

Operating System: Multilevel Paging

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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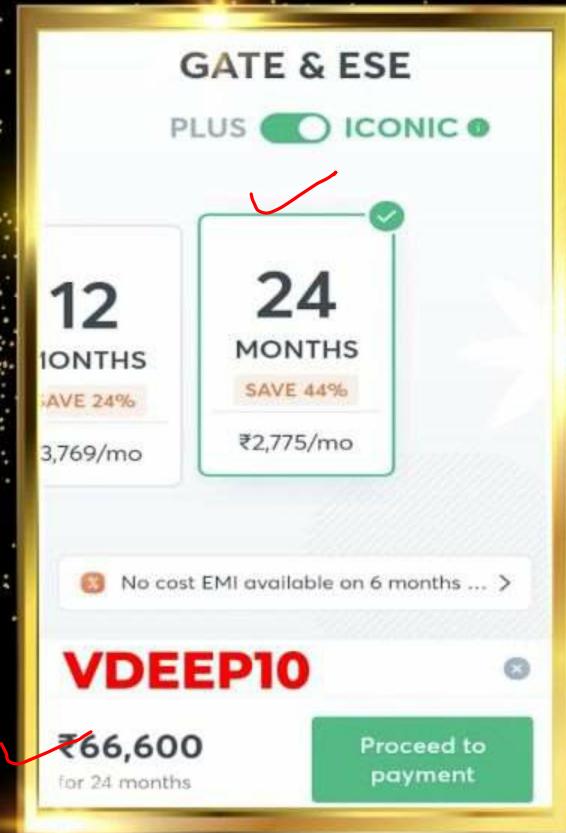
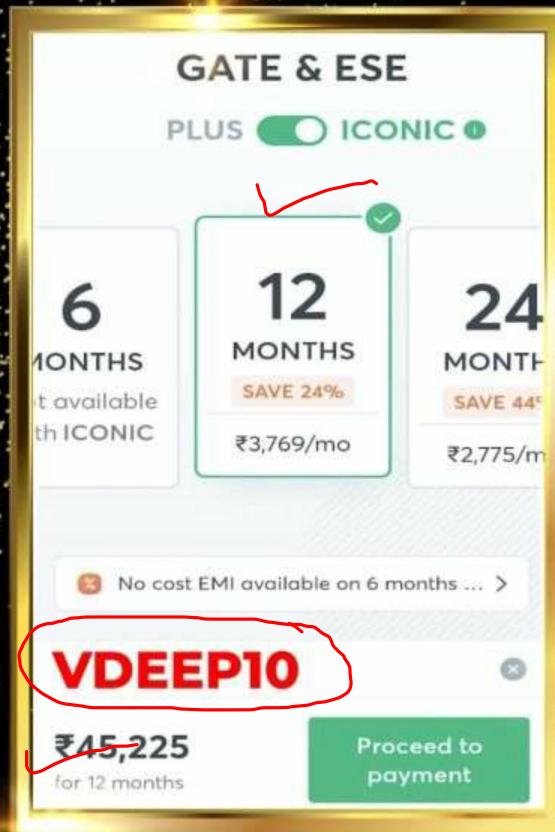
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JULY
2021**

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Assume

$$\text{no. of pages} = \frac{16 \text{ MB}}{1 \text{ KB}} = 16K$$

Process Size = 16MB

Page size = 1KB

Page table entry size = 4Bytes

Page Table Size = ? no. of pages * entry size

$$16K * 4B$$

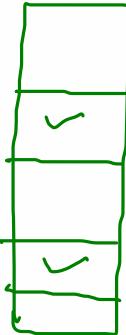
$$= 64KB$$

→ P.T. size > Page size → P.T. should be stored on multiple pages.

Now What?

Can you keep entire page table in single page?

If not then how to access the specific entry?



Let's Take a Simple Example

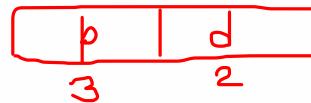
Process Size = 32B

Page size = 4B

Page table entry size = 1B

$$\text{no. of pages} = \frac{32B}{4B} = 8$$

L.A. = 5-bits

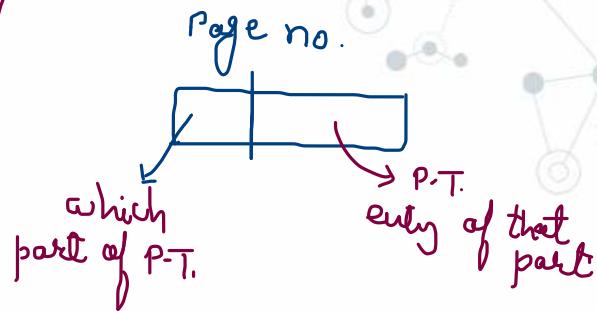
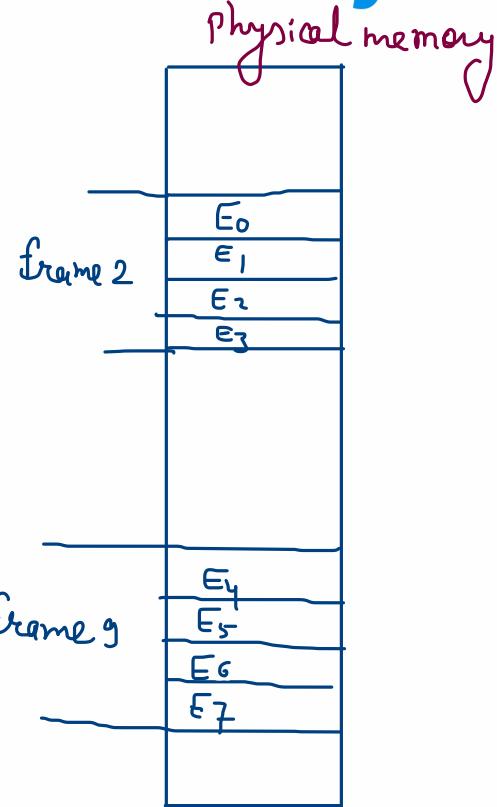
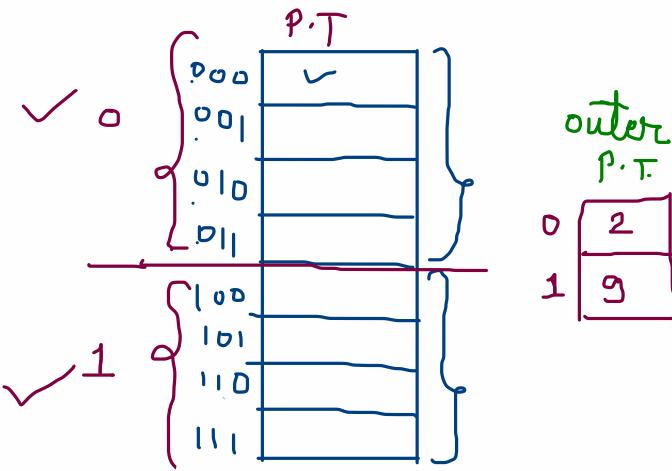


$$\begin{aligned}\text{Page Table Size} &= ? = 8 * 1B \\ &= 8B\end{aligned}$$

$$\begin{aligned}\text{no. of pages required for P.T.} &= \frac{8B}{4B} \\ &= 2 \text{ pages}\end{aligned}$$

Page Table in Memory

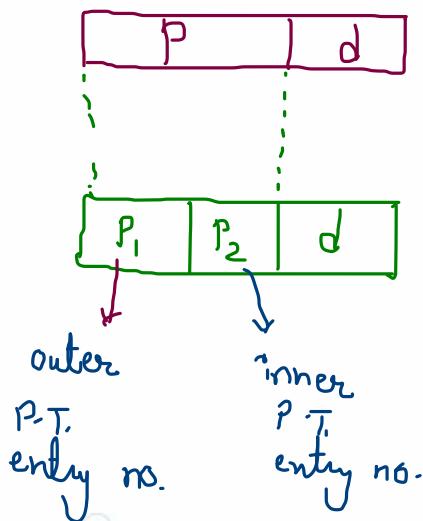
no. of P.T. entries in one page = $\frac{4B}{1B} = 4$



Multilevel Paging

↳ when entire P.T. can not be stored on single frame.

L.A.



Multilevel Paging

Ans) No. of pages = 2^{15}

Page size = $2KB$

P.T. entry = $4B$

P.T. size = $2^{15} * 4B$

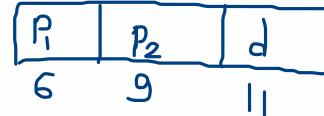
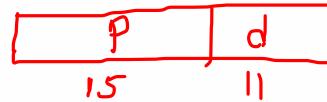
$$= 2^7 B$$

$$= 128 KB$$

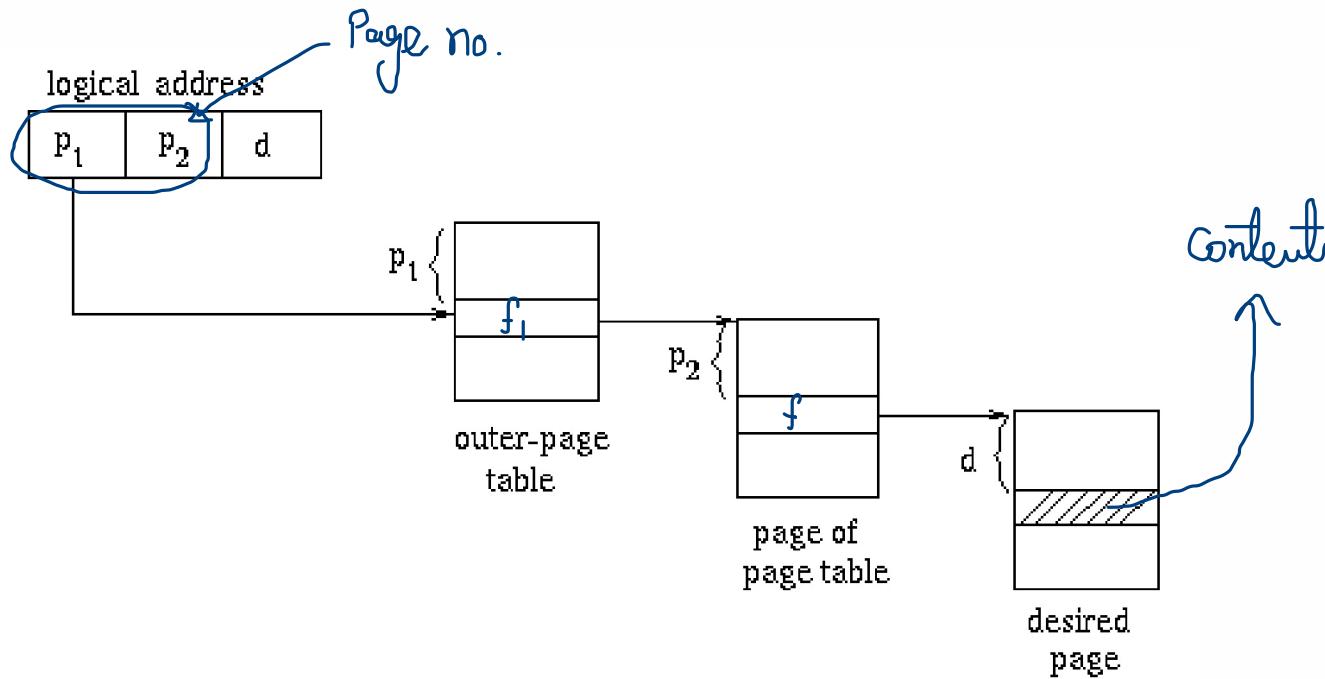
no. of P.T. entries in one page = $\frac{2KB}{4B}$
= 2^9

no. of pages for P.T. = $\frac{128KB}{2KB} = 64$

L.A.



Multilevel Paging



Multilevel Paging

Ques)

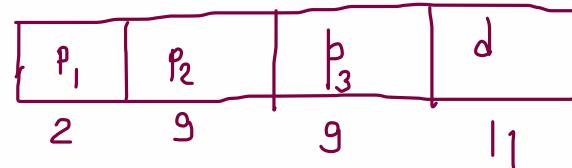
$$\text{No. of pages} = 2^{20}$$

$$\text{Page size} = 2\text{KB}$$

$$\text{entry size} = 4\text{B}$$

$$\begin{aligned}\text{no. of entries in one page.} &= \frac{2\text{KB}}{4\text{B}} \\ &= 2^9\end{aligned}$$

L.A.



Next Class

Multilevel Paging



Segments

Questions on Multilevel Paging



NEW INITIATIVE: FAQS OF GATE ASPIRANTS

SESSIONS ON:

LIST OF REFERENCE BOOKS

LIST OF IMPORTANT TOPICS

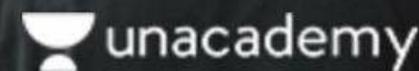
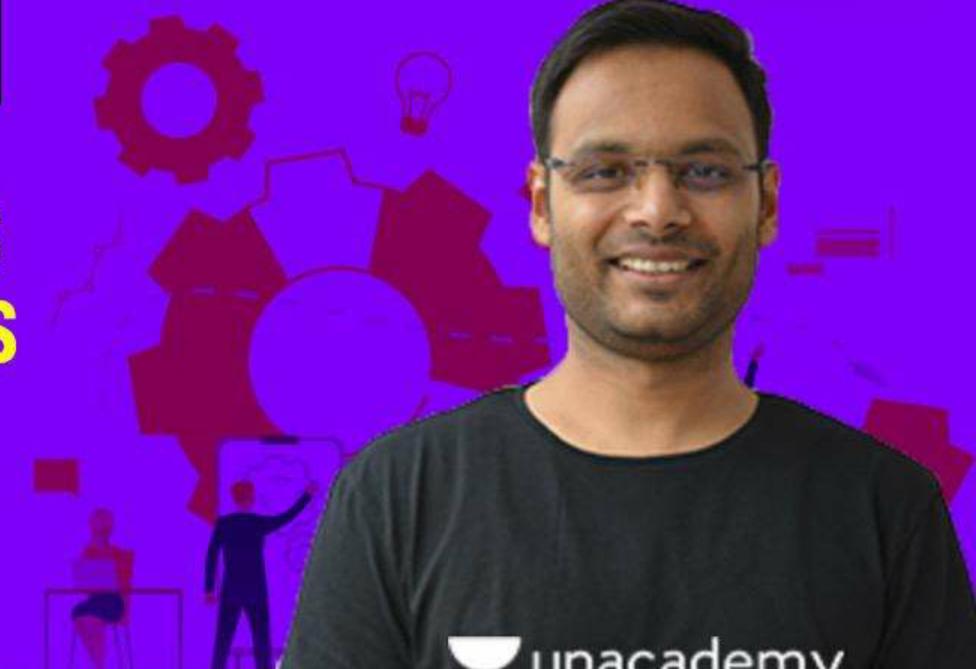
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HOW TO MAKE NOTES

STARTING FROM: 12 JULY

VISHVADEEP GOTHI SIR

TIME:
9:00AM
(MON-FRI)





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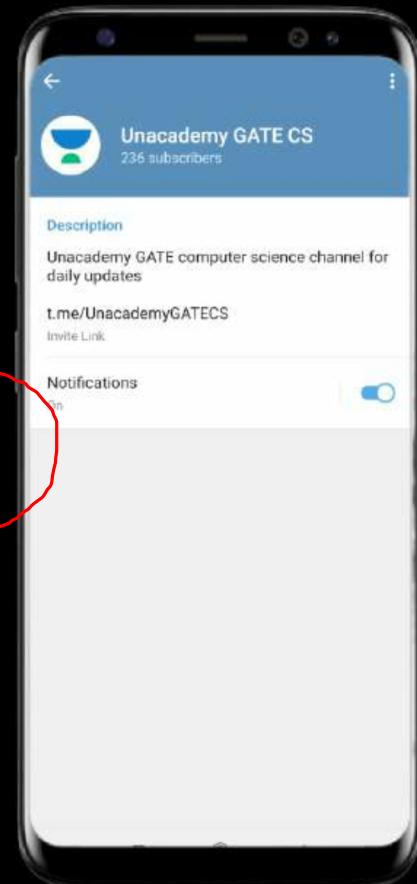
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6
MONTHS

Not available
with ICONIC

12
MONTHS

SAVE 24%
₹3,769/mo

24
MONTHS

SAVE 44%
₹2,775/mo

 No cost EMI available on 6 months ... >

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12
MONTHS

SAVE 24%
₹3,769/mo

24
MONTHS

SAVE 44%
₹2,775/mo

 No cost EMI available on 6 months ... >

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