chip that is capable of processing data. In fact, the performance, capability, and pricing of a computer system are largely determined by the processor to present in it. It controls all the components in a PC. The primary functions of a processor are –

i. **Fetch** –

Every instruction has its own address and is stored in the main memory. The CPU fetches the address of the instruction which is to be executed from the program counter in the memory and performs the instruction.

ii. **Decode** –

The instruction that is to be executed is converted into binary code so that the computer can easily understand it and perform the required function. The process of conversion is known as decoding.

iii. **Execute** –

The process of performing the required task specified in the instruction is known as execution. The execution of the instruction takes place in the CPU.

iv. **Writeback** –

After performing the instruction the CPU store the result in the memory that process is known as a store or Write back.

## ADVANTAGE OF PROCESSOR

- i. Microprocessor helps to perform all complex arithmetically and logically instructions.
- ii. processor has more power to execute 3-4 billion instructions in one second, and it measure in Hertz.
- iii. processor is able to transfer huge data one memory location to other location.
- iv. processor can be performed floating point number in few milliseconds.
- v. processor is generic product, means it can be used in various electronic processing devices with pre-programmed for performing to specific
- vi. processor helps to provide accessibility for controlling of couple of equipment's with in time sharing.
- vii. processor is able to multiprocessing and Parallel Processing.
- viii. Easy to modification
- ix. Low cost.
- x. Better Reliability and Versatility
- xi. Processor needs to external controllers for performing huge tasks along with extra capability.
- xii. Processor has flexible to program in nature.

## **DISADVANTAGES OF PROCESSOR**

- **Analysis**

Performing two or more tasks at the same time requires more number of memory models. This makes analysis a difficult process in a multi core processor. Especially, it is hard to measure time limits and may not be accurate. In addition to that, if the number of cores increases, it can cause complexity in the interference analysis. Thus, the O/S will not be able to deliver expected performance.

- **Resource Sharing**

Different resources both of which internal and external are shared by a multi core processor. These resources include main memory, system bus, memory controller and networks. Due to this, whatever the application which is executed on the same core will have a tendency to get interfered. These type of interference can be of both spatial and temporal isolation.

- **Software Interference**

A software interference that is caused due to the resource sharing can pose problems to spatial and temporal isolation. This chance is even greater if there are more number of cores. More cores essentially mean that there are high number of interference paths. It is almost impossible to analyze each and every interference paths.

## **FACTORS AFFECTING PROCESSOR PERFORMANCE**

Even though today's processors are tremendously fast, their performance can be affected by a number of factors:

- clock speed
- cache size
- number of cores

- i. Clock speed**

Clock speed is the number of pulses the central processing unit's (CPU) clock generates per second. It is measured in hertz.

CPU clocks can sometimes be sped up slightly by the user. This process is known as overclocking. The more pulses per second, the more fetch-decode-execute cycles that can be performed and the more instructions that are processed in a given space of time. Overclocking can cause long term damage to the CPU as it is working harder and producing more heat.

## **ii. Cache size**

Cache is a small amount of high-speed random access memory (RAM) built directly within the processor. It is used to temporarily hold data and instructions that the processor is likely to reuse.

The bigger its cache, the less time a processor has to wait for instructions to be fetched.

## **iii. Number of cores**

A processing unit within a CPU is known as a core. Each core is capable of fetching, decoding and executing its own instructions.

The more cores a CPU has, the greater the number of instructions it can process in a given space of time. Many modern CPUs are dual (two) or quad (four) core processors. This provides vastly superior processing power compared to CPUs with a single core.

## **COMMON SERVICES OFFERED BY PROCESSOR**

- **Payment Processing**

The primary merchant service payment processors offer is merchant accounts that allow businesses to accept credit and debit card payments. Merchant accounts are specialized bank accounts, different from standard business checking accounts and issued by payment processors in partnership with banks known as “receiving banks,” that are specially aligned with the major card companies like Visa, Mastercard, Discover, and more.

- **Payment Hardware and Software**

Merchant accounts allow a merchant to receive the funds from credit and debit card payments, but they still need to provide customers with a way to actually enter their card details. Whether it’s online, in-store, or both, many merchant services providers offer the hardware and software businesses need, including non-contact payment terminals, online payment gateways, and more.

## REFERENCES

Anderson, T.E., E.D. Lazowska, and H.M. Levy (1989), The Performance Implications of Thread Management Alternatives for Shared-Memory Multiprocessors, IEEE Transactions on Computers, Dec., 38(12):1631-1644.

23Brinch-Hansen, P. (1971), Short-Term Scheduling in Multiprogramming Systems, Proceedings of the Third ACM Symposium on Operating Systems Principles, Oct., pp.103-105.

Computer Systems Research Group – University of California at Berkeley (1986), BSD UNIX Reference Manuals, USENIX Association, CA.

Dijkstra, E.W. (1968), The Structure of the THE Multiprogramming System, Communications of the ACM, May, 11(5):341-346.

Labrosse, J.J. (1999), MicroC/OS-II, The Real-Time Kernel, 2nd ed., R&D Books, Gilroy, CA, December.

Peterson, J. L. and Silberschantz, A. (1985), Operating System Concepts. Addison-Wesley, Reading, MA.

Silberschatz, A., P. Galvin, and G. Gagne (2003), Applied Operating System Concepts, 1st ed., John Wiley & Sons, Inc., Danvers, MA.