Computer Software

Computer Software

- **Software** is a collection of **programs** that instruct the hardware to perform a set of tasks in a particular order.
- A **computer program** is a collection of instructions that performs a specific task when executed by a computer
- Hardware and software are complimentary to each other. Both have to work together to produce meaningful results.
- Computer software is classified into two categories; **system software and application software.**

System software

- System software perform the basic function necessary **to start and operate a computer.** It Controls and monitors the various activities and resource of a computer and makes it easier and more efficient to use the computer.
- Depending upon the task performed the system software can be divide into two major groups:
- **System management programs**
- Used for managing both the hardware and software system

System Development Programs

Used for developing and executing application software.

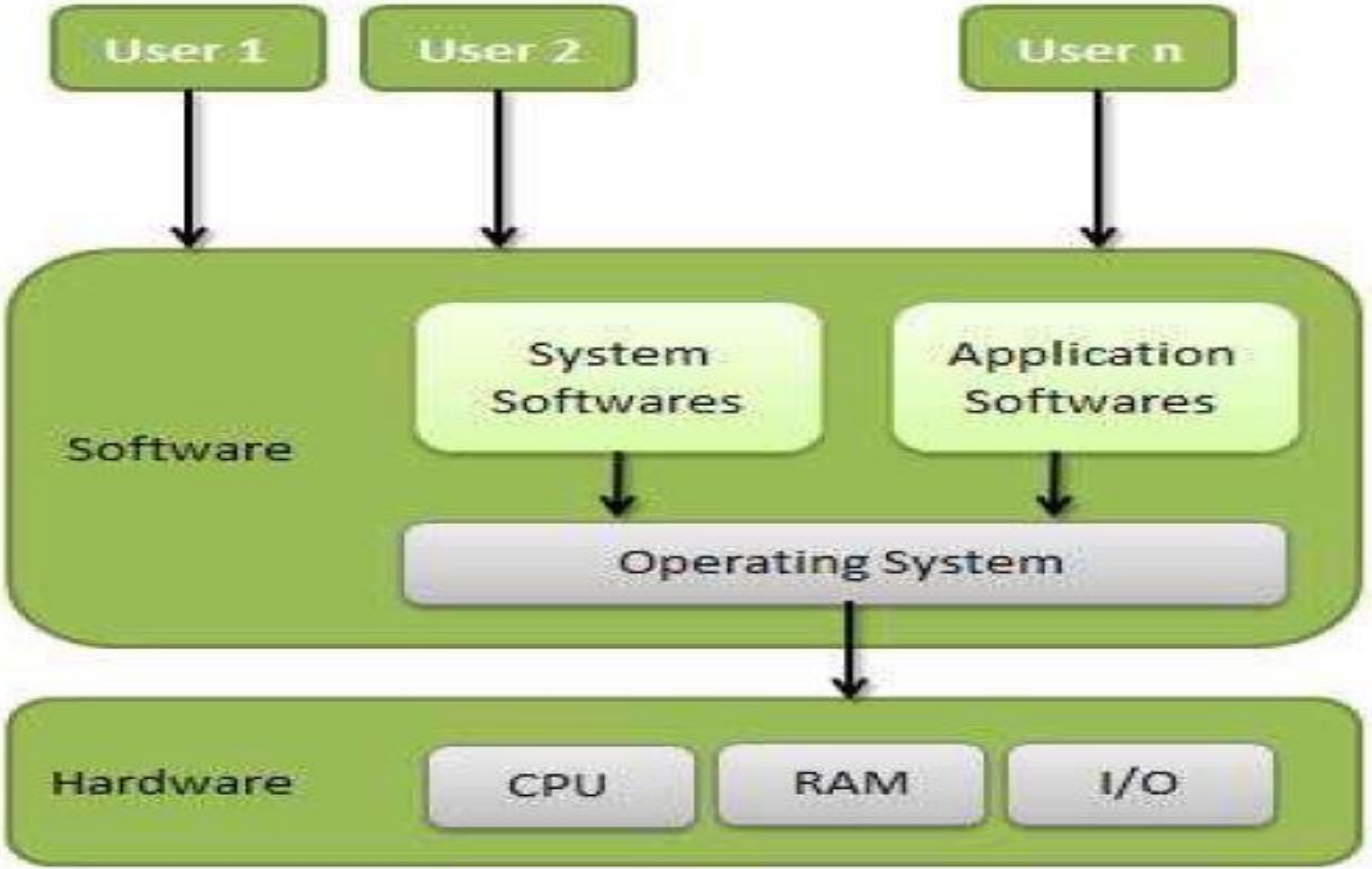
System management software

- System management software control the execution of programs, manage the storage and processing resource of the computer and perform management and monitoring function.
- They also enable the users to perform certain utility functions such as creating backup files, recovering damaged file and merging files. System management programs include:
- **Operating system (OS)**
- **Utility programs**
- **Device Drivers**

Operating System

- Operating system is the principal component of system software and is responsible for overall management of computer resources.
- OS act as an interface between the user and the computer hardware and controls the execution of all kinds of programs.
- It provides users an environment in which a user can execute programs conveniently and efficiently.

- The Operating System as a Resource Manager

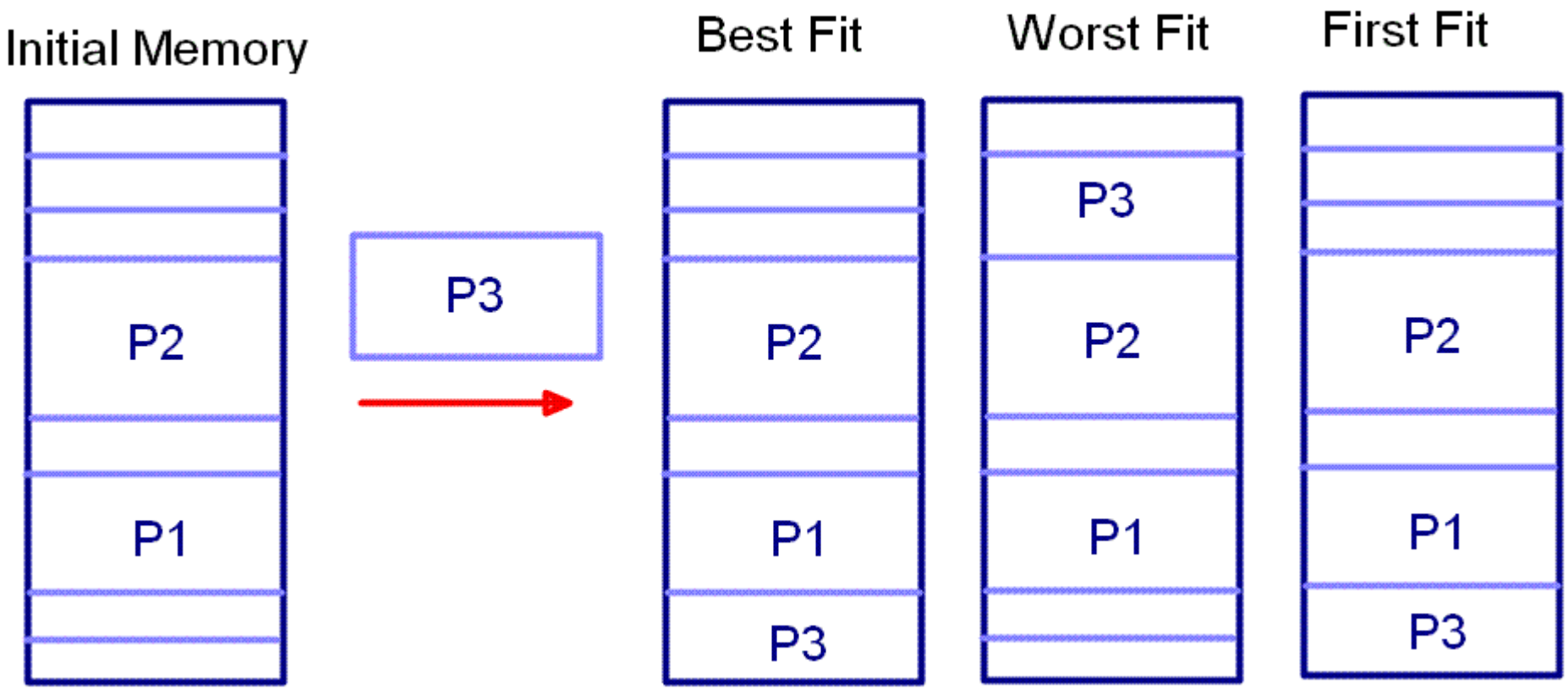

User 1
User 2
User n
Software
System Softwares
Application Softwares
Operating System
Hardware
CPU
RAM
I/O

Function of Operating System

- Memory management
- Processor management
- Device management
- File management
- Security management
- Control over the system performance
- Error Detecting

Memory Management

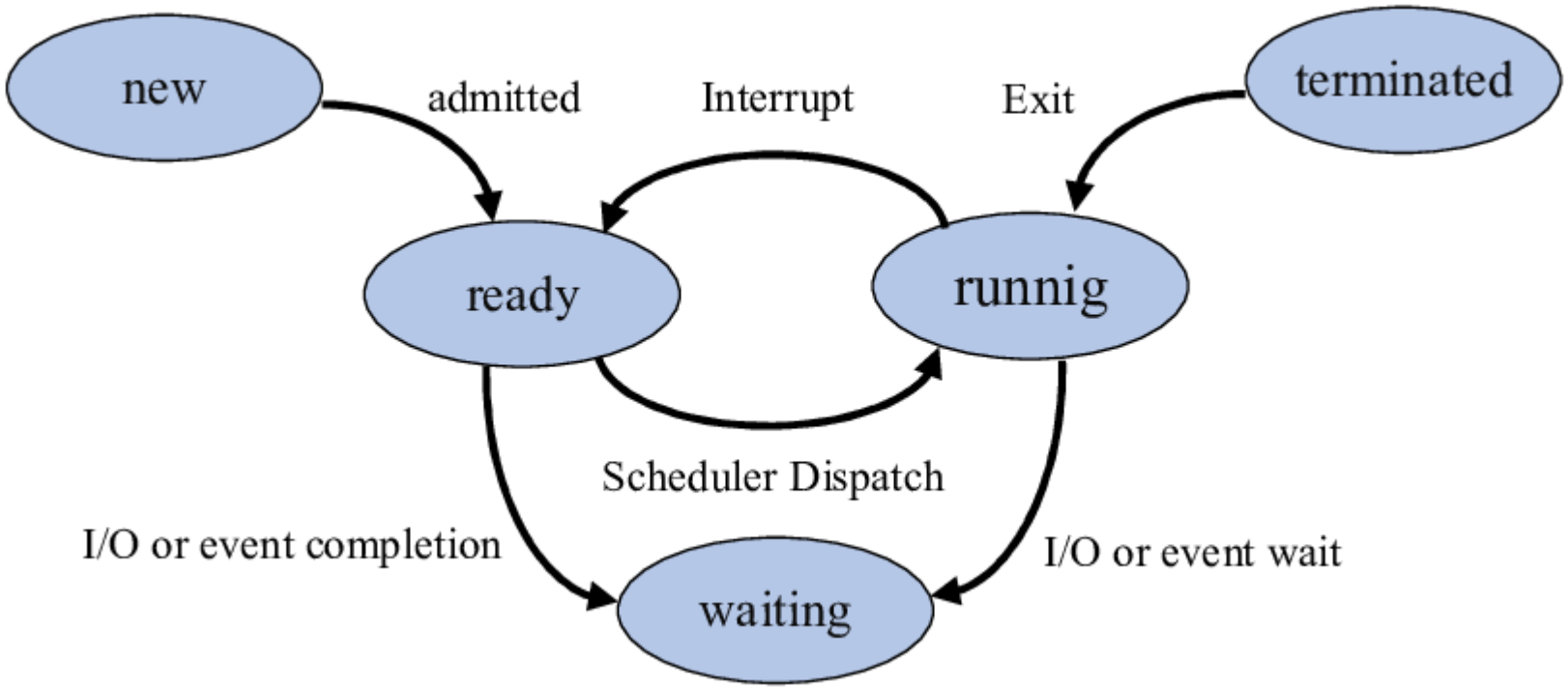
- Memory management refers to management of Primary Memory or Main Memory.
- Main memory provides a fast storage that can be access directly by the CPU. So for a program to be executed, it must in the main memory. Operating System does the following activities for memory management.
- **Keeps tracks of primary memory i.e. what part of it are in use by whom, what part are not in use.**
- **In multiprogramming, OS decides which process will get memory when and how much.**
- **Allocates the memory when the process requests it to do so.**
- **De-allocates the memory when the process no longer needs it or has been terminated.**


Initial Memory
P2
P1
P3
Best Fit
P2
P1
P3
Worst Fit
P3
P2
P1
First Fit
P2
P1
P3

Processor management

- In multiprogramming environment, OS decides which process gets the processor when and how much time. This function is called process scheduling. Operating System does the following activities for processor management.
- **Keeps tracks of processor and status of process. Program responsible for this task is known as traffic controller.**
- **Allocates the processor (CPU) to a process.**
- **De-allocates processor when processor is no longer required**

Process State



New

- New The process is being created.

Ready

- The process is waiting to be assigned to a processor. Ready processes are waiting to have the processor allocated to them by the operating system so that they can run.

Running

Process instructions are being executed (i.e. The process that is currently being executed)

Waiting

The process is waiting for some event to occur (such as the completion of an I/O operation).

Terminated

The process has finished execution.

Device management

- OS manages device communication via their respective drivers. Operating System does the following activities for device management.
- **Keeps tracks of all devices. Program responsible for this task is known as the I/O controller.**
- **Decides which process gets the device when and for how much time.**
- **Allocates the device in the efficient way.**
- **De-allocates devices.**

File Management

- A file is a collection of related information that is stored on secondary storage.
- File management includes the process of creating , modifying and deleting the file.
- A file system is normally organized into directories for easy navigation and usage. These directories may contain files and other directions. Operating System does the following activities for file management.
- **Keeps track of information, location, uses, status etc. The collective facilities are often known as file system.**
- **Decides who gets the resources.**
- **Allocates the resources.**
- **De-allocates the resources.**

- **File Attributes**

1. Name
2. File Type
3. Location
4. Size
5. Date and time

- **File Operation**

1. Creating
2. Saving
3. Opening
4. Modifying
5. Closing
6. Renaming
7. Deleting

File Access Permission

1. Read
2. Write
3. Delete
4. Modify
5. Execute

File System

1. File Allocation Table(FAT)
2. New Technology file System (NTFS)

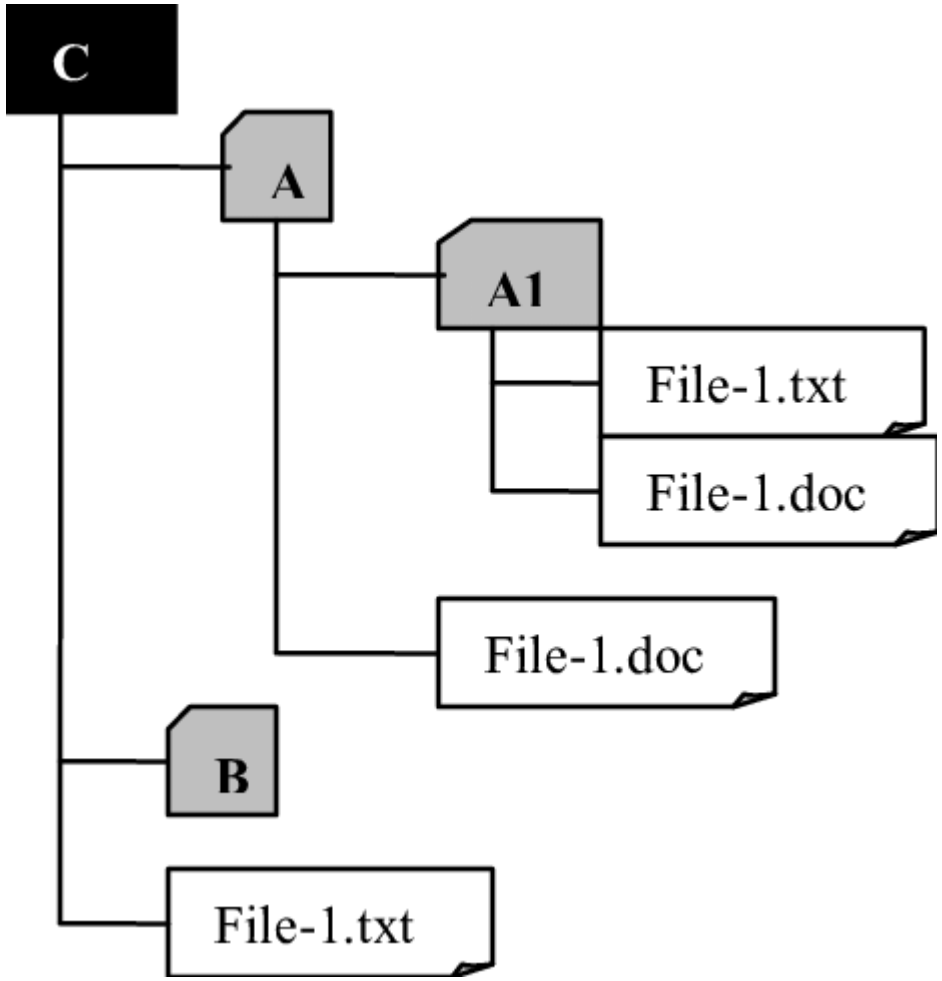
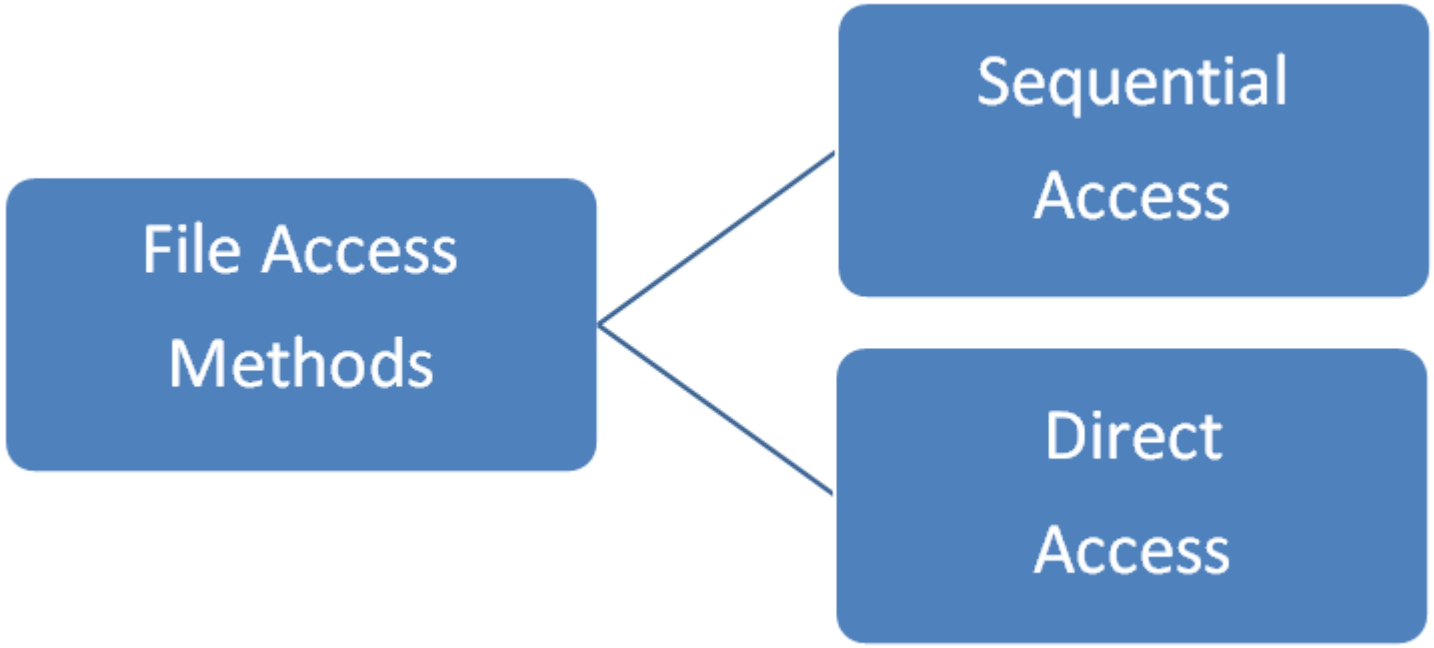


Fig 1 :Hierarchy of File Storage

Extension	Type of Document	Application
.doc or .docx	Word processing document	Microsoft Word
.xls or .xlsx	Workbook	Microsoft Excel
.ppt or .pptx	PowerPoint presentation	MS PowerPoint
.accdb	Database	Microsoft Access
.gif, .jpg, .png	Images	Windows Image Viewer
.mp4, .mp3	Videos, audio	Windows Media
.zip	Compressed file	WinZip
.pdf	Portable Document Format	Adobe Acrobat
.htm or .html	Web page	Hypertext Markup Language

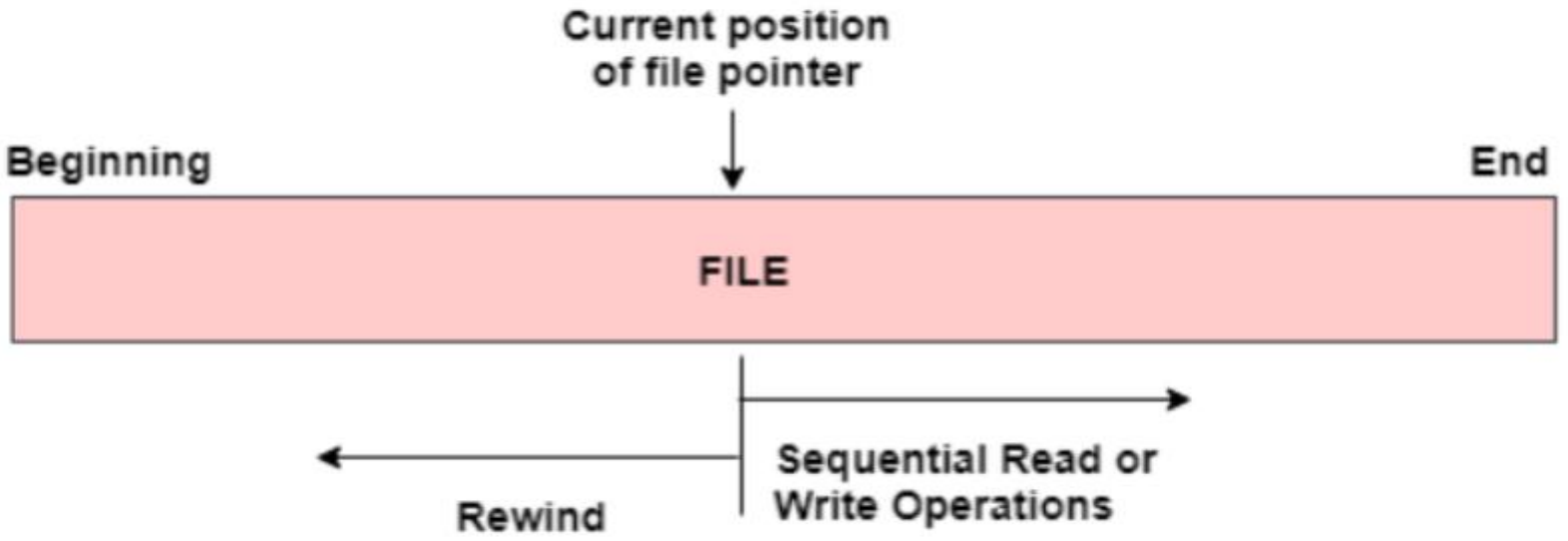
Fig 2 :File Extension Format

File Access Methods



➢Sequential Access

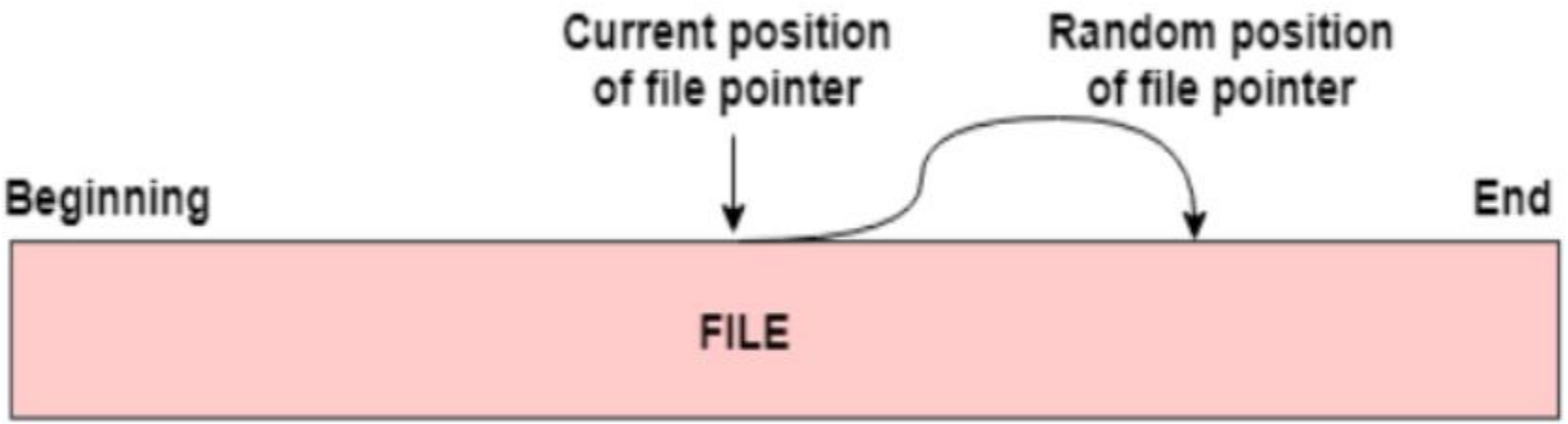
- The information in a file is processed in order using sequential access.
- The files records are accessed on after another.
- Most of the file systems such as editors, compilers etc. use sequential access. It is based on the tape model of a file.



SEQUENTIAL ACCESS IN FILES

➢Direct Access

- n direct access or relative access files can be accessed in random for read and write operations.
- The direct access model is based on the disk model of a file



DIRECT ACCESS IN FILES

➢ **Security**

- preventing unauthorized access to programs and data.
- operating system protects the resource of system form various threats such as virus attacks and unauthorized access. password and similar other technique are used to prevent data from authorized access

➢ **Control over system performance**

- Recording delays between request for a service and response from the system.

➢ **Error detecting aids**

- Production of dumps, traces, error messages and other debugging and error detecting aids.

➢ **Coordination between other software and users**

- Coordination and assignment of compilers, interpreters, assemblers and other software to the various users of the computer systems.

Utility Programs

- Utility program/service program are provide additional capabilities to the computer system in addition to the ones provided by the operating system.
- utility program programs are added to an operating system to perform many different tasks, which include:
- Search and replace
- Print
- Disk defragmenter
- System restore
- Virus scanner
- Backup
- Data recovery

Device Drivers

- A computer system is connected with multiple input and output devices, so that it can communicate with the end user.in order to interact with the I/O devices the computer system requires special software called device driver.
- The device driver act as a translator between the I/O devise and the computer.
- Sound card Driver, printers Driver, graphics card driver, USB driver

Application software:

- Software that can perform a specific task for the user. Word processors, spreadsheets, database management systems are examples of general purpose application software.
- **List of Application Software**

1. Word processing software
2. Database software
3. Spread sheet software
4. Presentation software
5. Multimedia software
6. Web browser

Word processing software:

The main purpose of this software is to produce documents. MS-Word, Word Pad, Notepad and some other text editors are some of the examples of word processing software.

Database software:

Database is a collection of related data. The purpose of this software is to organize and manage data.

The advantage of this software is that you can change the way data is stored and displayed. MS access, dBase, FoxPro, Paradox, and Oracle are some of the examples of database software.

Spread sheet software:

- The spread sheet software is used to maintain budget, financial statements, grade sheets, and sales records. The purpose of this software is organizing numbers.
- It also allows the users to perform simple or complex calculations on the numbers entered in rows and columns.
- MS-Excel is one of the example of spreadsheet software.

Presentation software:

This software is used to display the information in the form of slide show. The three main functions of presentation software is editing that allows insertion and formatting of text, including graphics in the text and executing the slide shows

- The best example for this type of application software is Microsoft PowerPoint.

Multimedia software:

- Media players and real players are the examples of multimedia software. This software will allow the user to create audio and videos. The different forms of multimedia software are audio converters, players, burners, video encoders and decoders

Web Browsers

Web browser is the software which is used to access the world wide web(www). The browser main job is to display web pages. A web browser provides many features that help to achieve easy access to the www and internet. Such as you can create bookmark for sites you like so that you can easily find them again later. Google chrome, Mozilla Firefox, Microsoft edge are common example of browsers.

Difference Between System and Application Software

Bases of Difference	System Software	Application Software
Use	System software used for operating computer hardware.	Application software is used by user to perform specific task
Installation	Computer can't run without system software so that it pre-installed on system.	Application software are installed according to user requirements
Interaction with users	In General , the user does not interact with system software because it works in the background	The user directly interacts with application software
Dependency	System software can run independently . It provides platform for running application software.	Application software can’t run independently .
Examples	Operating system, Device Drivers	Word Processor , web browser, media player

Difference Between CUI and GUI

CUI	GUI
Character /command user Interface	Graphical User Interface
The user interacts with the computer using commands like text.	The user interacts with the system using Graphics like icons, images.
CUI is less user friendly , commands need to be memorized	More user friendly , visual icons are easy to understand.
Less memory required	More memory required as visual components are involved.
Only Keyboard used.	Both keyboard and Mouse Used
Only one task can run at a time	Multiple task can run at a time
MS-DOS is an example of CUI.	Windows is an example of GUI

End !!!