**NITTE MEENAKSHI INSTITUTE OF TECHNOLOGY**

(AN AUTONOMOUS INSTITUTION, AFFILIATED TO VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELGAUM, APPROVED BY AICTE & GOVT.OF KARNATAKA)



**COMPILER DESIGN LA REPORT**

On

# LINKERS AND LOADERS

*Submitted in partial fulfilment of the requirement for the award of Degree of*

*Bachelor of Engineering*

*in*

## Computer Science and Engineering

*Submitted by:*

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Department of Computer Science and Engineering



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**CERTIFICATE**

This is to certify that the Report is an authentic work carried out by **V VENKATA SREE HARSHA(1NT18CS181), N SAICHARAN REDDY**(**1NT18CS104**) and **POORNAVIKAS A S** (**1NT18CS113**) Bonafedestudents of **Nitte Meenakshi Institute of Technology**, Bangalore in partial fulfilment for the award of the degree of ***Bachelor of Engineering*** in COMPUTER SCIENCE AND ENGINEERING of Visvesvaraya Technological University, Belagavi during the academic year ***2021-2022.*** It is certified that all corrections and suggestions indicated during the internal assessment has been incorporated in the report.

Internal Guide Signature of HOD

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We hereby declare that

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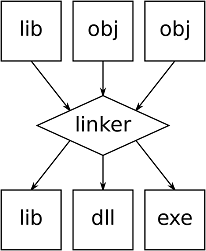
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**LINKERS AND LOADERS**

### 

**LINKERS:**

* Linker is a program in a system which helps to link a object modules of program into a single object file.
* It takes object modules from assembler as input and forms an executable file as output for loader.
* The main function of Linker is to generate executable files
* It takes one or multiple object files, which are generated by compiler. And, then combines these files into an executable file.



Source code -> compiler -> Assembler -> Object code -> Linker -> Executable file -> Loader

**TYPES OF LINKERS**

* **Static Linker:**
* Static linking is a kind of linking that is performed during the compilation of a source program.
* Linker produces a result at the time of copying all library routines into the executable image, which is known as static linking.
* The static linker will copy all library routines used in the program into executable image. As a result, it require more memory space.

Two major tasks are performed by the static linker:

* Symbol resolution
* Relocation
* **Dynamic Linker:**

* Dynamic linking, which is performed at the run time, and it performs a final linking. This linking fix the address at run time; also, it allows the users to reposition the code in order to smooth running of code.
* This linking is accomplished by placing the name of a shareable library in the executable image
* In dynamic linking, the often-used libraries do not need to store in every single executable file; they only need to store in only one location that helps to save memory and disk space.
* It require less memory space as multiple program can share a single copy of the library.

**LOADER:**

* Loader is a part of operating system and is responsible for loading executable files into memory and execute them.
* It calculates the size of a program (instructions and data) and creates memory space for it.
* It initializes various registers to initiate execution.
* It is in charge of loading programs and libraries in operating system.

These are loading schemes:

1. Absolute Loaders

2. Relocating Loaders

3. Direct Linking Loaders

4. Bootstrap Loaders

1.Absolute Loader:

The operation of absolute loader is very simple. The object code is loaded to specified locations in the memory. At the end the loader jumps to the specified address to begin execution of the loaded program.

2.Relocating Loader:

To avoid possible reassembling of all subroutines, when a single subroutine is changed and to performed the task of allocation and linking of the programmer.

3.Direct Linking Loader:

Direct linking loader is a general relocatable loader and perhaps the most popular loading scan presently used.

4.Bootstrap Loader:

When a computer is first turned on or restarted, a special type of absolute loader, called bootstrap loader is executed. This bootstrap loads the first program to be run by the computer -- usually an operating system.

### DIFFERENCES BETWEEN LINKERS AND LOADERS

|  |  |
| --- | --- |
| LINKERS | LOADERS |
| * The main function of Linker is to generate executable files. | * Whereas main objective of Loader is to load executable files to main memory. |
| * The linker takes input of object code generated by compiler/assembler. | * And the loader takes input of executable files generated by linker. |
| * Linking can be defined as process of combining various pieces of codes and source code to obtain executable code. | * Loading can be defined as process of loading executable codes to main memory for further execution. |

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