Compiler Construction

(Week 1, Lecture 1)

Google Classroom Code: mnym4an

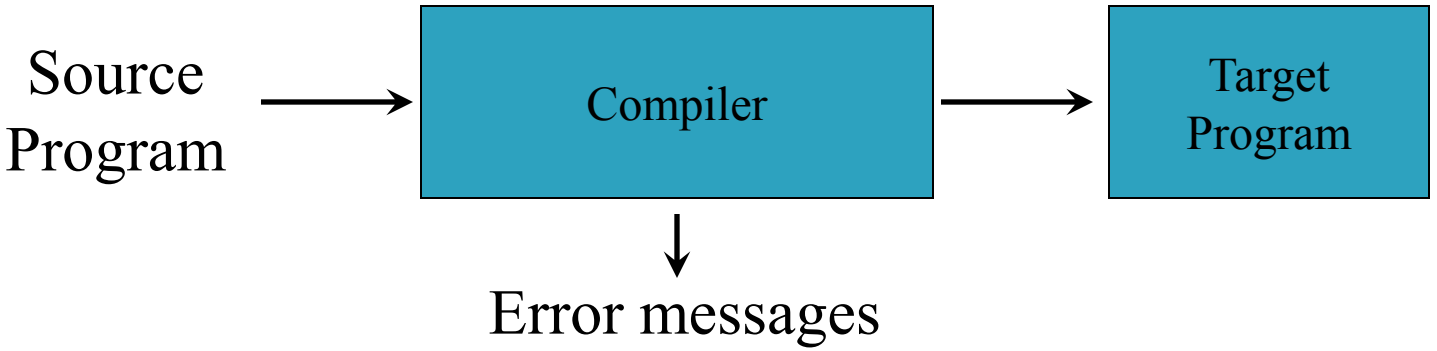
Course Outline

Marks Distribution

	Frequency	Marks	Total
Quizzes	3	5	15
Assignments	3	5	15
Mid-Term	1	25	25
Mid-Term Viva	1	5	5
Final Exam	1	30	30
Final Viva	1	10	10

Compilers and Interpreters

- Compilation
  - Translation of a program written in a source language into a semantically equivalent program written in a target language.

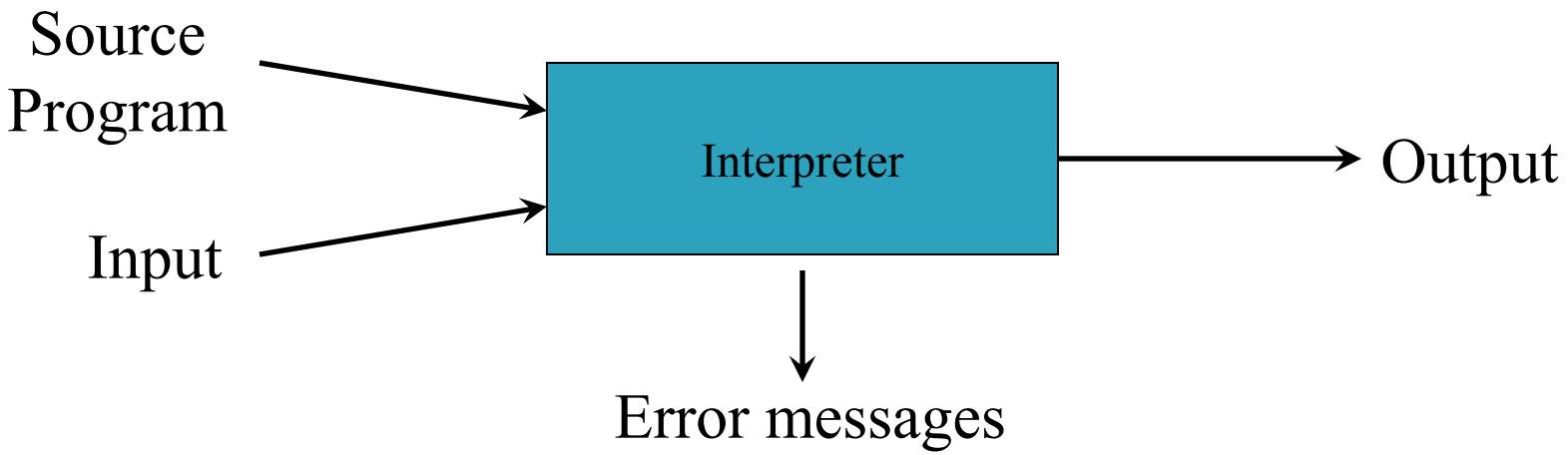


Compilers and Interpreters

- Running the Target Program
  - If the target program is an executable machine-language program, it can then be called by the user to process inputs and produce outputs.

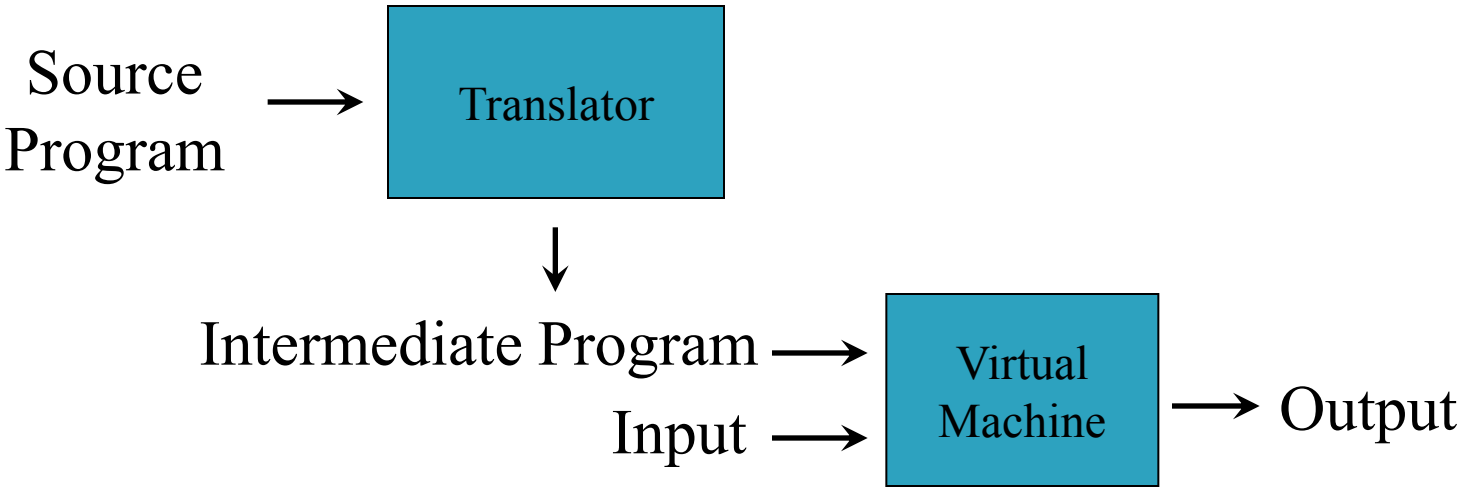
Compilers and Interpreters

- Interpretation
  - Performing the operations implied by the source program.



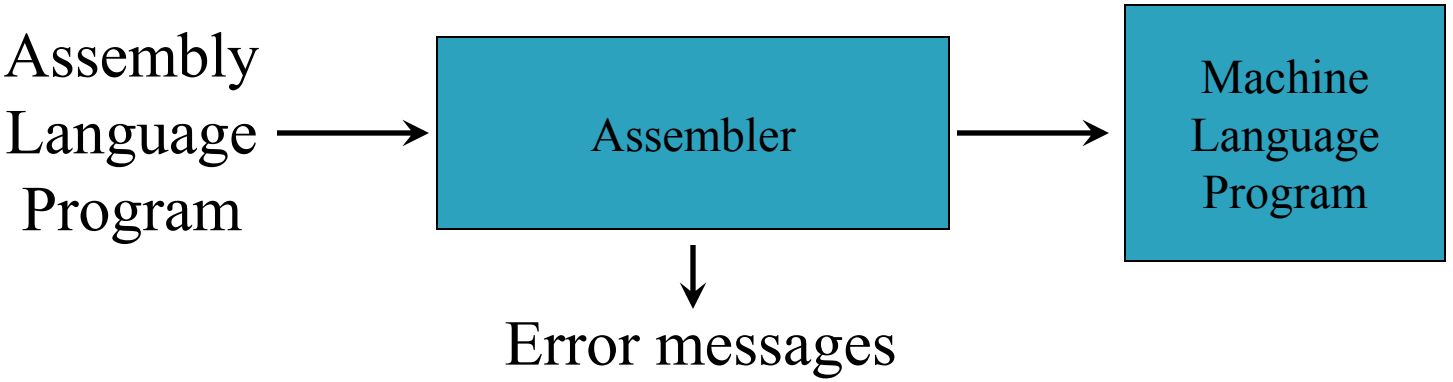
Compilers and Interpreters

- Hybrid Compiler
  - Performing the operations implied by the source program.

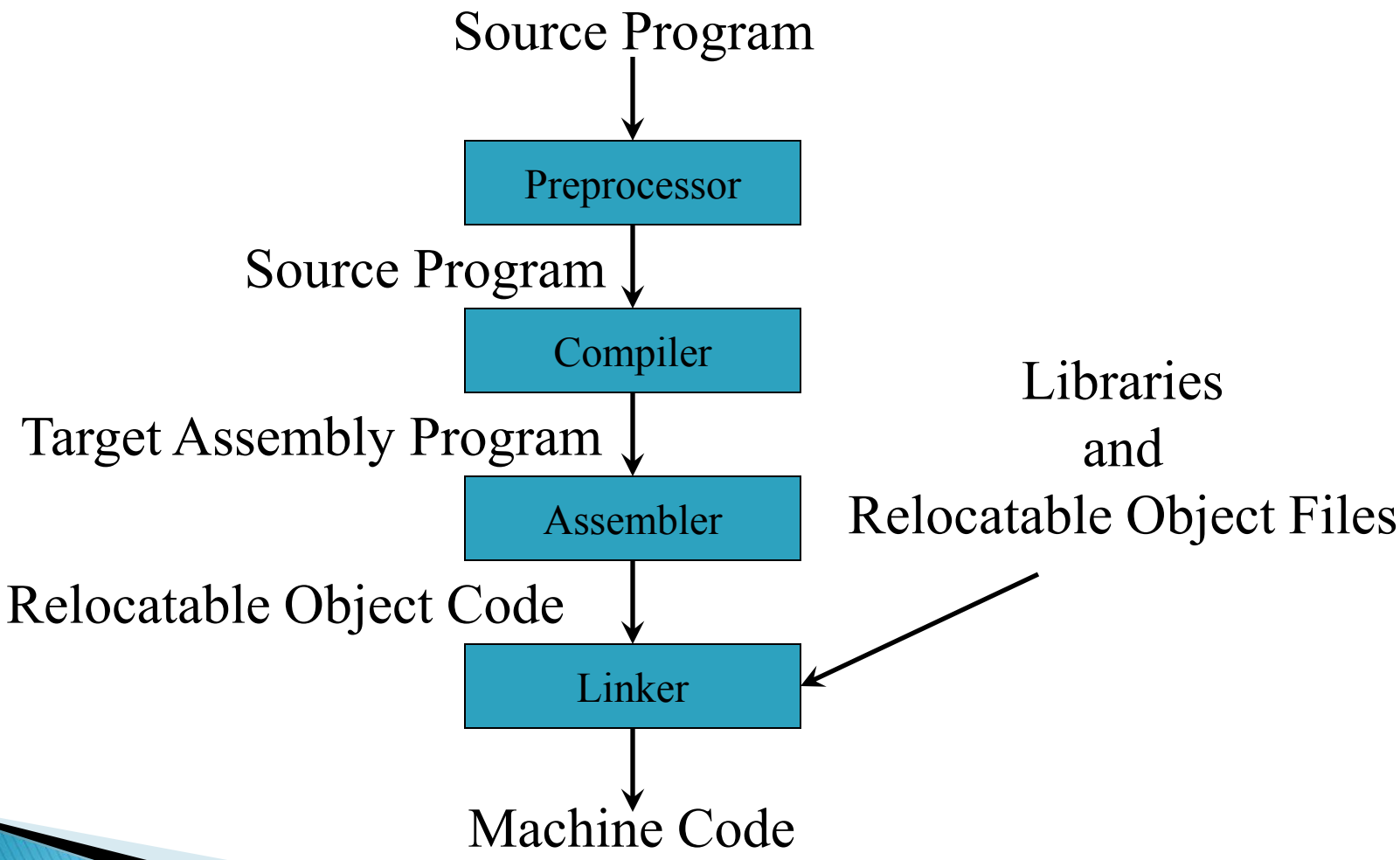


Compilers and Interpreters

- Assembler
  - Conversion of assembly language into machine code.



Language Processing System



Language Processing System

- Preprocessor can
  - Delete comments
  - Include other files, e.g.

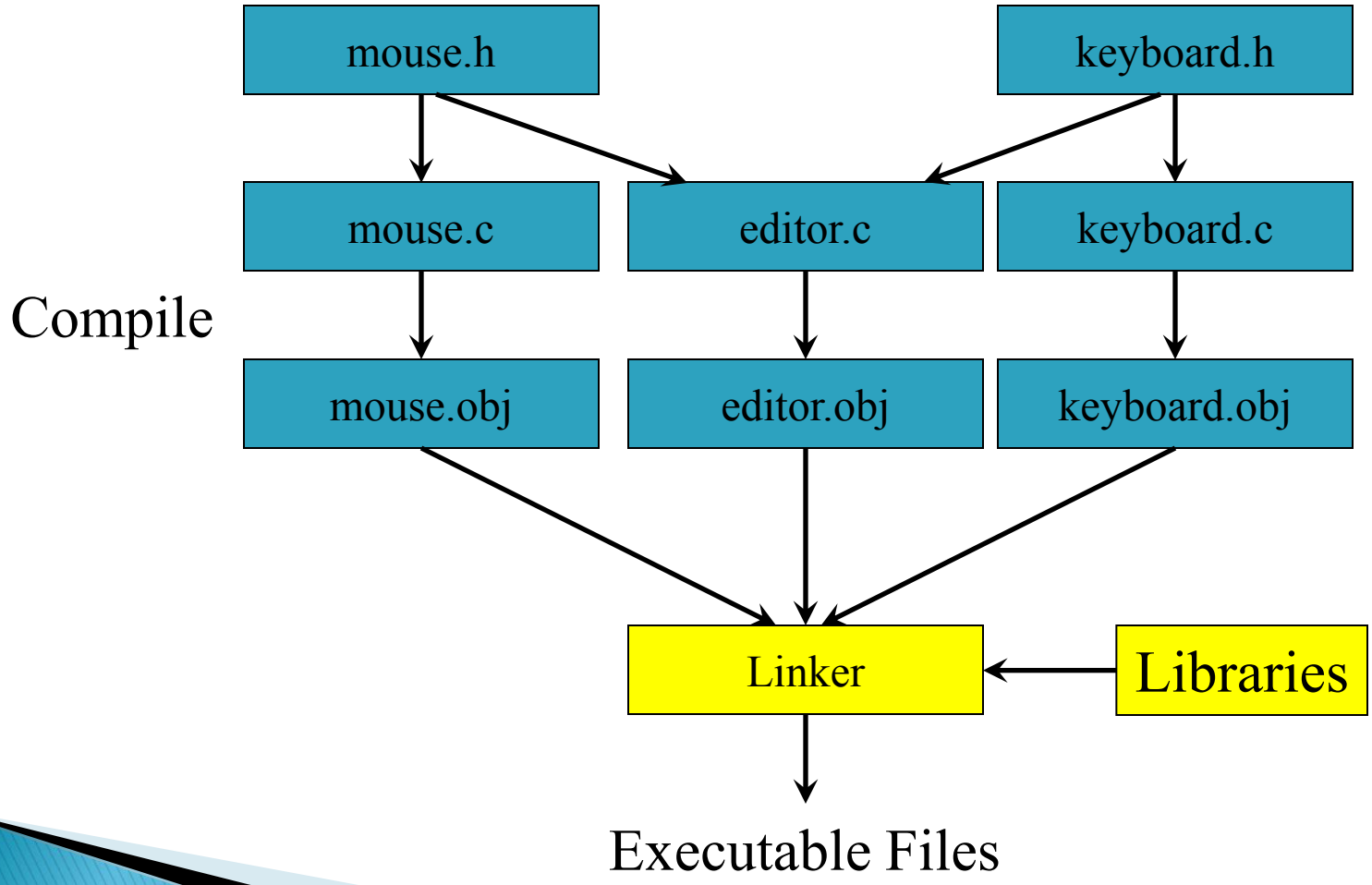
    #include <stdio.h>
  - Perform macro substitutions, e.g.

    #define SUM(x, y) (x + y)
- Assembler
  - Translator for Assembly Language

Language Processing System

- Linker
  - Collects code separately compiled or assembled in different object files.
  - Connects object program(s) to the code for standard library functions.

Language Processing System



Relocation

Sample Program	After Compilation

a db 3
b db 5
c db 0
mov AX, a
mov BX, b
add AX, BX
mov c, AX
	0000 a db 3
	0001 b db 5
	0002 c db 0
	0003 mov AX, [0000]
	0005 mov BX, [0001]
	0007 add AX, BX
	0009 mov [0002], AX
	
	- Assuming each instruction is of 2B
	- Addresses are relocatable

Relocation

After Compilation	Loaded at 5000
0000 a db 3 0001 b db 5 0002 c db 0 0003 mov AX, [0000] 0005 mov BX, [0001] 0007 add AX, BX 0009 mov [0002], AX – Assuming each instruction is of 2B – Addresses are relocatable	5000 a db 3 5001 b db 5 5002 c db 0 5003 mov AX, [5000] 5005 mov BX, [5001] 5007 add AX, BX 5009 mov [5002], AX – Addresses are physical