

**Assignment**

**Computer Fundamentals**

Semester II

**Submitted by:** **Submitted to:**

**Utkarsh Agnihotri Sir Chandan Kumar**

**BCS2017013**

**B.Tech. CS**

**Q.1- Explain the difference between Data and Information.**

**Ans.**

## Data vs. Information - Differences in Meaning

**Data** are simply facts or figures — *bits* of information, but not information itself. When data are processed, interpreted, organized, structured or presented so as to make them meaningful or useful, they are called **information**. Information provides context for data.

For example, a list of dates — data — is meaningless without the information that makes the dates relevant (dates of holiday).

"Data" and "information" are intricately tied together, whether one is recognizing them as two separate words or using them interchangeably, as is common today. Whether they are used interchangeably depends somewhat on the usage of "data" — its context and [grammar](https://www.diffen.com/difference/Category:Grammar).

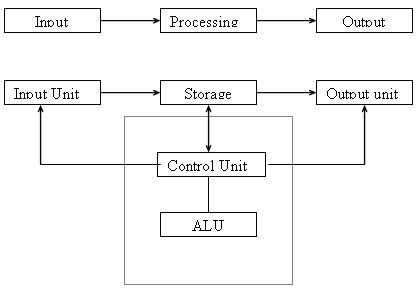
|  |  |  |
| --- | --- | --- |
| Data versus Information comparison chart | | |
|  | **Data** | **Information** |
| Meaning | Data is raw, unorganized facts that need to be processed. Data can be something simple and seemingly random and useless until it is organized. | When data is processed, organized, structured or presented in a given context so as to make it useful, it is called information. |
| Example | Each student's test score is one piece of data. | The average score of a class or of the entire school is information that can be derived from the given data. |
| Etymology | "Data" comes from a singular Latin word, datum, which originally meant "something given." Its early usage dates back to the 1600s. Over time "data" has become the plural of datum. | "Information" is an older word that dates back to the 1300s and has Old French and Middle English origins. It has always referred to "the act of informing, " usually in regard to education, instruction, or other knowledge communication. |

**Q.2- Draw a Block Diagram of a Digital Computer and Explain the Function of each unit.**

**Ans.**

A computer can process data, pictures, sound and graphics. They can solve highly complicated problems quickly and accurately. A computer as shown in Fig.  performs basically five major computer operations or functions irrespective of their size and make. These are

1) it accepts data or instructions by way of input,  
2) it stores data,  
3) it can process data as required by the user,  
4) it gives results in the form of output, and  
5) it controls all operations inside a computer.



**1. Input:**This is the process of entering data and programs in to the computer system. You should know that computer is an electronic machine like any other machine which takes as inputs raw data and performs some processing giving out processed data. Therefore, the input unit takes data from us to the computer in an organized manner for processing.

**2. Processing:**The task of performing operations like arithmetic and logical operations is called processing. The Central Processing Unit (CPU) takes data and instructions from the storage unit and makes all sorts of calculations based on the instructions given and the type of data provided. It is then sent back to the storage unit.

**3.Output:**This is the process of producing results from the data for getting useful information. Similarly, the output produced by the computer after processing must also be kept somewhere inside the computer before being given to you in human readable form. Again the output is also stored inside the computer for further processing.

**4. Storage:**The process of saving data and instructions permanently is known as storage. Data has to be fed into the system before the actual processing starts. It is because the processing speed of Central Processing Unit (CPU) is so fast that the data has to be provided to CPU with the same speed. Therefore, the data is first stored in the storage unit for faster access and processing. This storage unit or the primary storage of the computer system is designed to do the above functionality. It provides space for storing data and instructions.

The storage unit performs the following major functions:

• All data and instructions are stored here before and after processing.

• Intermediate results of processing are also stored here.

**5. Control:**The manner how instructions are executed and the above operations are performed. Controlling of all operations like input, processing and output are performed by control unit. It takes care of step by step processing of all operations inside the computer.

## FUNCTIONAL UNITS

In order to carry out the operations mentioned in the previous section the computer allocates the task between its various functional units. The computer system is divided into three separate units for its operation. They are

### Image result for draw a block diagram of a digital computer and explain the function of each unit

### **Arithmetic Logical Unit (ALU)**

**Logical Unit**: After you enter data through the input device it is stored in the primary storage unit. The actual processing of the data and instruction are performed by Arithmetic Logical Unit. The major operations performed by the ALU are addition, subtraction, multiplication, division, logic and comparison. Data is transferred to ALU from storage unit when required. After processing the output is returned back to storage unit for further processing or getting stored.

### **Control Unit (CU)**

The next component of computer is the Control Unit, which acts like the supervisor seeing that things are done in proper fashion. Control Unit is responsible forcoordinating various operations using time signal. The control unit determines the sequence in which computer programs and instructions are executed. Things like processing of programs stored in the main memory, interpretation of the instructions and issuing of signals for other units of the computer to execute them. It also acts as a switch board operator when several users access the computer simultaneously. Thereby it coordinates the activities of computer’s peripheral equipment as they perform the input and output.

### **Central Processing Unit (CPU)**

The ALU and the CU of a computer system are jointly known as the central processing unit. You may call CPU as the brain of any computer system. It is just like brain that takes all major decisions, makes all sorts of calculations and directs different parts of the computer functions by activating and controlling the operations.

## Q.3- Explain Generations of Computers.

## Ans.

## First Generation: Vacuum Tubes ****(1940-1956).****

The first computers used vacuum tubes for circuitry and magnetic drums for memory, and were often enormous, taking up entire rooms. These computers were very expensive to operate and in addition to using a great deal of electricity, the first computers generated a lot of heat, which was often the cause of malfunctions.

First generation computers relied on machine language, the lowest-level programming language understood by computers, to perform operations, and they could only solve one problem at a time. It would take operators days or even weeks to set-up a new problem. Input was based on punched cards and paper tape, and output was displayed on printouts.

The **UNIVAC** and **ENIAC** computers are examples of first-generation computing devices. The UNIVAC was the first commercial computer delivered to a business client, the U.S. Census Bureau in 1951.

The limitations of the First Generations of computer are:

 1. The operating speed was quite slow.

2. Power consumption was very high.

3. It required large space for installation.

4. The programming capability was quite low.

## Second Generation: Transistors ****(1956-1963)****

The world would see transistors replace vacuum tubes in the second generation of computers. The transistor was invented at Bell Labs in 1947 but did not see widespread use in computers until the late 1950s.

The transistor was far superior to the vacuum tube, allowing computers to become smaller, faster, cheaper, more energy-efficient and more reliable than their first-generation predecessors. Though the transistor still generated a great deal of heat that subjected the computer to damage, it was a vast improvement over the vacuum tube. Second-generation computers still relied on punched cards for input and printouts for output.

### **From Binary to Assembly:**

Second-generation computers moved from cryptic binary machine language to symbolic, or assembly, languages, which allowed programmers to specify instructions in words. High-level programming languages were also being developed at this time, such as early versions of COBOL and FORTRAN. These were also the first computers that stored their instructions in their memory, which moved from a magnetic drum to magnetic core technology.

Advantages:

1.  Size of Computer has come down as well as power consumption.

2. The Cost of Computer reduced.

**Some of the computers of the Second Generation were**

**IBM 1620**: Its size was smaller as compared to First Generation computers and mostly used for scientific purpose.

**IBM 1401**: Its size was small to medium and used for business applications.

**CDC 3600**: Its size was large and is used for scientific purposes.

## Third Generation: Integrated Circuits ****(1964-1971)****

The development of the integrated circuit was the hallmark of the third generation of computers. Transistors were miniaturized and placed on silicon chips, called semiconductors, which drastically increased the speed and efficiency of computers.

Instead of punched cards and printouts, users interacted with third generation computers through keyboards and monitors and interfaced with an operating system, which allowed the device to run many different applications at one time with a central program that monitored the memory. Computers for the first time became accessible to a mass audience because they were smaller and cheaper than their predecessors,

The size of computers, cost, heat generation and power consumption decreased to great extent, speed and reliability increased as compared to previous generation. These machines used IC's with large scale Integration (LSI).

## Fourth Generation:  Microprocessors ****(1971-Present)****

The microprocessor brought the fourth generation of computers, as thousands of integrated circuits were built onto a single silicon chip. What in the first generation filled an entire room could now fit in the palm of the hand. The Intel 4004 chip, developed in 1971, located all the components of the computer—from the central processing unit and memory to input/output controls—on a single chip.

In 1981 IBM introduced its first computer for the home user, and in1984 Apple introduced the Macintosh. Microprocessors also moved out of the realm of desktop computers and into many areas of life as more and more everyday products began to use microprocessors.

As these small computers became more powerful, they could be linked together to form networks, which eventually led to the development of the Internet. Fourth generation computers also saw the development of GUIs, the mouse and handheld devices.

Advantages:

1. These computers have high processing powers, low maintenance, and high reliability and very low power consumption.

2. The size & cost of computers come down drastically

## ****Fifth Generation: Artificial Intelligence (Present and Beyond)****

Fifth generation computing devices, based on artificial intelligence, are still in development, though there are some applications, such as voice recognition, that are being used today. The use of parallel processing and superconductors is helping to make artificial intelligence a reality. Quantum computation and molecular and nanotechnology will radically change the face of computers in years to come. The goal of fifth-generation computing is to develop devices that respond to natural language input and are capable of learning and self-organization.

**Q.4- List out various Applications of Computers.**

**Ans.**

## Application of Computer

The various applications of computers in today's arena :   
  
1. Business  
2. Education   
3. Marketing   
4. Banking   
5. Insurance   
6. Communication   
7. Health Care   
8. Military   
9. Engineering Design 

**› Business**  
A computer has high speed of calculation, diligence, accuracy, reliability, or versatility which made it an integrated part in all business organizations.  
Computer is used in business organizations for: Payroll calculations, Sales analysis, Budgeting, Financial forecasting, Managing employees database and Maintenance of stocks etc.   
  
**› Education**  
Computers have its dominant use in the education field which can significantly enhance performance in learning. Even distance learning is made productive and effective through internet and video-based classes. Researchers have massive usage of these computers in their work from the starting to till the end of their scholarly work.

**› Marketing**  
In marketing, uses of computer are :  
**Advertising**- With computers, advertising professionals create art and graphics, write and revise copy, and print and disseminate ads with the goal of selling more products.  
**Home Shopping**- Home shopping has been made possible through use of computerized catalogues that provide access to product information and permit direct entry of orders to be filled by the customers.

**› Banking**  
Today banking is almost totally dependent on computer. Banks provide the facilities of:  
Banks provide online accounting facility, which includes current balances, deposits, overdrafts, interest charges, shares, and trustee records.  
ATM machines are making it even easier for customers to deal with banks.

**› Insurance:**  
Insurance companies are keeping all records up-to-date with the help of computers. The insurance companies, finance houses and stock broking firms are widely using computers for their concerns.

**› Communication:**  
Communication means to convey a message, an idea, a picture or speech that is received and understood clearly and correctly by the person for whom it is meant for. Some main areas in this category are: Chatting, E-mail, Usenet, FTP, Video-conferencing and Telnet.

**› Health Care**  
Most of the medical information can now be digitized from the prescription to reports. Computation in the field of medicine allows us to offer varied miraculous therapies to the patients. ECG’s, radiotherapy wasn’t possible without computers.   
  
**› Military**  
Computers are the main tools which help in developing missiles and other equipment in the deference system. Designing and the maintenance are possible only through computers. Computer builds the links between the soldiers and commanders through the satellite. Construction of weapons and controlling their function is not possible without the aid of computers. The list of the criminals and the records of the cops are maintained regularly in the system.   
  
**› Engineering Design**  
As per the title, computers aid in designing buildings, magazines, prints, newspapers, books and many others. The construction layouts are designed beautifully on system using different tools and software’s.

**Q.5- Describe the term Operating System and explain the function of Operating System.**

**Ans.**

**Operating System,**a program that acts as anintermediary between a user of a computer and the computer hardware.The operating system is the most important program that is on a computer.  The operating system basically runs the computer and allows other programs to run as well.  The operating system does all the basic things that a computer needs to do, such as recognizing inputs from the mouse or the keyboard.  It keeps track of where all the files are on the computer.  It allocates resources to the various programs that are running and it prevents unauthorized access to the computer.

The most popular operating system today is Microsoft's Windows operating system.  Macintosh computers have their own operating system, the most recent of which is called Mac OS X.  There are also open source operating systems such as Linux.

**Operating system Functions**:

1. Execute user programs and make solving user problems easier.

2. Make the computer system convenient to use.

3. Use the computer hardware in an efficient manner.

4.**Interface between the user and the hardware**

**5.Coordinate hardware components**

**6. Provide environment for software to function**

**7.  Monitor system health and functionality**