

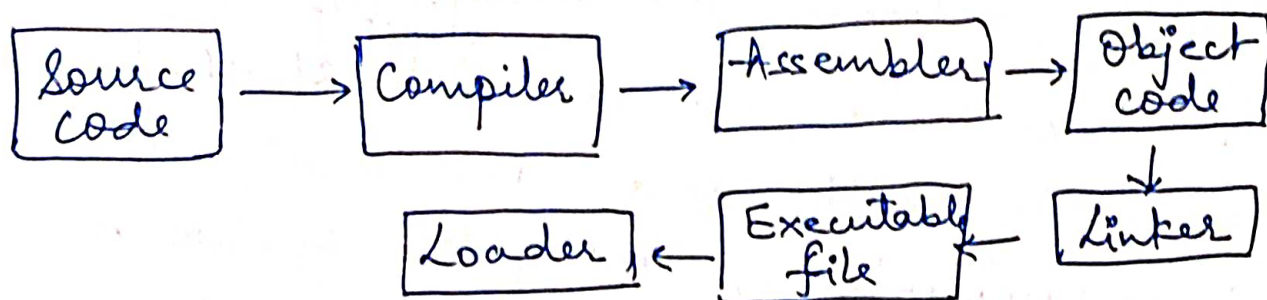
## Linker

Linker is a program in a system which helps to link object modules of a program into single object file.

It performs the process of linking. Linkers are also called as link editors.

Linking is the process of collecting and maintaining piece of code and data into a single file.

Linking is performed at both compile time, when the source code is translated into machine code and load time. When the program is loaded into memory by loader. Linking is performed at the last step in compiling a program.



Linker is of two types —

- (1) Static Linking
- (2) Dynamic Linking

(1) Static Linking — It is performed by at the time of compilation of source program. Linking is performed before execution in static linking. It takes collection of relocatable object files and command-line arguments and generates a fully linked object file that can be loaded and run. It performs two major tasks:

① Symbol resolution : It associates each symbol reference with exactly one symbol definition. Every symbol has a predefined task.

② Resolution : It relocates code and data section and modifies the symbol references to the relocated memory locations.

The linker copies all library routines ~~are~~ used in the program into executable images. As a result, it requires more memory space. As it does not require the presence of library on the system when it is run, so it is faster and more portable. No failure chance and less error chance.

② Dynamic linking : It is performed during the runtime. This linking is accomplished by placing the name of sharable library in the executable image. There are more chance of errors and failures. It require less ~~more~~ memory space as multiple program can share single copy of library. if same object are using, a number of times in the program, instead of linking the same object again and again into library, each module shares the information of the object with other modules having the same object.



## Difference between Linker and Loader

Linker	Loader
<ul style="list-style-type: none"><li>① The main function is to generate executable files.</li><li>② It takes input of object code generated by compiler or assembler.</li><li>③ A process of combining various pieces of codes and code source code to obtain executable code.</li><li>④ With the help of Linker, All the object modules is to be combined.</li><li>⑤ It is also responsible for arranging objects in program's address space.</li></ul>	<ul style="list-style-type: none"><li>① It is used to load executable files to main memory.</li><li>② It takes input of executable files generated by linker.</li><li>③ A process of loading executable codes to main memory for further memory.</li><li>④ It helps in allocating the address to executable code or files.</li><li>⑤ It is also responsible for adjusting references which are used within the program.</li></ul>

## Editors

Editors or text editors are software programs that enable the user to create and edit text files.

In the field of programming, there are editors that include many special features for writing and editing code. Notepad, Wordpad are some of the common editors used on Windows OS and vi, emacs, Ted, pico are the editors on UNIX OS.

Features normally associated with text editors —

- moving the cursor

- deleting

- Replacing

- Pasting

- Finding

- Finding & Replacing

- Saving.

## Type of editors

There are generally five types of editors, are —

- ① Line editor

- ② Stream editor

- ③ Screen editor

- ④ Word Processor

- ⑤ Structure Editor

### ① Line editor

- In this editor, we can only edit one line at a time or an integral number of lines.
- Cannot have a free-flowing sequence of characters.
- It will take care of only one line. eg:- Teleprinter

### ② Stream editor

- In this type of editors, the file is treated as continuous flow or sequence of characters instead of line numbers, which means type paragraphs eg:- sed editor in UNIX.

### ③ Screen editors

- In this type of editors, the user is able to see the cursor on the screen and can make a copy, cut, paste operation easily. It is very easy to use mouse pointer.  
eg:- vi, emacs, Notepad

### ④ Word Processor

Overcoming the limitations of screen editors, it allows one to use some format to insert images, files, videos, use font, size, style features. It majorly focuses on Natural languages.



## ⑤ Structure Editor

- It focus on programming languages.
- It provides features to write and edit source code.  
eg:- Netbeans IDE, gedit.

## Other Editors

### ⑥ Full Screen Editor

- It is a text editor that occupies full display on with the purpose of sidelining the user from OS and other applications.
- It helps the user to focus on writing only & do not get distracted by other applications and cluttered applications interface.
- It has dark background and a text editor with light coloured text.
- They include customizable interfaces & features like word count.  
eg:- Acme, Coderoom, FocusWriter

### ⑦ Multiple Window Editor

- It allows to work on more than one file at a time and cut & paste text from file into another.
- Two concepts that lie behind multiwindow editors — buffer and windows.

Buffer - It holds the text to be edited. The text may come from one file or a brand new text that want to write on a file. A file only has one buffer associated with it.

Window - Window provides a view to the buffer to see what the buffer holds and edit & modify it. A buffer may have multiple windows.

- Any changes made in any of the windows will be reflected in all other windows associated with same buffer.

- Once the last window associated with a buffer is closed, the file gets hidden. But when any changes done to the buffer & not have written them into disk, it may not allow to close the window.

## ⑧ DOS - Editor

- MS-DOS editor is a character based text editor that comes with MS-DOS and a 32-bit version of windows.

- Previously, it was QBASIC running in editor mode but after DOS-7, it become a standalone program.

- It is also used as substitute for Notepad

- DOS editor can work only on small files, DOS editor can work on around 66,257 lines and upto ~~256~~ 5 MB disk space.



- It has features like a customizable colour theme, it can open upto 9 files at a time, it can open files in binary mode.

### ⑨ Vi-Editor

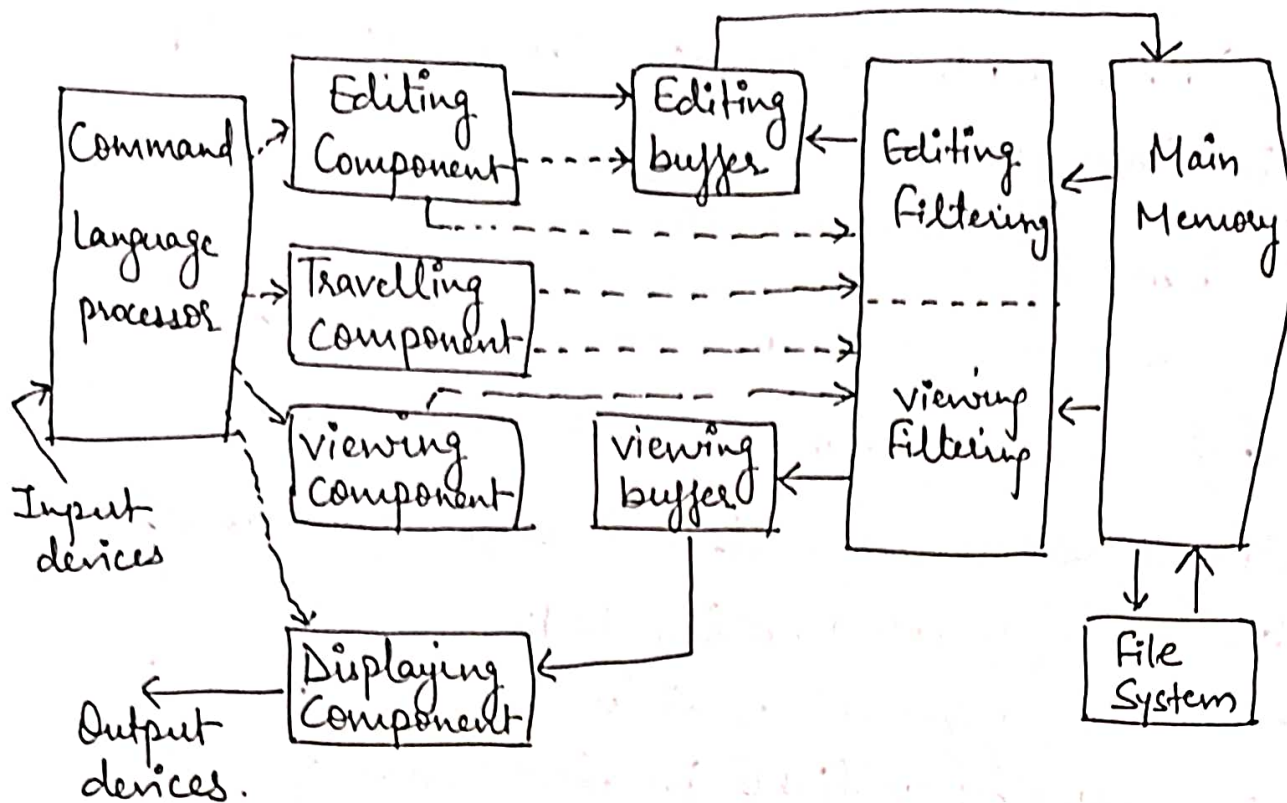
- Vi-Editor is short name for Visual Editor .T
- It is screen editor which is available in UNIX OS.
- It has no menus instead it uses a combination of keystrokes to accomplish tasks.
- An improved version of vi is vim (vi improved).
- It is usually available in all versions of UNIX OS, its implementation is very easy, it requires only a few resources and it is more user-friendly.

### ⑩ Online Editors

- It is an interface for ~~editors~~ editing the texts within a web browser.
  - It aims to reduce the efforts made by the user by directly editing and updating into a valid HTML markup language.
  - Internet Explorer added just the feature of "design mode".
  - The design mode allows the user to edit their document and it also allows the use of cursor to do the editing.
- eg:- CKEditor, SnapEditor.



## Editor Structure



### Command Language Processor

- Accepts command.
- uses ~~Subroutine~~ semantic routines
- performs functions such as editing & viewing

The semantic routines involve travelling, editing, viewing and display functions.

Editing operations are specified explicitly by the user and display operations are specified implicitly by the editor.

Editing component is a collection of modules dealing with editing tasks.

Editing component invokes the editing filter - generates a new editing buffer - contains part of the document to be edited from current editing pointer.

Filtering and editing may be interleaved with no explicit editor buffer being created.

viewing component is a collection of modules responsible for determining the next view.

viewing component invokes the viewing filter -

- generates a viewing buffer
- contains part of the document to be viewed from current viewing pointer.

viewing buffer is then passed to the display component of the editor, which produces a display by mapping the buffer to a rectangular subset of the screen called a window.