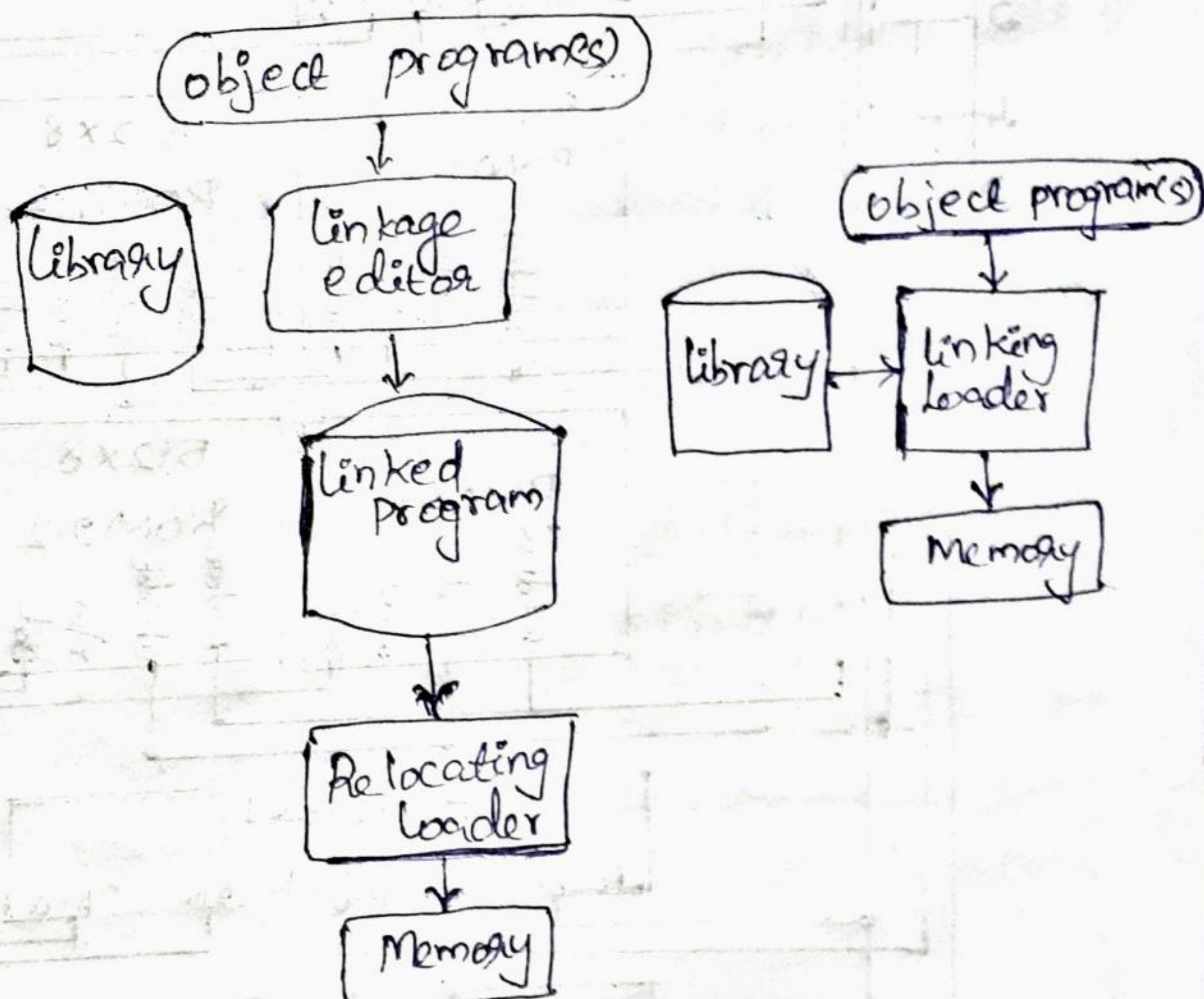


Digital Assignment-3

→ Compare the process of Linking loader and linkage editor?

⇒ Linking loader and linkage editor both loads the program into memory for execution.



Linking Loader

- * A linking loader makes two passes
- * In pass 1 Assigns addresses to all external symbols by creating ESTAB.

* In pass 2 performs the actual loading, relocation, and linking using ESTAB.

* The main data structure is ESTAB (hashing table).

* Many linking loaders can automatically incorporate routines from a sub-program's library into the program being loaded.

* Two variables PROGADDR and CSADDR

* PROGADDR is the beginning address in memory where the linked program is to be loaded.

* CSADDR contains the starting address assigned to the control section currently being scanned by the loader.

* The standard library system.

* The subroutines called by the program being loaded are automatically fetched from the library, linked with main program and loader.

Linkage editor

* A linkage editor produces a linked version of the program (load module or executable image) which is written to a file or library for later execution.

* When the user is ready to run the linked program a simple relocating loader can be used to load the program into memory.

* The only Object Code modification necessary is the addition of an actual load address to relative values within the program.

* The LE performs relocation of all the Control section relatives to the start of the linked program.

* If a program is to be executed many times without being reassembled the use of a LE substantially reduces the overhead required.

2) Bitmask and its uses:-

* Group of reallocation bits gathered together is known as bit mask.

* In SIC, reallocation is done when the program is a relocatable program.

* That is, when the mention address is occupied by some other process, loader loads the program in free location.

* If the bit = 1, the program needs to be relocated.

* Thus the bitmask tells the loader whether the program code needs to be relocated.

* Example

HA copy, 000000 and 00107A

TABLE 1000 000 IE (FF) 14033 1

Bit mask

111 1 111 1100

Q) linking Concept with example:

* Linking is the process of bringing external programs together required by the one all write for the successful execution. Linking can be done at both time while compile and load time and even at run-time, by application program called linker or link editor.

- * Dynamic linking postpones the linking function while execution time.

* A subroutine is loaded and linked to the host, when the program loaded first.

* Dynamic linking is often used to allow several cutting program to share one copy of subroutine or library.

- * Run time library and dynamic linking library.

* A single copy of the routine in this library could be loaded into the memory of the computer.

* Dynamically linked programs are dependent on having a compatible library. If a library is changed application might have to be reworked to be made compatible with the new version of the library.

* If a library is removed from the system, programs using the library will be no longer available.

* Dynamic linking provides the ability to load the routines only when they are needed.

Example:-

* If a program contains subroutine that corrects the error or clearly diagnose the error in the input data during execution.

* If such errors are rare, the correction and the diagnostic routines may not be used at all during most execution of the program.

* However, if the program were completely linked before execution, these subroutine needs to be loaded and linked everytime.