

GATE +
Computer Science & IT

Data structure

C Programming

Language Processor

Lecture No. 01



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Topics to be Covered



2001
2009



Teaching - 15 years
HCL - 2 years

<https://t.me/Abhisheksharmapw>

Topic

Machine / Computer and ISA

Topic

Program

Topic

Language Processors

Topic

Compilers of C Language

Topic

Our first C Program



Telegram
link

Best gate score

481

Rank

Jadavpur kolkata

programming & Data Structure (PDS)

Weightage

"programming in C: (Data structure)

Dry Run

6 Question [Avg]

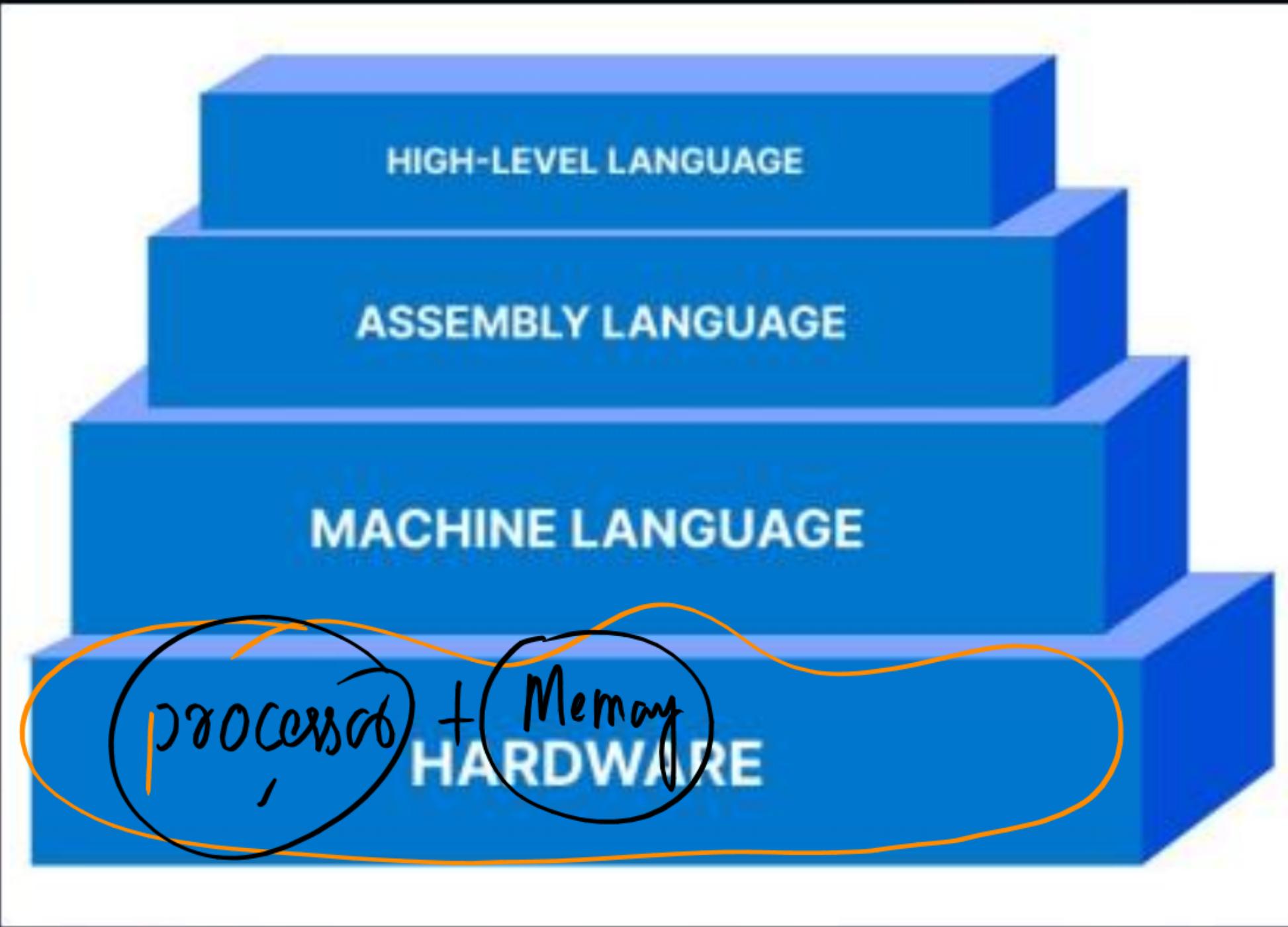
Marks : 9-10 marks

3 Question
programming

3 Question
Data structure



Topic : Computer



Computer

Hardware

- * Hard disk
- * RAM
- * processor
- ect.
- chip



Topic : Machine Instruction



processor + Hardware ← Interaction

Language required for interaction.

processor understand what type of language



Topic : Machine Instruction



processors : ISA (Instruction Set Architecture)

8085 : ADD : 01011000 ← M/c
SUB : 01101100 Instruction

Addition

MUL : 1111000

Jump

DIV

⋮

Instruction of
processors
Instruction
Set



Topic : Assembly Language: Low Level Language



Computer understand Language of 0's & 1's

Computer wants Everything in Binary

Communication Gap

Human

English

Mother Tongue

Computer

Binary

Instruction : Binary

Input : Binary

Output : Binary

Error : Binary



Topic : Assembly Language: Low Level Language



first thing to fill communication gap between Computer

is Assembly

Assembly given Machine Instruction in Binary
form a Name.

e.g. (Hypothetical)

(Name) ADD - 01011000 (Addition)
(Name) Sub - 01101100 (Subtraction)

⋮



Topic : Human Language



Assembly Language programming : directly processor Instruction

are used

$$a = b + c$$

Assembly Code

4 to 5 Instruction

- 1. take value of b
- 2. take value of c
- 3. Add them
- 4. put the value in a



Topic : High level Language



Writing Assembly code results in Large No. of Instruction that

Increases Size of Assembly code.

High Level Language : Human understandable form

Human Language Syntax

C- Language * High Level Language (middle Level)



Topic : Human Language



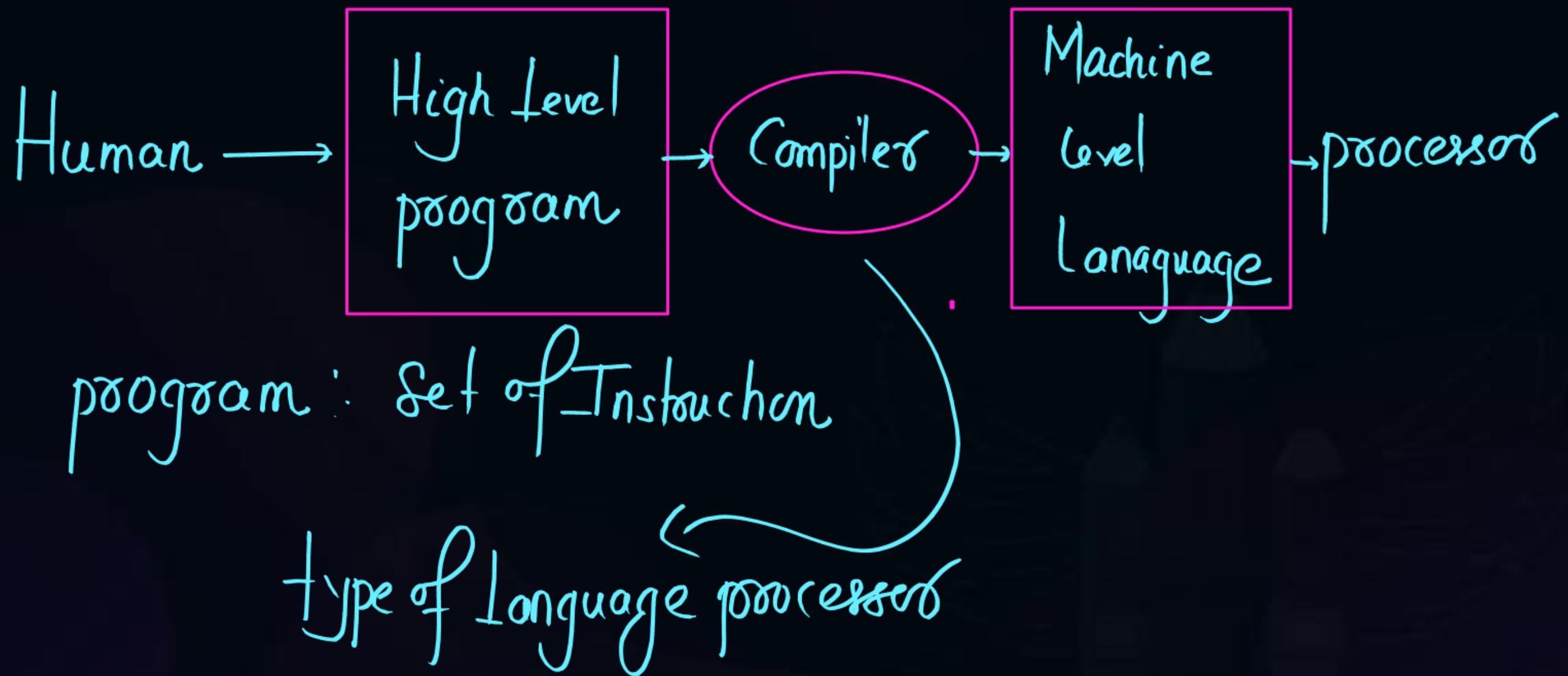
High level languages are programming languages which are used for writing programs or software which could be understood by the humans and computer.

High level languages are easier to understand for humans because it uses lot of symbols letters phrases to represent logic and instructions in a program. It contains high level of abstraction compared to low level languages.

Human understandable form



Topic : Translation of one language to another





Topic : Translation of one language to another



Language
processors

include <stdio.h>

define Max 100

Exe

stdio.h

Linker Combine
files & create
Single exe file

preprocessor

↓ expanded

file

Compiler

↓ Object file

Assembler

↓

Linker

↓ Loader

* Inclusion of header file (Inclusion of file from outside)
* Macro Expansion (with C syntax)

High Level Language to Assembly Language

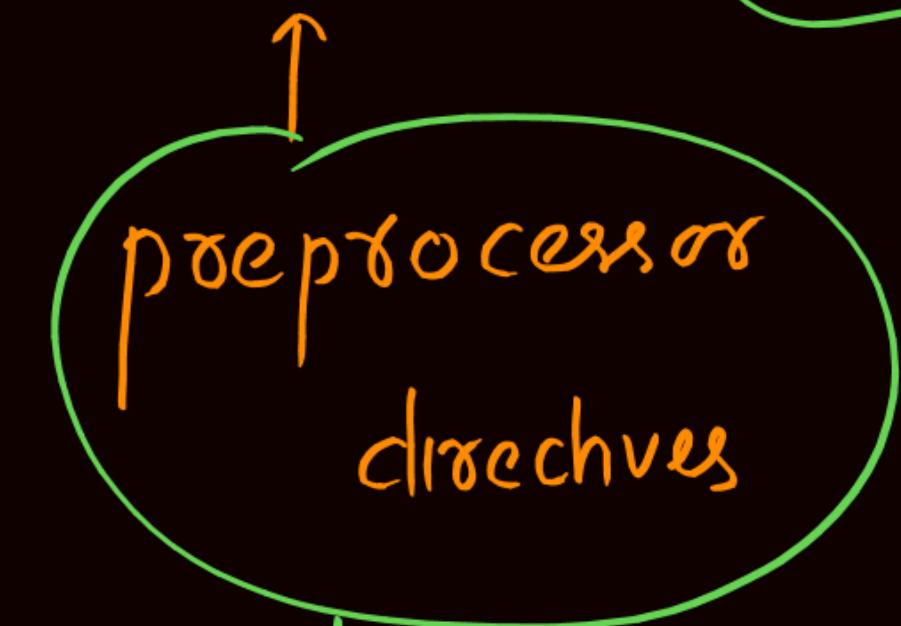
Assembly program and converts into

Exe file Machine Instruction (in Binary form)

M/C Instruction (Binary form)

Executable file

define Max 100 ← Macro



It instructs the preprocessor to replace Max written in program to 100.

Max = max + 1;

100 = 100 + 1

or max > 99
 100 > 90



Topic : Translation of one language to another



Executable file : Can directly Run by processor &
Execute the instruction in binary form one after another.



Topic : C is middle Level language



C is considered a middle-level language because it has features of both low-level and high-level languages. For example, C supports pointer arithmetic, which is low-level, but it is also machine independent, which is high-level. C also gives programmers access to direct manipulation with the computer hardware, which higher-level languages do not allow.



Topic : C Developed By

1972 Dennis Ritchie





Topic : What is a Program?



program :- Set of Instructions to perform some task.

1. $\text{Ins}_1;$ - By default Sequential flow of execution

2. $\text{Ins}_2;$

3 $\text{Ins}_3;$

After completing one Instruction Second instruction in Sequence will be executed.



Topic : What is a Program?



A program is a piece of code or set of instructions that tells a computer how to perform a task.



Topic : Application of C



- Application program :- Salary processing, Database
- System program :- Network drivers
 - Network application protocol
 - Assemblies



Topic : C program Structure



1. preprocessor Commands (# include)
2. function (Main function)
3. variable
4. Expression or Statement
5. Comments



Topic : First C program



```
file include           #include <stdio.h>      preprocessor Command  
standard input output  
headers file          int main() {  
function              printf("Hello world");  
()                   // print Hello world  
}                   Semicolon  
                      comments  
                      Input output statement  
                      function Terminate  
                      Statement
```

Summary

Q: * Communication between Human & Computer

Name/Abhishek Sharma * Assembly Language

* High level Language

* Language processor

* Structure of program

THANK - YOU