Operating Systems & Systems Programming
Module 11
System Programming

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Overview

Introduction

- System Programming can be defined as the act of building Systems Software using System Programming Languages.
- According to Computer Hierarchy, one which comes at last is Hardware. Then it is Operating System, System Programs, and finally Application Programs.
- Program Development and Execution can be done conveniently in System Programs.
- Some of the System Programs are simply user interfaces, others are complex. It traditionally lies between the user interface and system calls.

System Program

These are programs which are required for the effective execution of general user programs on computer system.

System Programming

It is an art of programming and implementing system programs.

Components of System Programming

- Interpreter
- Assembler
- Compiler
- Macros and Microprocessors
- Formal Systems
- Debugger
- Linkers
- Operating System

Need of System Software

The basic need of system software is to achieve the following sets:

- To achieve efficient performance of the system
- To make effective execution of general user program
- To make effective utilization of human resources
- To make available new, better facilities

Operating System

- It is the collection of system programs which acts as an interface between user and the computer and computer hardware.
- The purpose of an operating system is to provide an environment in which a user can execute programs in a convenient manner.

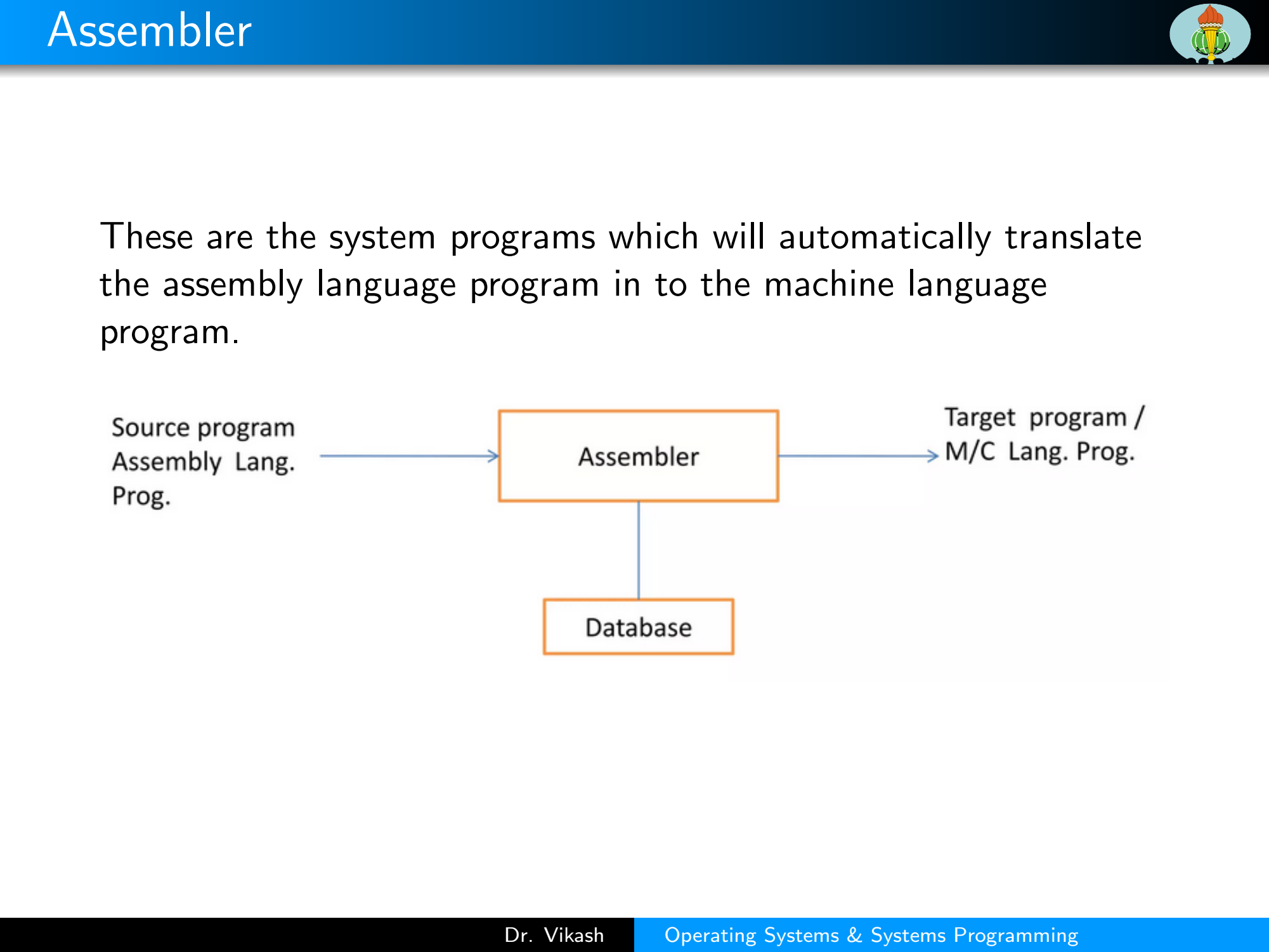
Functions of Operating System

- File handling and management
- Storage management
- Device scheduling and management
- CPU scheduling
- Information management
- Process control
- Error handling
- Protecting itself from user & protecting user from other users

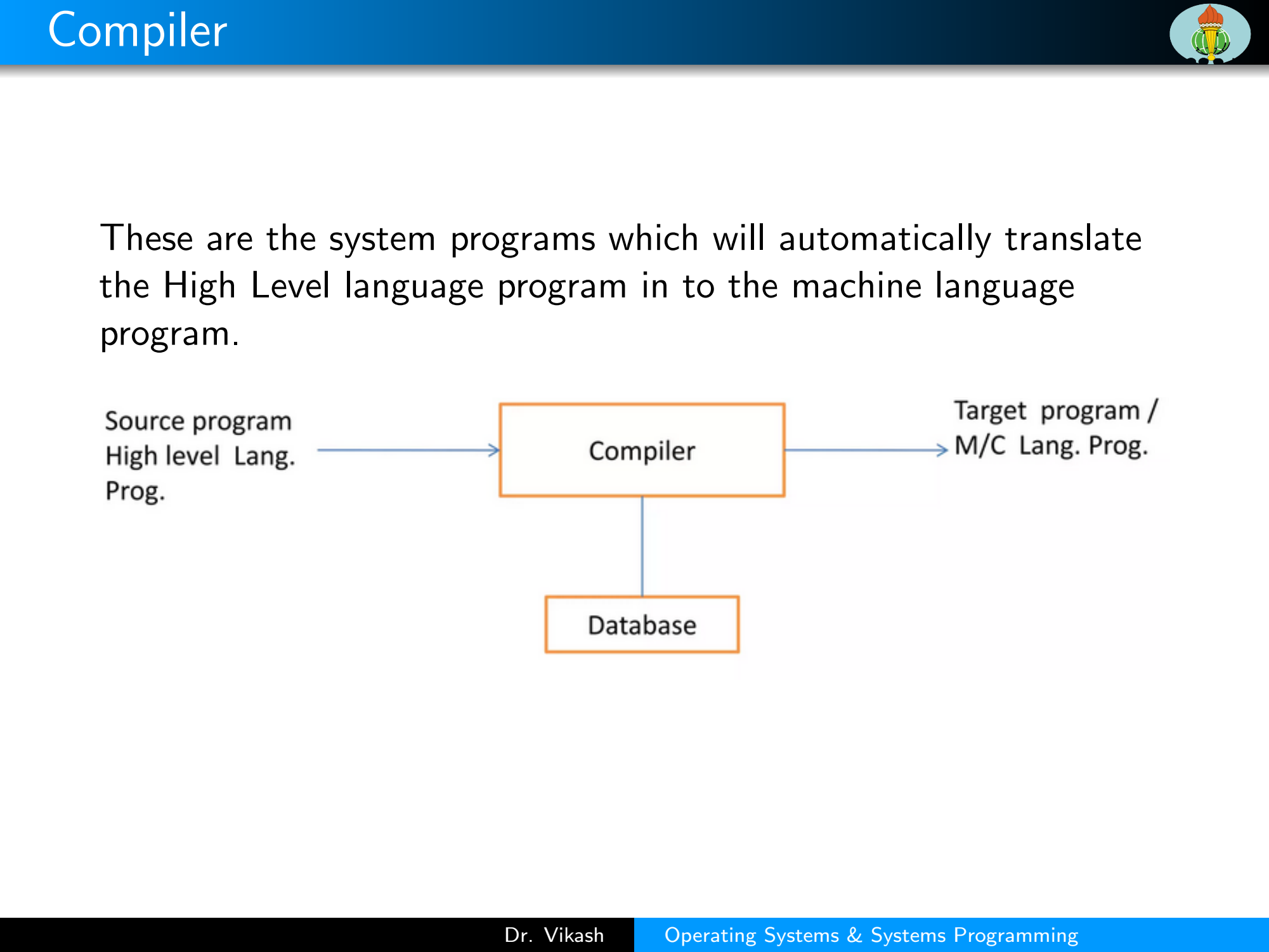
Translators

- These are the system programs that converts the source program into computer understandable fashion.
- Types of translators
  - Single Pass Translator
  - Multi Pass Translator

Assembler



These are the system programs which will automatically translate the assembly language program in to the machine language program.



These are the system programs which will automatically translate the High Level language program in to the machine language program.

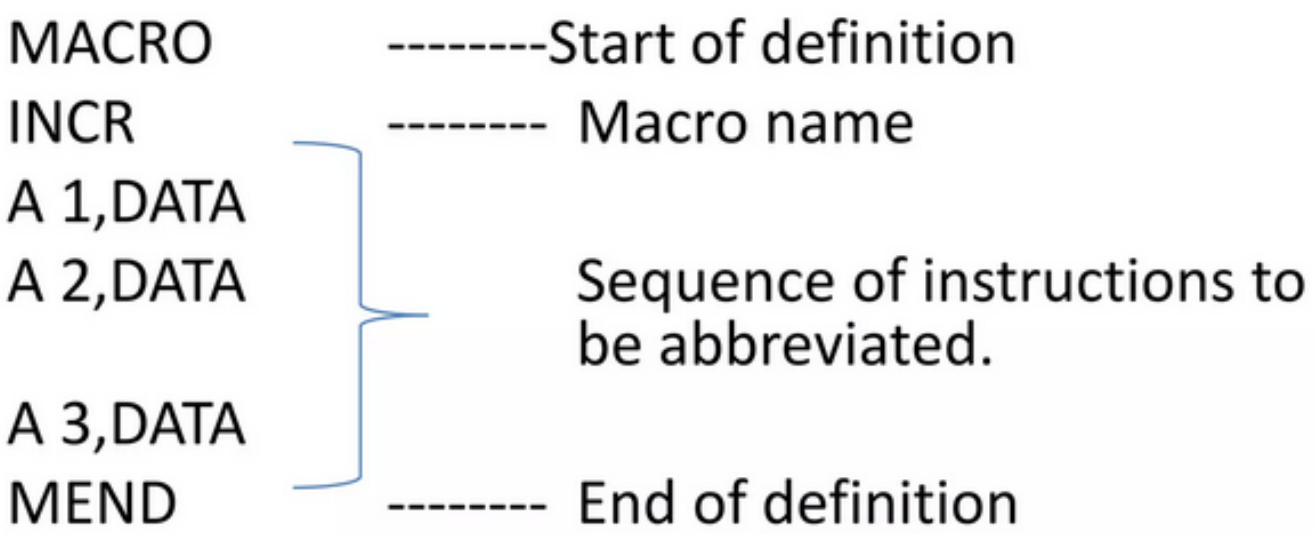
Interpreter

- It is the language translator which execute source program line by line without translating them into machine language.
- Pure Interpreter:-
  - In this case no preprocessing is required on source program before an interpretation starts.
  - Some preprocessing is required on source program before an interpretation starts.

Loader

- A loader is system program that place the object program into main memory and prepares it for execution.
- Basic function of loader
  - Allocation
  - Linking
  - Relocation
  - Loading
- Types of Loader
  - Compile-and-go Loader
  - Relocating Loader
  - Direct Linking Loader
  - Absolute Loader
  - General Loader
  - Dynamic Loader

Macro is a single line abbreviation for a group of instruction.



Formal System

- A formal system is an un interpreted calculus. it consists of
  - Alphabets
  - A set of words called Axioms
  - Finite set of relations called rules of inference or production rules
  - Example: Boolean algebra

Thank You!!!