COMPUTER SCIENCE

Memory Management

Lecture No 02

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Abstract View of memory

Loading vs linking

Q.5 Consider a System Using Variable Partition with no Compaction

Free l1oles

4K; BK; 201<; 2K

11:50 am

Program size	2K; 14K; 3K; 6K; 10K; 20K; 2K
Time for Execution	4; 10; 2; 1; 4; 1; 8

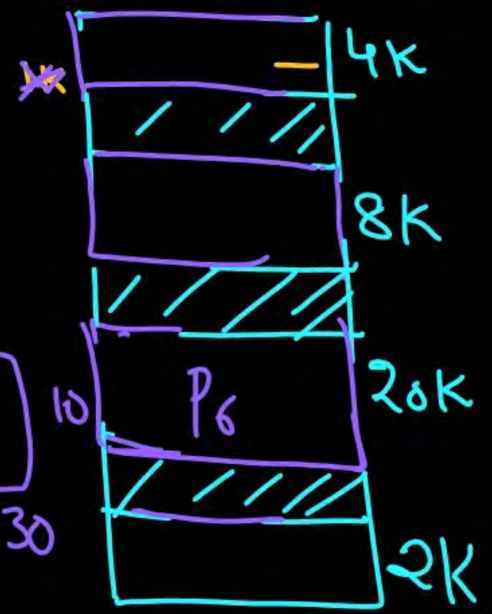
B.Ts

Using Best Fit Allocation Policy and FCFS CPU Scheduling Technique, Find the Time of Loading & Time of Completion of each program. The Burst Times are in Seconds.

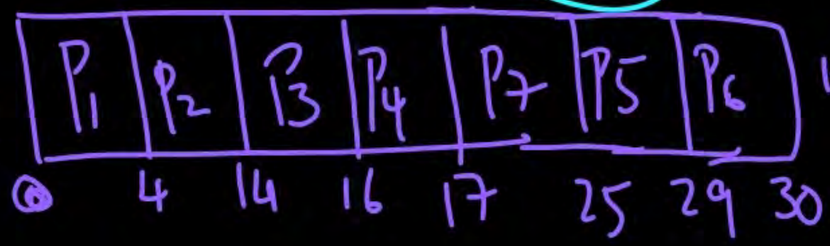
t_0: P_1, P_2, P_3, P_4, P_7

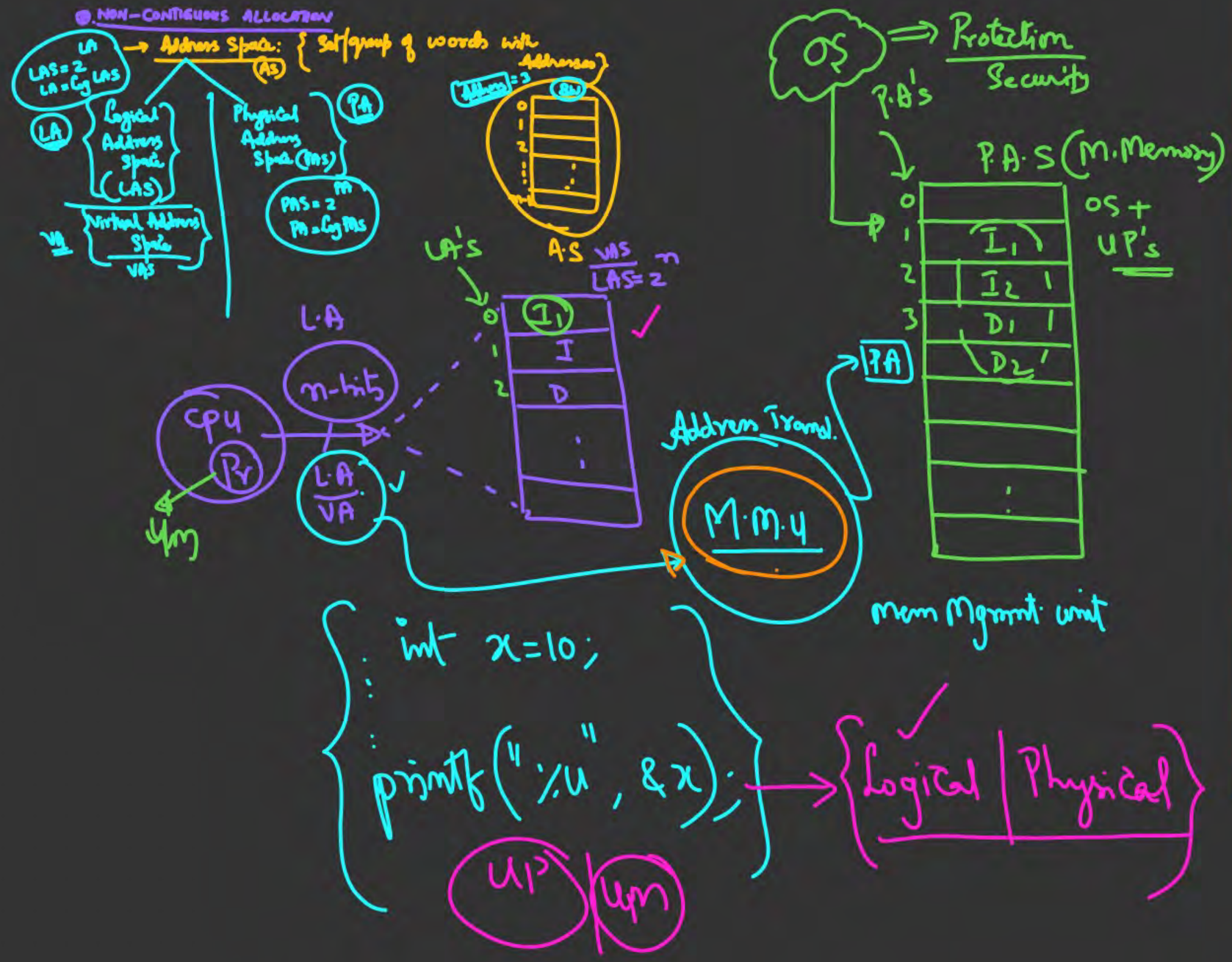
t_{14}: P_5

t_{29}: P_6



CPU





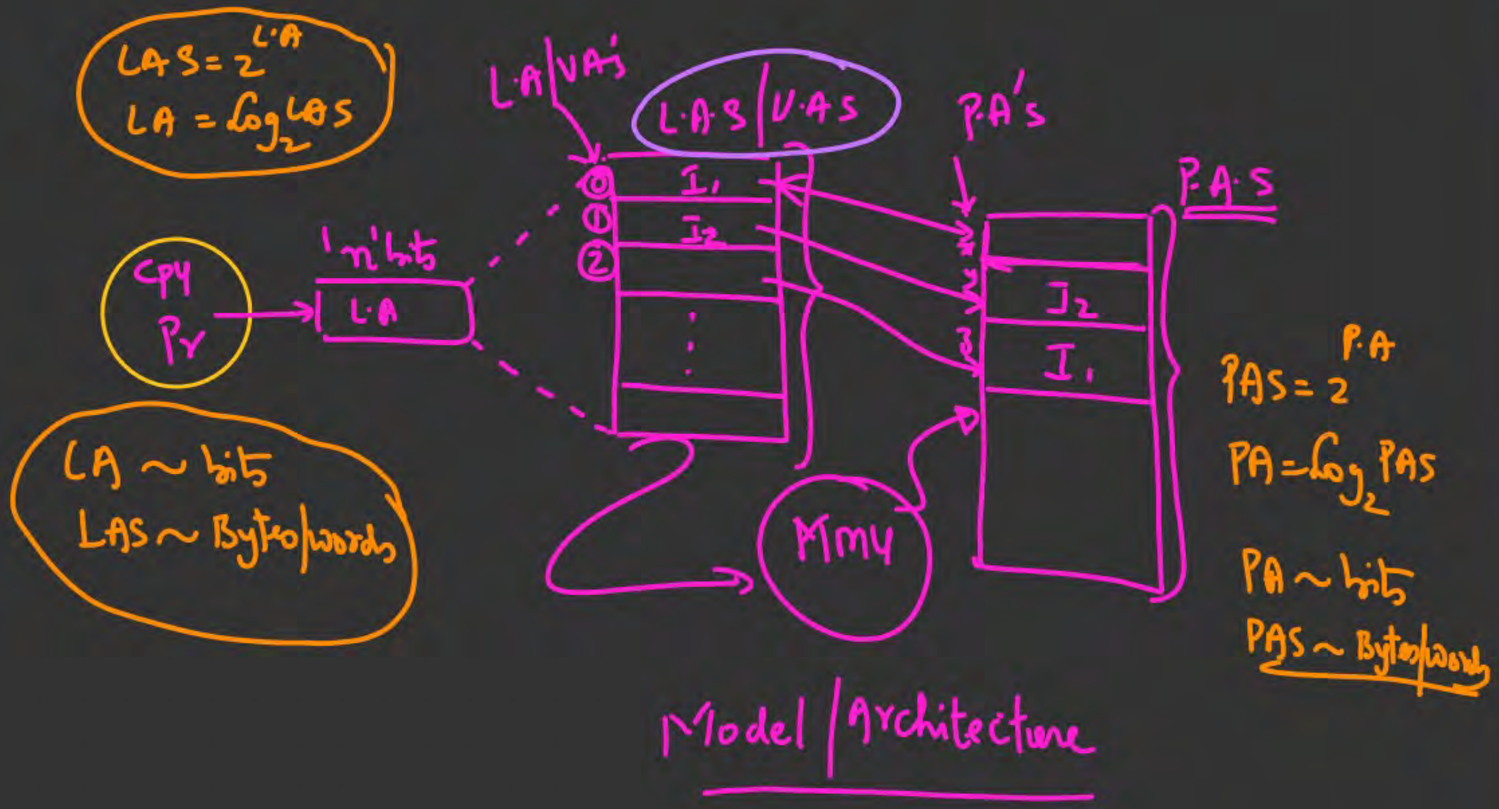
I. for compile Time, Load Time Address Binding Schemes,

(L.A = P.A)

II. for Run Time Address Binding

(L.A ≠ P.A)

(Moder Systems)



Model / Architecture

N.C.G Alloc. Techniques

1. orgnz. of LAS/VAS
2. " " P.A.S
3. " " MMU

I. SIMPLE PAGING:

LAS = 8KB; PAS = 4KB ; Page Size = 1KB ;

LA = 13 bits PA = 12 bits

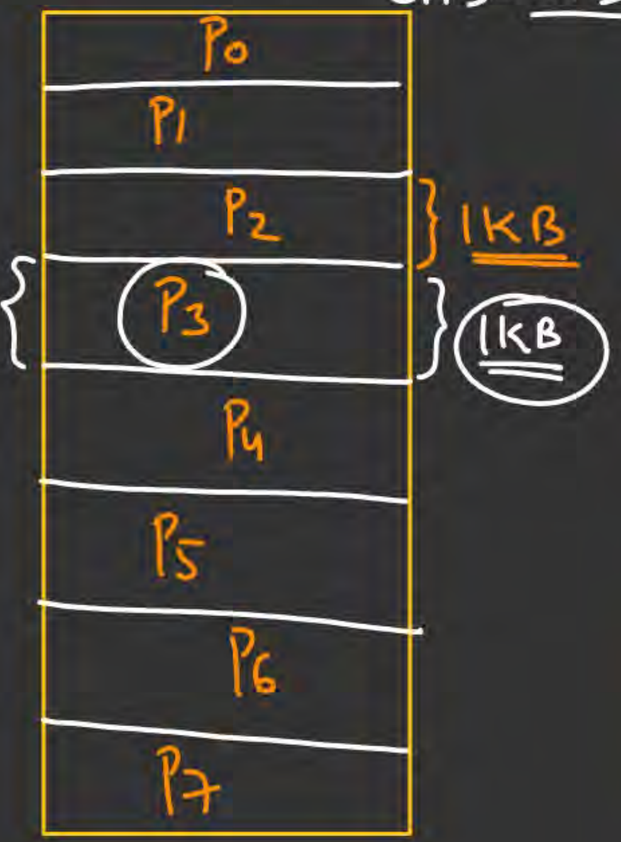
(PS)

a) (Orgn'g of LAS/VAS):

→ LAS is divided into equal size units (chunks) known as Pages;

→ Page Size (P.S) is gen. a Power of 2;

→ **No. of Pages (N) = LAS / PS**



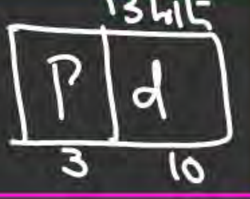
→ **Page No (P) = $\log_2 N$** bits

$N = 2^P$

→ **Page offset (d) = $\log_2 PS$** bits

$PS = 2^d$

→ L.A. / V.A. format:



Q1) LA: 19 bits {1W = 1B}

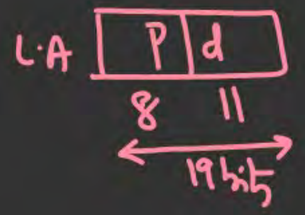
P.S: 2KB ⇒ d = 11

$L.A.S = 2^{19} = 2^9 \times 2^{10} = 512KB$ ✓

$N = \frac{2^{19}}{2^{11}} = 2^8 = 256$

P = 8 bits

d = 11 bits



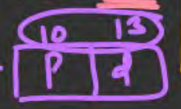
Q2) LAS = 8MB; d = 13 bits → P.S = 8KB

L.A = 23 bits

P = 10 bits

$N = 2^{23}/2^{13} = 2^{10} = 1K$

P.S = 8KB



B = Byte

b = bits

1K = 1024

Q3) System has 8K Pages & Page offset = 13 bits

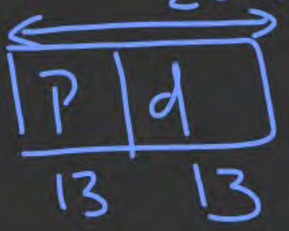
What is LAS = ?

N = 8K

d = 13 bits

→ $P = \log_2 N = \log_2 8K = 13$ bits

LAS = ?



$\therefore LAS = 2^{26}$

$= 64MB$ ✓

8K * 8K

LAS = N * PS

$= 64MB$ ✓

MB

ii) Organization of P.A.S

→ PAS is divided into equal size units known as Frames (Page-frames)

→ Frame Size = Page Size

→ No. of frames (M) = PAS / PS

→ frame NO (f) = $\log_2 M$ bits

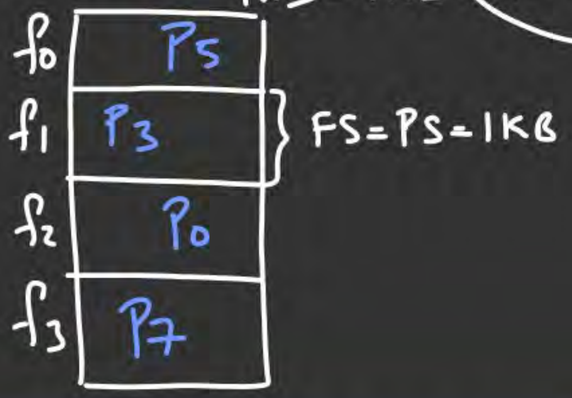
$M = 2^f$

PAS = 4KB; PS = 1KB = FS

PA = 12 bits

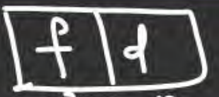
PAS = 4KB

$d = \log_2 PS$



→ frame offset = Page offset = d

→ P.A format:



→ Any Page can be Stored in any frame (as this is Non-CS)

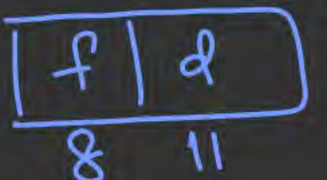
Q1

L.A.S = 2MB; PS = 2KB; d = 11

PAS = 512KB

L.A = 21 bits ✓

P.A = 19 bits ✓



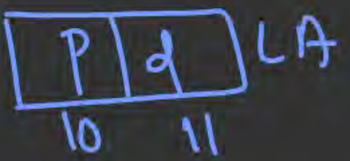
Pages $N = 2^{21}/2^{11} = 2^{10} = 1024 = 1K$ pages

frames $M = 2^{19}/2^{11} = 2^8 = 256$ frames

P = 10 bits

f = 8 bits

d = 11 bits



Q.6

Consider allocation of memory to a new process. Assume that none of the existing holes in the memory will exactly fit the process's memory requirement. Hence, a new hole of smaller size will be created if allocation is made in any of the existing holes. Which one of the following statements is TRUE?

A. The hole created by next fit is never larger than the hole created by best fit

B. The hole created by worst fit is always larger than the hole created by first fit

C. The hole created by first fit is always larger than the hole created by next fit

D. The hole created by best fit is never larger than the hole created by first fit

THANK YOU!