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INTRODUCTION

By: Vishvadeep Gothi

VISHVADEEP GOTHI SIR

AIR- 19, 119, 440, 682 in GATE

ME from IISc Bangalore
Mtech BITS Pilani in Data Science

14+ Years of Teaching Experience,
10+ Years in GATE/IES

Subjects Taken:
Computer Organization & Architecture, data structure, operating system, C-Programming, Data science, Machine Learning, Python, coding interview problems,

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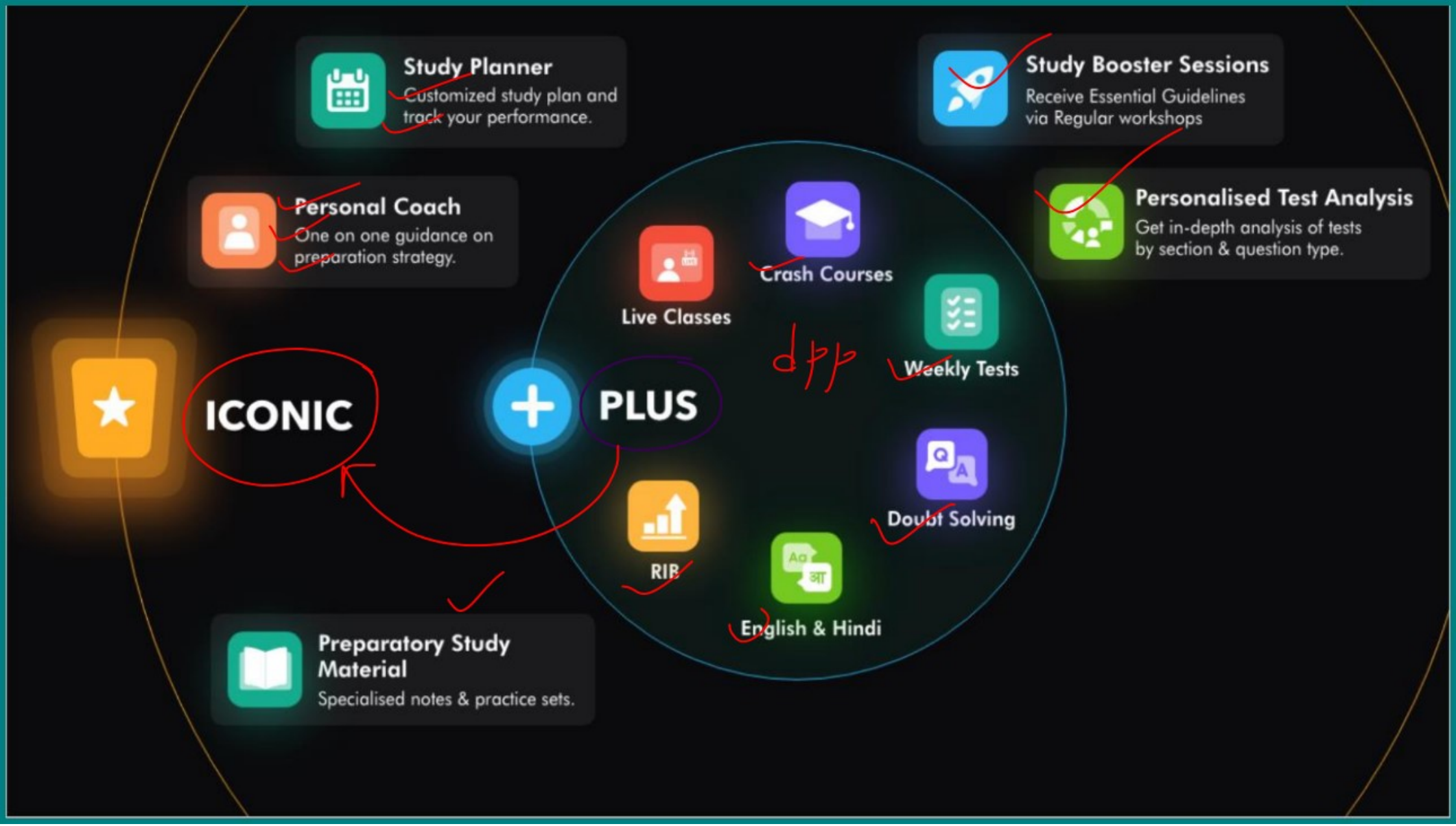
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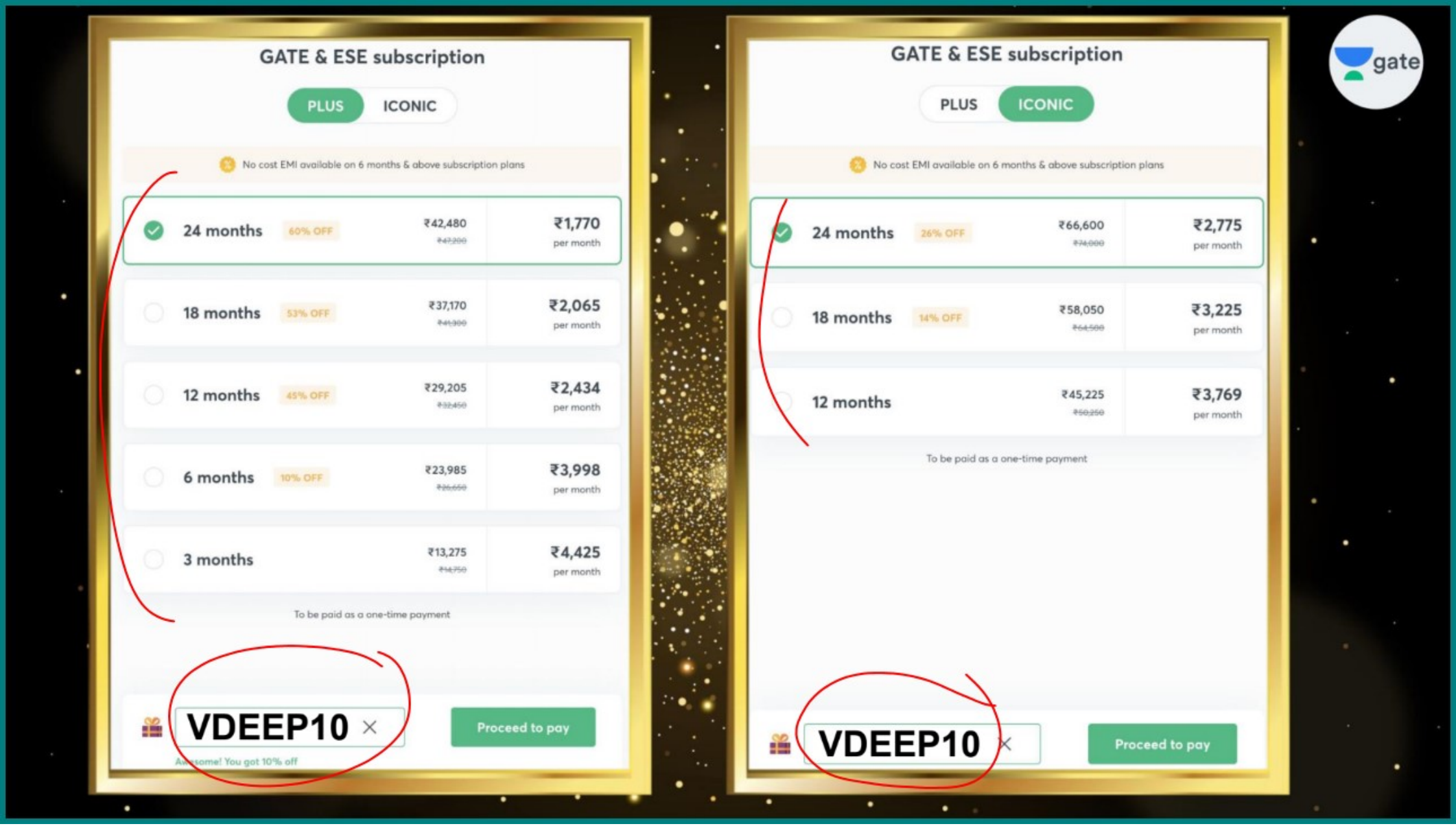
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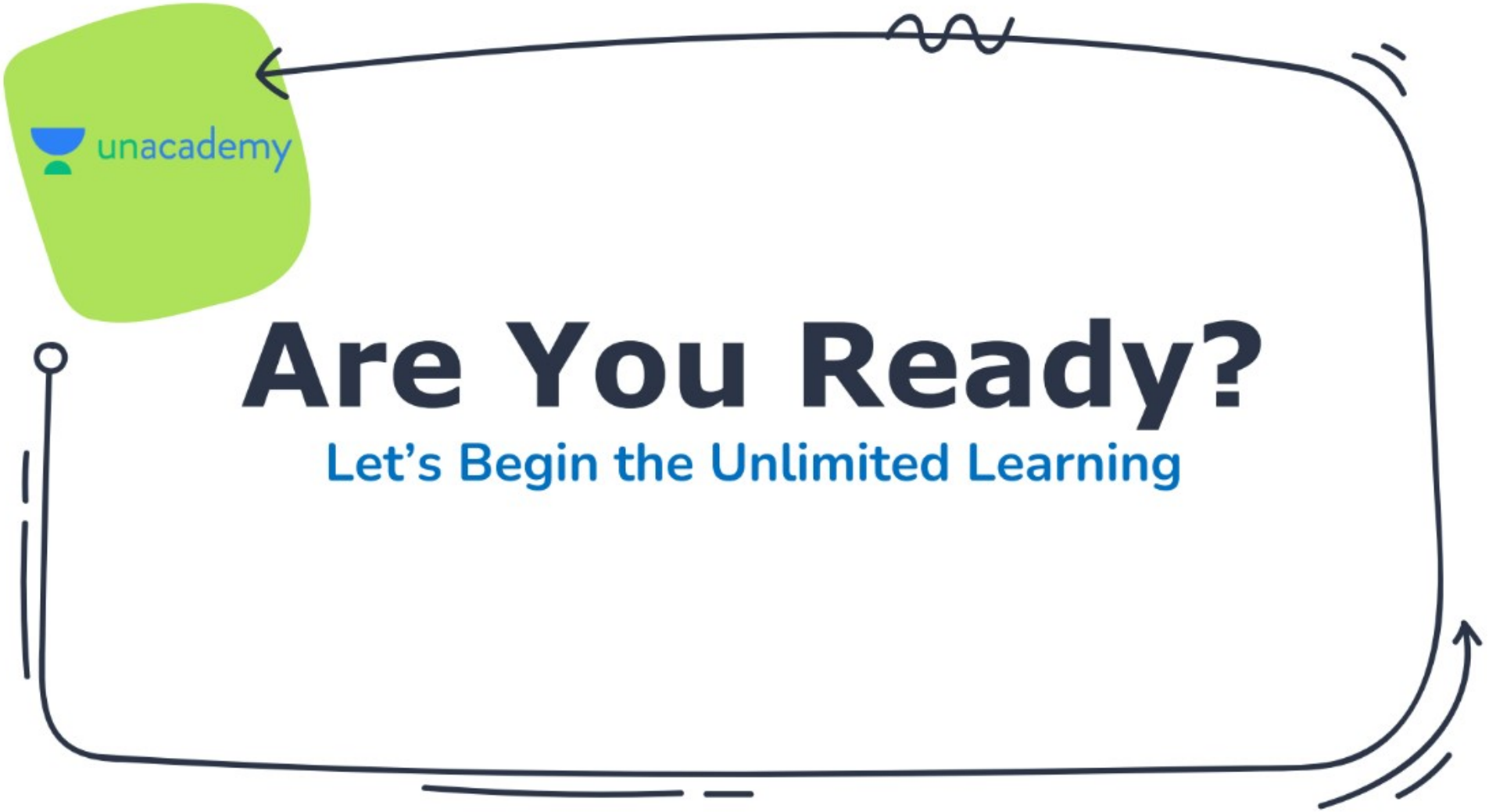
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Course Structure

C. A.

1. Introduction
2. Floating Point Representation
3. Basics of Computer System & Microoperations
4. Instruction & Addressing Modes
5. CPU, Data-path & Control Unit

C. O.

6. IO Organization
7. Memory & Cache
8. Pipelining

Books

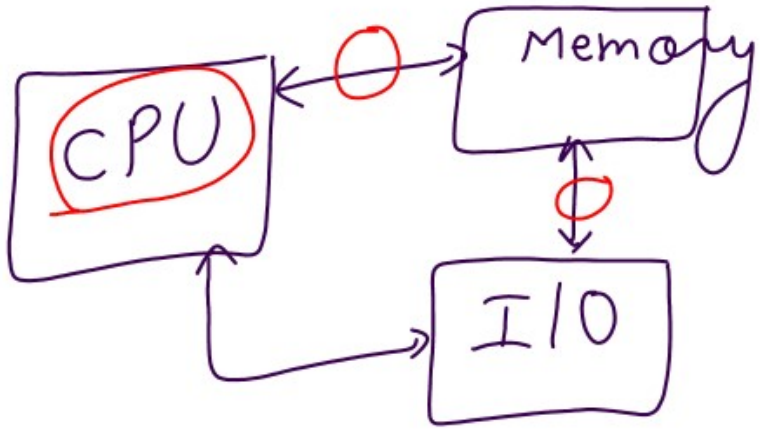
Title	Author	Topics to Refer
Computer System Architecture	Morris Mano	Basics
Computer Organization	Hamacher	All Syllabus Specially Pipeline
Computer Architecture & Organization	JP Hayes	Instruction, CPU
Computer Organization & Design	Paul Choudhury	Memory, IO

Architecture vs Organization

Architecture vs Organization

Architecture: → CPU design, instructions, add. mode, data format

Conceptual design & fundamental operational structure



Architecture vs Organization

Organization: → implementation of arch.

Deals with physical devices and their interconnections with a perspective of improving the performance

Architecture vs Organization

Computer Architecture	Computer Organization
• CPU Design	• I/O Organization
• Instructions	• Memory Organization
• Addressing modes	• Performance
• Data format	

Question

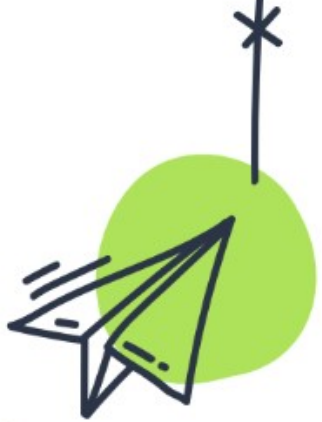
Which of the following is included in the architecture of computer?

1. Addressing Modes, Design of CPU
2. Instruction Set, Data Format
3. Secondary Memory, Operating System

(A) 1 and 2
(B) 2 and 3
(C) 1 and 3
(D) 1, 2 and 3

Data Format

Binary representation of data values



Data

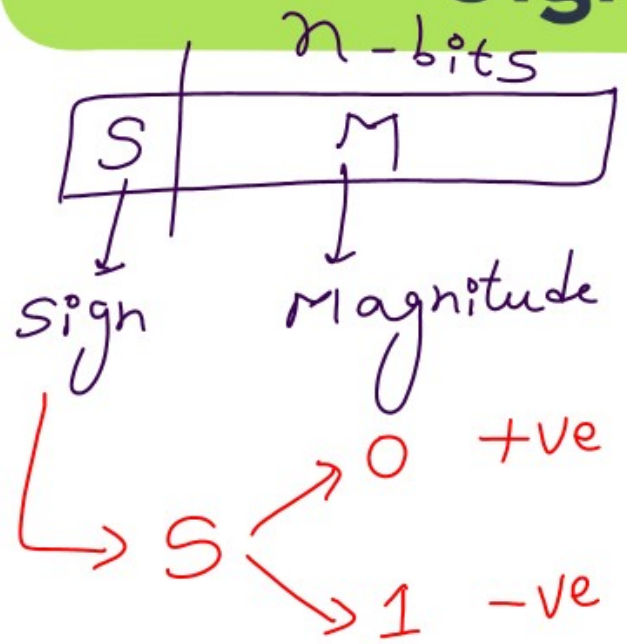
- numbers
  - fixed point
    - unsigned
      - 5 ⇒ 101
      - 12 ⇒ 1100
    - Signed
  - floating point
- characters
  - ASCII
    Americal standard code for information Interchange
  - EBCDIC

Signed Numbers

arithmetic numbers

1. Sign Magnitude
2. 1's Complement
3. 2's Complement

Sign Magnitude



$+5 = (0101)_2$

$-5 = (1101)_2$

+0 = 0000

-0 = 1000

1's Complement

$+5 = (0101)$

$-5 = (1010)_2$

$+0 \Rightarrow (0000)$

$-0 \Rightarrow 1111$

$(11001) \Rightarrow -6$

⇓

1's comp

⇓

00110

2's Complement

→ 1's comp. + 1

$+5 = (0101)_2$

⇓

2's comp.

⇓

1010
+1
$(1011)_2$ ← −5

$(11010)_2$ → −6

⇓

2's comp.

⇓

00101
+1
00110 ⇒ +6

Stored Program Architecture

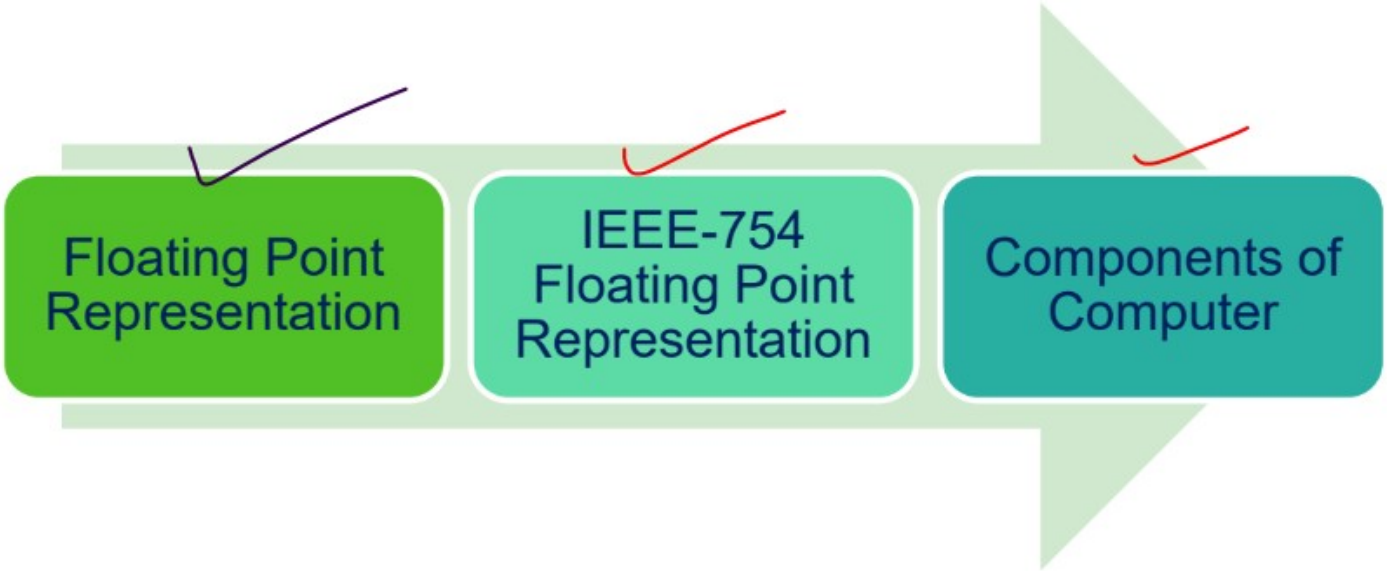
The prog. which processor executes should be stored in a memory.

→ RAM

- → Von-neumann's
- → Harvard arch.

Stored Program Architecture

Next Class


Floating Point Representation
IEEE-754 Floating Point Representation
Components of Computer

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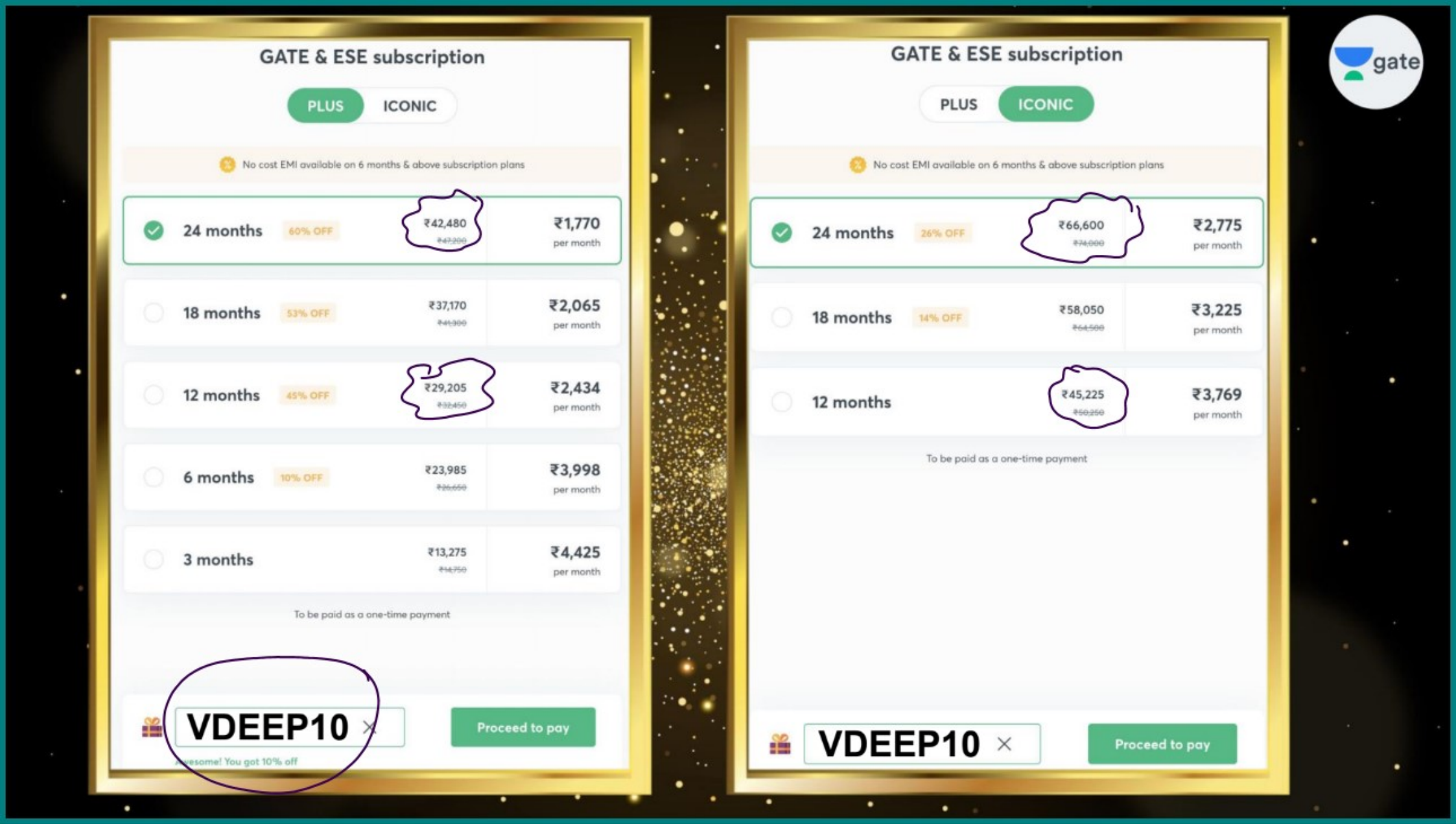
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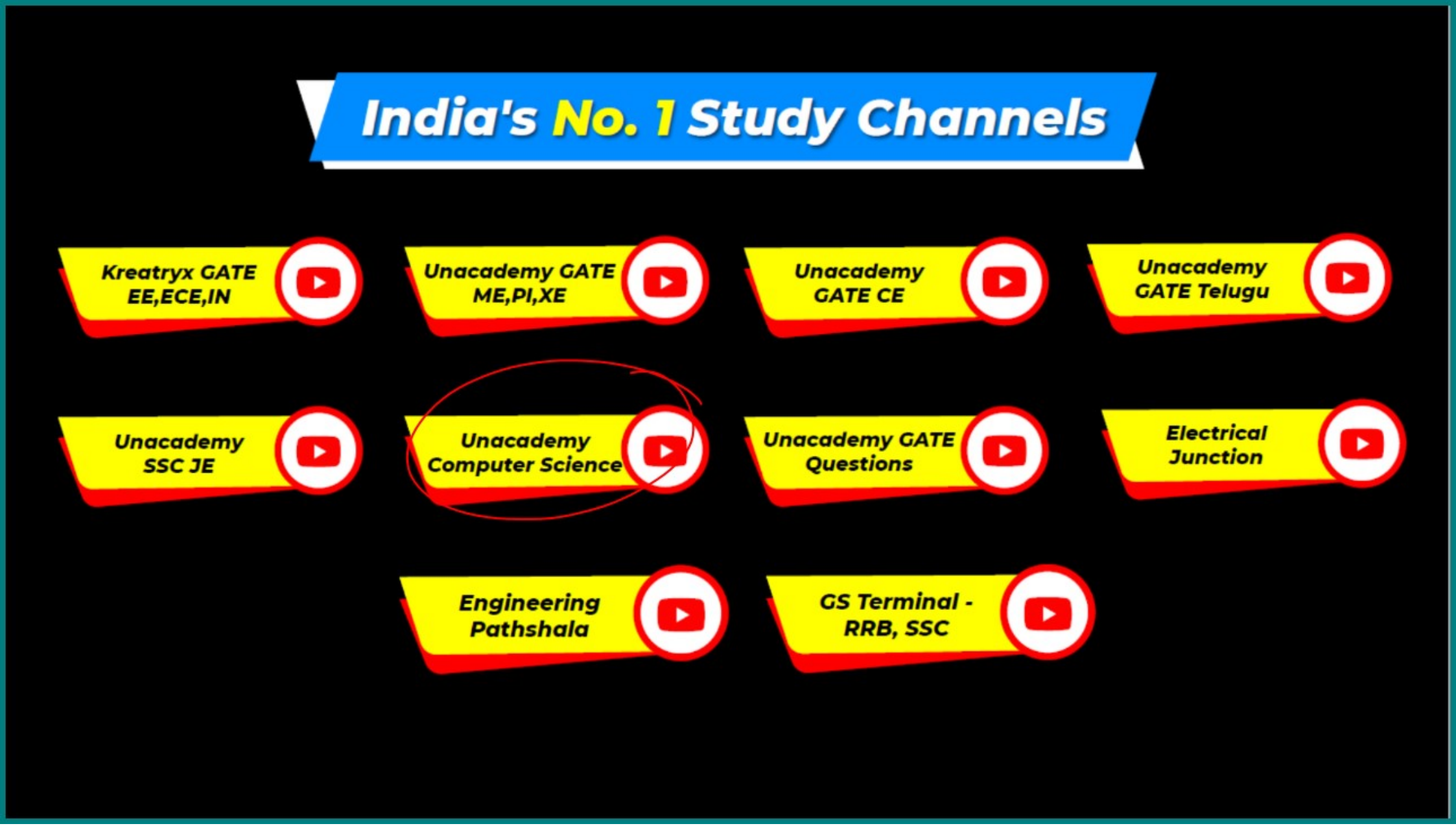
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