LAB 1

INTRODUCTION TO COMPUTER HARDWARE & SYSTEM INFORMATION

1. OBJECTIVES

To provide basic knowledge of Computer and its Hardware Devices. Visually learning method is adopted by conducting practical Labs.

2. KEY FEATURES:

Hardware Devices of a Computer

3. INPUT DEVICES:

An **input device** is any peripheral (piece of computer hardware equipment) used to provide data and control signals to an information processing system such as a computer or other information appliance.

3.1 Types of Input Devices:

Mouse**,** Joystick, Keyboard and Scanner etc

Figure: 1 "Input Devices"

4. OUTPUT DEVICES:

An **output device** is any piece of computer hardware equipment used to communicate the results of data processing carried out by an information processing system (such as a computer) to the outside world.

4.1 Types of Output Devices:

Speakers, Headphones, Screen (Monitor), Printer

Figure: 2 "Output Devices"

5. SYSTEM UNITS:

The system unit is the core of a computer system. Usually it's a rectangular box placed on or underneath your desk. Inside this box are many electronic components that process information. The most important of these components is the central processing unit (CPU), or microprocessor, which acts as the "brain" of your computer. Another component is random access memory (RAM), which temporarily stores information that the CPU uses while the computer is on. The information stored in RAM is erased when the computer is turned off.

Almost every other part of your computer connects to the system unit using cables. The cables plug into specific ports (openings), typically on the back of the system unit. Hardware that is not part of the system unit is sometimes called a peripheral device or devices.

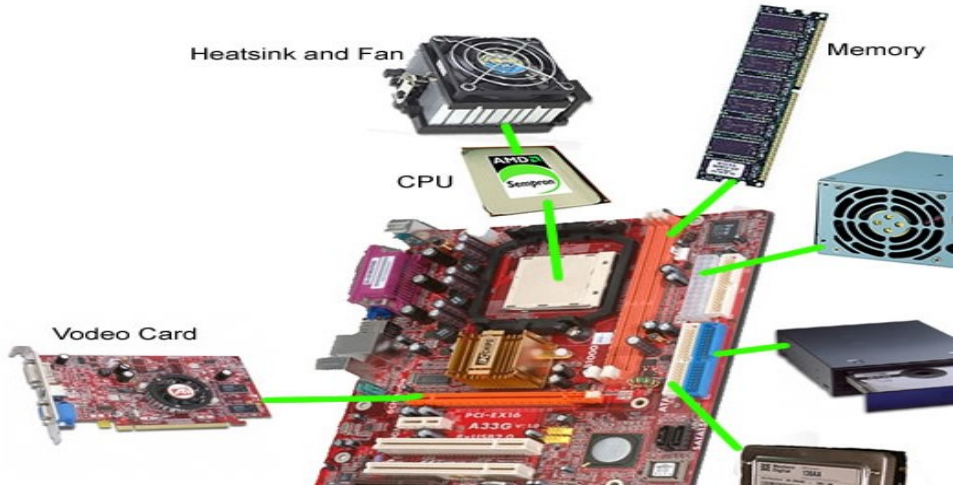


Figure: 3 "System Unit"

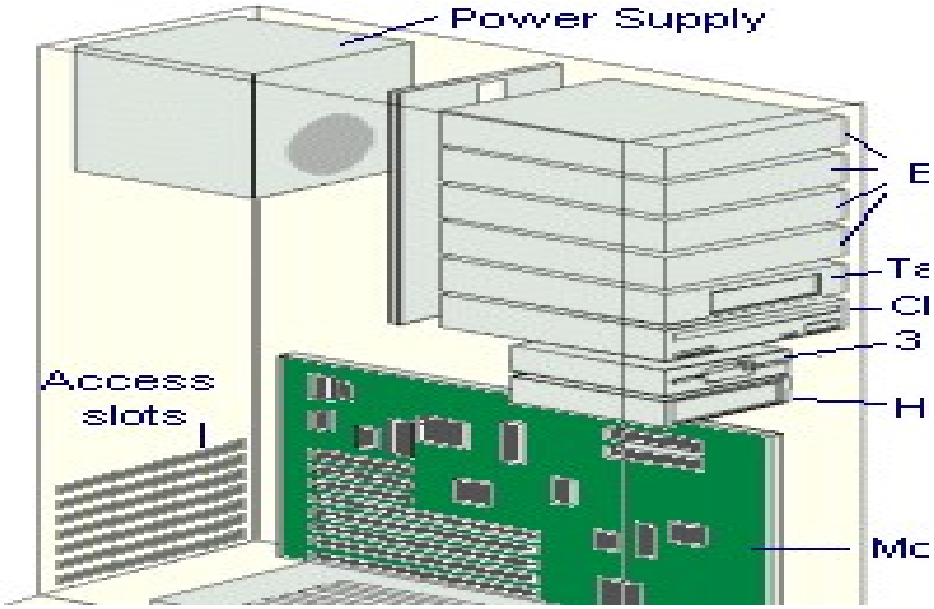


Figure: 4 "System Unit"

5.1 MOTHERBOARD

In personal computers, a motherboard is the central printed circuit board (PCB) in many modern computers and holds many of the crucial components of the system, providing connectors for other peripherals. The motherboard is sometimes alternatively known as the main board, system board, or, on Apple computers, the logic board. It is also sometimes casually shortened to mobo.

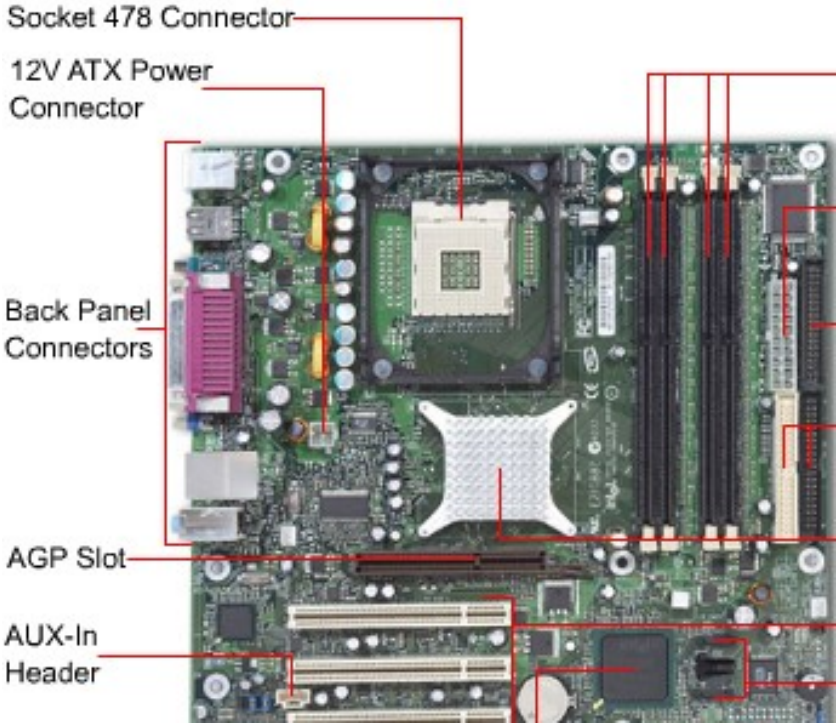


Figure: 4a Mother Board

5.2 PORTS AND SLOTS

In the most easy to understand terms, "ports" are holes used to plug external devices into your computer. They will be found largely in the back of the computer. "Slots" are holes used to plug internal devices (sound/video cards...etc) INTO your computer. These will be found on the inside of your computer...and the devices you pug into the will have "ports" on them...which will be able to be accessed from the back of the computer like the other ones.
The most common "slots" that you will find inside the computer are as follows:

ISA (Industry Standard Architecture): This slot is obsolete and you probably won't find it on any computer newer than 5 years old. It is the longest of the slots, and usually colored black.

PCI (Peripheral Component Interface): The most common slot. It is the second to the smallest slot, and is the most widely used slot, being smaller, and faster than ISA. It is typically colored white.

AGP (Accelerated Graphics Port): This usually "light brown" colored slot is used almost exclusively for video cards. It is quite a bit faster than PCI, with a larger data path, making it perfect for data rich video/graphics. You'll find one of these slots on just about any computer 5 years old or newer.

5.3 SERIAL PORT

Serial ports transmit data one bit at a time. Typically on older PCs, a modem, mouse, or keyboard would be connected via serial ports. Serial cables are cheaper to make than parallel cables and easier to shield from interference.

5.4 PARALLEL PORT

The parallel port of older PCs could transmit 8 bits of data at a time, so it was faster than the old serial port (just as more traffic can move along a multi-lane highway than can move along a one-lane road). The parallel port was typically used to connect a printer to the computer.

5.5 USB PORT

USB (Universal Serial Bus) is a newer type of serial connection that is much faster than the old serial ports. USB is also much smarter and more versatile since it allows the "daisy chaining" of up to 127 USB peripherals connected to one port.

USB ports can support the connection of many kinds of devices (keyboard, mouse, printer, audio in/out, external floppy or Zip drives, scanner, flash drive, etc.). Newer PCs and Macs include several USB ports, some often located in handy spots on the front panel of the computer case or the side of the keyboard. USB connections are hot-swappable (they can be connected and disconnected while the devices are turned on; this is not always true for older connection methods).

An updated version, called USB 2.0 has a speed of 480 Mb/sec, which is 40 times faster than the older USB port's high-speed mode (the connectors look the same).

USB 3.0 is the third major version of the Universal Serial Bus (USB) standard for interfacing computers and electronic devices. Among other improvements, USB 3.0 adds the new transfer mode SuperSpeed (SS) that can transfer data at up to 5 Gbit/s (625 MB/s), which is about ten times faster than the USB 2.0 standard. USB 3.0 connectors are usually distinguished from their USB 2.0 counterparts by blue color-coding of the receptacles and plugs, and the initials SS.

5.6 STORAGE DEVICES

Your computer has one or more disk drives—devices that store information on a metal or plastic disk. The disk preserves the information even when your computer is turned off.

5.6.1 Types of Storage Devices:

Hard Disk Drive, Floppy Disk, CDs and DVD and Flash Stick Devices etc

5.6.1.1 HARD DISK DRIVE

Your computer's hard disk drive stores information on a hard disk, a rigid platter or stack of platters with a magnetic surface. Because hard disks can hold massive amounts of information, they usually serve as your computer's primary means of storage, holding almost all of your programs and files. The hard disk drive is normally located inside the system unit.

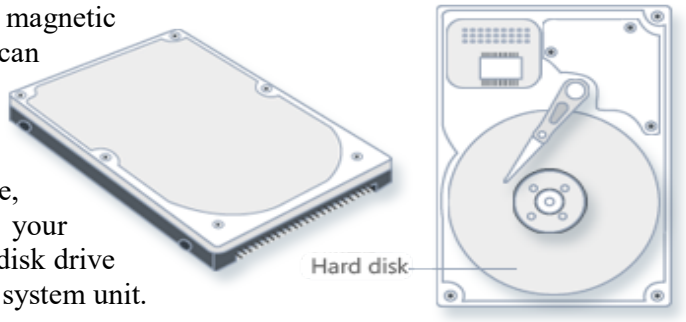


Figure: 5 "Hard Disk"

5.6.1.2 Solid State Drives

A solid-state drive (SSD) is a solid-state storage device that uses integrated circuit assemblies as memory to store data persistently. SSDs have no moving (mechanical) components. This distinguishes them from traditional electromechanical magnetic disks such as hard disk drives (HDDs) or floppy disks, which contain spinning disks and movable read/write heads. Compared with electromechanical disks, SSDs are typically more resistant to physical shock, run silently, have lower access time, and less latency.

Figure: 5B "SSD drive"

However, while the price of SSDs has continued to decline over time, consumer-grade SSDs are still roughly six to seven times more expensive per unit of storage than consumer-grade HDDs.

As of 2014, most SSDs use NAND-based flash memory, which retains data without power. For applications requiring fast access, but not necessarily data persistence after power loss, SSDs may be constructed from random-access memory (RAM). Such devices may employ separate power sources, such as batteries, to maintain data after power loss.

Hybrid drives or solid-state hybrid drives (SSHDs) combine the features of SSDs and HDDs in the same unit, containing a large hard disk drive and an SSD cache to improve performance of frequently accessed data

5.8 CD AND DVD DRIVES

Nearly all computers today come equipped with a CD or DVD drive, usually located on the front of the system unit. CD drives use lasers to read (retrieve) data from a CD, and many CD drives can also write (record) data onto CDs. If you have a recordable disk drive, you can store copies of your files on blank CDs. You can also use a CD drive to play music CDs on your computer.

Figure: 6 "Compact Disk"

DVD drives can do everything that CD drives can, plus read DVDs. If you have a DVD drive, you can watch movies on your computer. Many DVD drives can record data onto blank DVDs. If you have a recordable CD or DVD drive, periodically back up (copy) your important files to CDs or DVDs. That way, if your hard disk ever fails, you won't lose your data.

5.9 FLOPPY DISK DRIVES

Floppy disk drives store information on floppy disks, also called floppies or diskettes. Compared to CDs and DVDs, floppy disks can store only a small amount of data. They also retrieve information more slowly and are more prone to damage. For these reasons, floppy disk drives are less popular than they used to be, although some computers still include them.

Figure: 7 "Floppy disk"

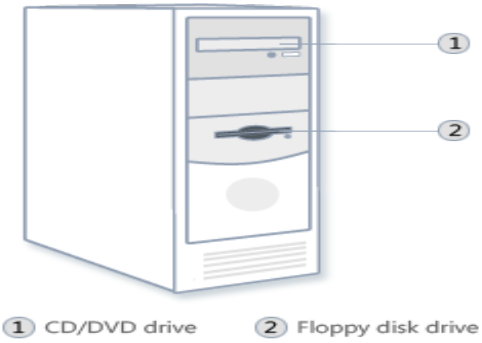


Figure:8 "Floppy disk and CD Drive

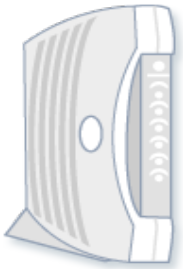
6. COMMUNICATION DEVICES

Computers can communicate (To transfer information from one computer to another) with the other computer by forming networks (with the help of different communication devices**).**

6.1 Types of Communication Devices

Modem, Nic Adapters, Routers, Hubs, Switches, Gateways Networking Cables etc.

6.2 MODEM



To connect your computer to the Internet, you need a modem. A modem is a device that sends and receives computer information over a telephone line or high-speed cable. Modems are sometimes built into the system unit, but higher-speed modems are usually separate components.

Figure: 9 "Cable Modem"

6.3 NIC ADAPTERS:

NIC is Network Interface Card; this is the most important device in building network. These adapters are the most common part of computers which are used in our homes and offices. Nic is also referred to LAN, i.e. is Local area network card. Communication mediums (cables) are attached to this card to build network.

This device has unique Mac address. To build network unique IP address is assign to this LAN card to begun communication. In case of developing WLAN, instead of LAN card we use Wireless card. Its functionality is same as simple LAN card; it is just wireless communication device which connects to router for communication.

Figure: 10 "NIC Adapters"

6.4 ROUTERS

Router is intelligent device which routes data to destination computers. It helps in connecting two different logical and physical networks together. In small network server is connected to router along with clients for communication. With routers network communication is not possible; it is soul of network without which distribution if internet and other network data to entire network is impossible.

Figure 11: "Router"

It works very same when it comes to use wireless network using wireless network router. It performs all functions similarly without using any medium like cables etc. Router uses software known as routing table. Routing table is used to store source and destination address. Major companies which know for manufacturing routers and wireless routers are Tp Link, Cisco systems, Nortel, D link etc.

6.5 HUBS

Networks on larger scale hub(s) are required to build network. All computers are connected directly to the hub as hub performs as centralized device the network. When data is sent to the hub it broadcasts the data to all the ports of the hub and then it is sent to destination computer on the network. If hubs fails to perform its routine functions it will halt the working of the entire network until it is put back in normal condition.

Figure 12: "Hub"

6.6 SWITCHES

Switch is another important device when we talk about computer network on broader spectrum.It is used at the same place as hub is but the only difference between the two is that switch possess switching table with in it. Switching tables store the MAC addresses of every computer it is connected to and send the data to only requested address unlike hub which broadcasts the data too all the ports. Switches can be considered advance form of hubs.

Figure 13: "Switch"

6.7 GATEWAYS

As name suggests it some kind of passing through to some thing. Interestingly gateways can be software or it can also be device. Gateway device connects LAN with internet. Its basic functionality is to provide security to the network. By using gateways incoming/out going traffic can be monitored for any malicious activity within the network which can be harmful to network integrity.

Work to be done at the end of the Lab as an assignment

- **Find all the input and output hardware from Internet, label them and identify them as input or output device.**
- **Take a picture of the Computer or laptop and identify the parts.**
- **Write a Lab Report**

After completion of above set labs:
One week will cover the Viva Voca, grading and testing of students after completion.
Grading will be done on the basis of rubrics displayed on notice board.

LAB 2 & 3

GUI, Operating System and File Extensions

1. GUI (Graphical User Interface):

In computing, a graphical user interface GUI, sometimes pronounced gooey is a type of user interface that allows users to interact with electronic devices with images rather than text commands. GUIs can be used in computers, hand-held devices such as MP3 players, portable media players or gaming devices, household appliances and office equipment.

A GUI represents the information and actions available to a user through graphical icons and visual indicators such as secondary notation, as opposed to text-based interfaces, typed command labels or text navigation. The actions are usually performed through direct manipulation of the graphical elements.

The term GUI is historically restricted to the scope of two-dimensional display screens with display resolutions able to describe generic information, in the tradition of the computer science research at the PARC (Palo Alto Research Centre). The term GUI earlier might have been applicable to other high-resolution types of interfaces that are non-generic, such as video games, or not restricted to flat screens, like volumetric displays.

2. OPERATING SYSTEM:

An operating system (OS) is software, consisting of programs and data that runs on computers manages computer hardware resources, and provides common services for execution of various application software. The operating system is the most important type of system software in a computer system. Without an operating system, a user cannot run an application program on their computer, unless the application program is self booting.

For hardware functions such as input and output and memory allocation, the operating system acts as an intermediary between application programs and the computer hardware, although the application code is usually executed directly by the hardware and will frequently call the OS or be interrupted by it. Operating systems are found on almost any device that contains a computer—from cellular phones and video game consoles to supercomputers and web servers. Examples of popular modern operating systems include BSD, Linux, Mac OS X, Microsoft Windows, and UNIX.

2.1 EXTENSIONS:

A filename extension is a suffix to the name of a computer file applied to indicate the encoding convention (file format) of its contents.

In some operating systems (for example UNIX) it is optional, while in some others (such as DOS) it is a requirement (it may be empty but it always exists). Some

operating systems or rather their native or default files systems limit the length of the extension (such as DOS and OS/2 using FAT file system not allowing more than three characters) while others (such as Unix) do not. Some operating systems (for example RISC OS) do not use filename extensions. UNIX accepts the separator dot as a legal character but does not give it a special recognition on the OS level.

A file extension is a way of showing the type of a computer file, and a clue to what program it should be opened with. File extensions are usually three letters long and come after the name of the file.

Some examples of common file extensions are:

- TXT files are plain text files
- JPG are picture files in the JPEG format
- MP3 are music files in the MP3 format
- MPEG are motion picture encoded video files
- HTM or *HTML are Hyper Text Markup Language files such as web pages
- PHP are web server scripts which create web pages
- ODT are Open Document text files
- DOC are text documents in Microsoft Word format
- XLS are Microsoft Excel spreadsheet documents
- PPT are Microsoft Power Point presentation files
- EXE are Microsoft Windows executable program files
- DLL are Dynamic Link Libraries, a type of executable file, in MS Windows
- ZIP are Compressed files (Lempel Ziff algorithm in an archive)
- Z are Unix / Linux compressed files
- bz2 are bzip2 block compressed files (very good compression)
- jar are Java archive files
- JSP are Java server pages files
- java are Java source code files
- class are Java compiled source code files
- oc are Java run-time library files
- tar are Unix / Linux tape archive files
- sh are Unix / Linux shell script files
- awk are Unix C like pattern processing language source code files
- sed are Unix stream editor command files
- lex are Unix / Linux lexical analyzer C code generator specification files
- .c Extensions are C programming language source files
- .o Extensions are C programming language compiled files

Work to be done at the end of the Lab as an assignment

- **Take pictures of GUI of different environments and flavors of Linux, UNIX, Apple and Windows.**
- **Identify the different file extensions that a students uses in daily life.**
- **Write a Lab Report**

After completion of above set labs:
One week will cover the grading and testing of students after completion.
Grading will be done on the basis of rubrics displayed on notice board.

LAB 4, 5 & 6

MICROSOFT WORD

1. OBJECTIVES

To provide basic knowledge of Microsoft Word in such a way that one is able to have a full command while preparing assignments, CV, lab reports etc.

2. KEY FEATURES

- Different Views
  - Normal, web, print etc.
- Formatting Text
  - Copy, Paste, Cut, coloring, highlighting etc.
- Alignment
  - Left, central, right, justify
- Spacing
  - Line spacing, paragraph spacing
- Moving Text
- Working on Headers & Footers
  - Different function on toolbar
- Tables
  - Creating, deletion, adding etc.
- Columns
  - Creating, deletion, adding etc.
- Text Boxes
- Pictures
  - Creating, moving and working on toolbar
- Keyboard shortcuts-
- Grammar and Spelling Check
- Hyperlink
  - Creating, deletion, adding bookmarks etc.
- Templates
- Mail merging
- Macros
  - Creating, disabling, etc
- Working on Sections
- Adding security to a document
- Equation editor
- Indexing for a report
- Line Indents ,
- Drop caps,
- Water Marking

Work to be done at the end of the Lab as an assignment

- **Make your own CV.**
- **Write a column of any news paper exactly as it is printed in newspaper and paste the column of newspapers within the report.**
- **Write a Lab Report**

After completion of above set labs:
One week will cover the grading and testing of students after completion.
Grading will be done on the basis of rubrics displayed on notice board.

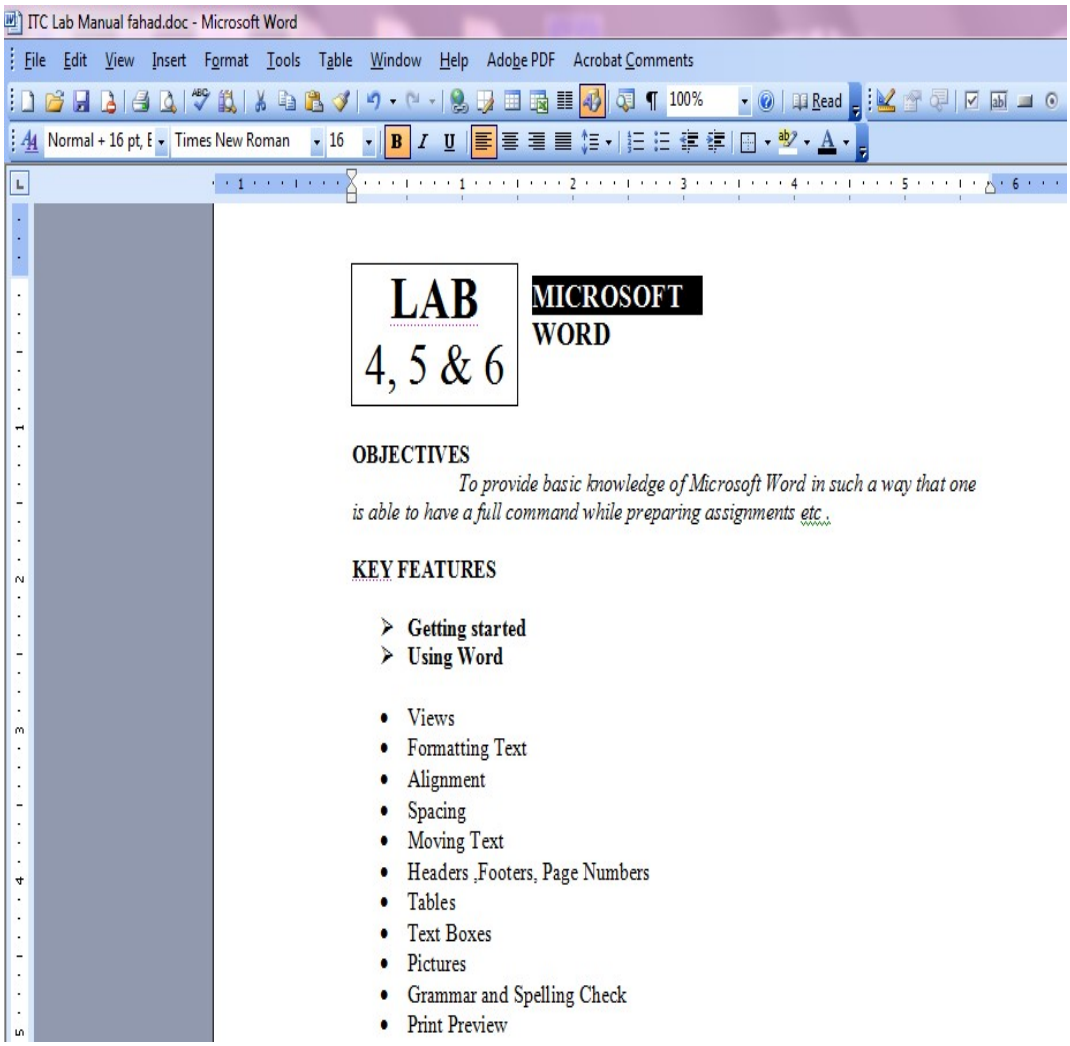


Figure: 15 "Microsoft Word"

LAB 7, 8 & 9

MICROSOFT POWER POINT

1. OBJECTIVES

To provide basic knowledge of Microsoft Power Point such that, one is able to have a full command while preparing different presentation and assignments etc. and it helps them to enhance their presentation skills.

2. KEY FEATURES of LAB

- Understanding the basics
- Starting a new presentation
- Master slide concepts and how it helps in preparing presentation.
- Formatting text
- Drawing tools
- Using Pictures
- Slide Layouts
- Design and coloring
- Creating tables and charts
- Inserting graphics and multimedia
- Using animation and triggers.
- Templates

Work to be done at the end of the Lab as an assignment

- **Prepare a presentation on given topic**
- **Present your presentation before the end term.**
- **Write a Lab Report**

After completion of above set labs:
One week will cover the grading and testing of students after completion.
Grading will be done on the basis of rubrics displayed on notice board.

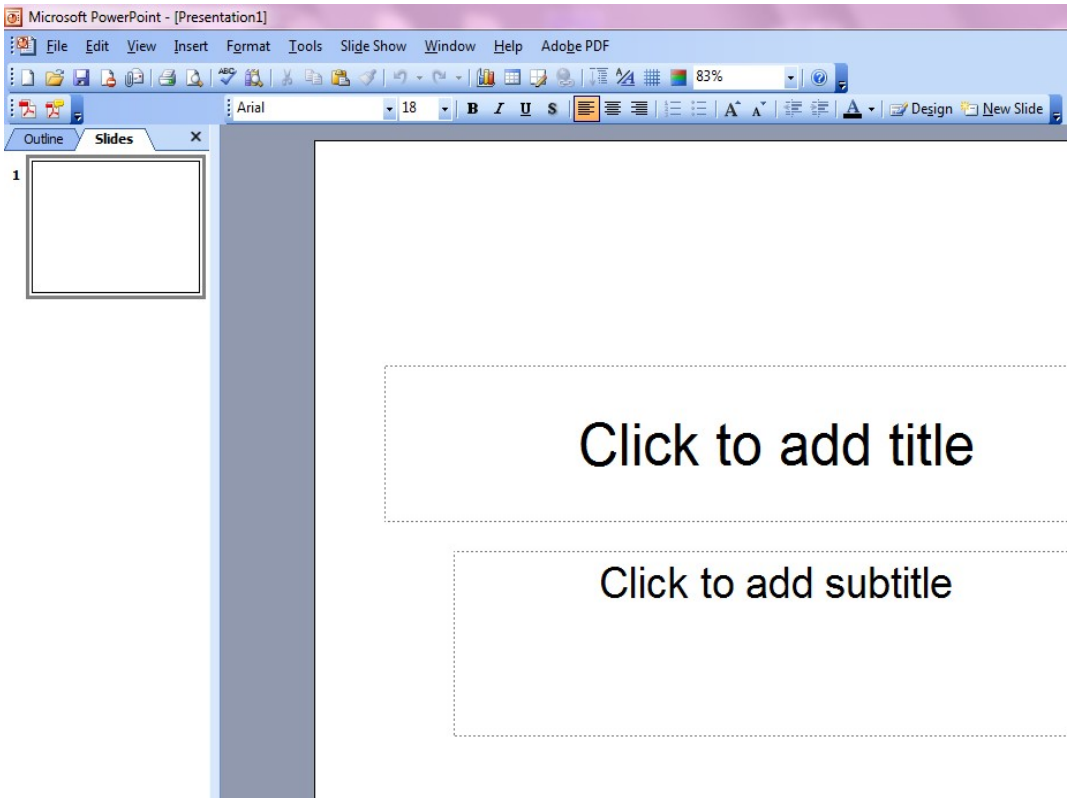


Figure: 16 "Microsoft PowerPoint"

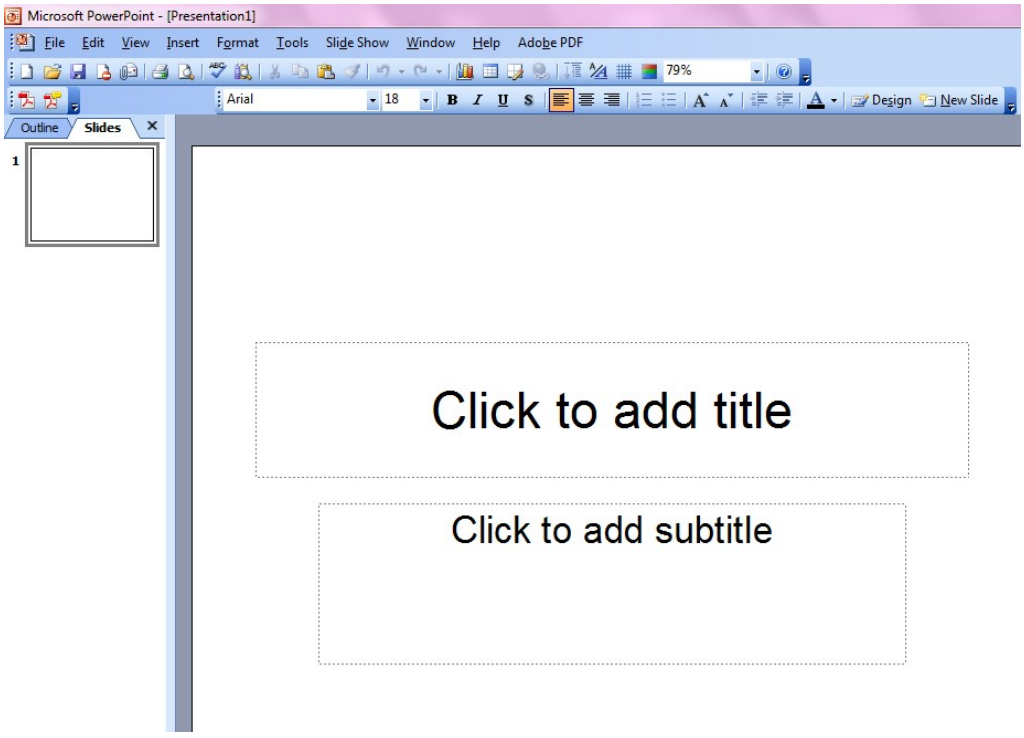


Figure: 17 "slide designing and layouts"

LAB 10 & 11

MICROSOFT EXCEL

1. OBJECTIVES

To provide basic knowledge of Microsoft Excel so that one is able to have a full command while preparing different Formulas Sheet and helps to enter Data in proper Format etc

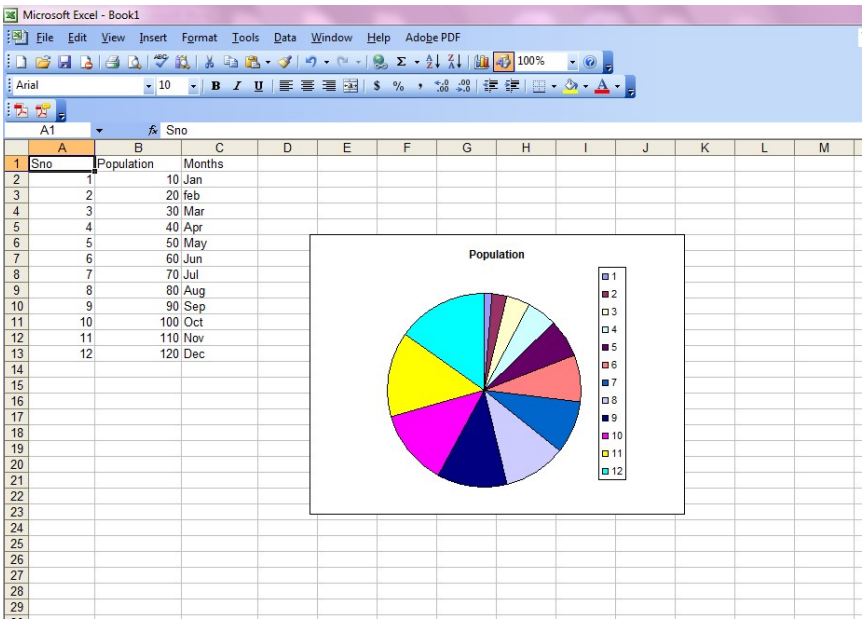
2. KEY FEATURES

- Creating a Basic worksheet
- Concepts of cells, rows and columns
- Merging cells
- Entering data
- Create Basic Formulas
- Calculate with Functions
- Copy Formulas and Functions
- Making graphs for analysis

Work to be done at the end of the Lab as an assignment

- **Prepare a student evaluation and grading award list.**
- **Make a graph of the award list for analysis.**
- **Write a Lab Report**

After completion of above set labs:
One week will cover the grading and testing of students after completion.
Grading will be done on the basis of rubrics displayed on notice board.



Sno	Population	Months
1	10	Jan
2	20	feb
3	30	Mar
4	40	Apr
5	50	May
6	60	Jun
7	70	Jul
8	80	Aug
9	90	Sep
10	100	Oct
11	110	Nov
12	120	Dec

Figure:18 "Microsoft Excel"

LAB 12

INTRODUCTION TO COMPUTER LANGUAGE

1. OBJECTIVES:

To provide basic knowledge of Programming Language 'C' so that students have an outer view of the C Language focusing on its syntax and different functions.

- Getting started
- Pseudo Coding
- Flow Charts
- Introduction to C Language
    - Writing a first program (Hello World)

Work to be done at the end of the Lab as an assignment

- **Prepare a Pseudo code of adding two digits**
- **Prepare a flowchart of the above Pseudo code**
- **Write a Lab Report**

After completion of above lab:
One week will cover the grading and testing of students after completion.
Grading will be done on the basis of rubrics displayed on notice board.